



**SCHOOL OF ENVIRONMENTAL TECHNOLOGY,
FEDERAL UNIVERSITY OF TECHNOLOGY**
MINNA, NIGER STATE, NIGERIA



4th

INTERNATIONAL CONFERENCE (SETIC2022)

BOOK OF PROCEEDINGS

MAIN THEME:

**SUSTAINABLE DEVELOPMENT AND RESILIENCE OF THE
BUILT ENVIRONMENT IN THE ERA OF PANDEMIC**

6th - 8th February, 2023

**VENUE: NITDA Centre,
Federal University of Technology,
Minna, Niger State, Nigeria**

Chief Host

Prof. Faruk Adamu Kuta

*Vice-Chancellor
Federal University of Technology Minna, Nigeria*

Host

Prof: R.E. Olagunju mnia

*Dean, School of Environmental Technology
Federal University of Technology Minna, Nigeria*

**EDITOR IN CHIEF
B.J. Olawuyi**





School of Environmental Technology International Conference (SETIC 2022)

6th – 8th February, 2021

**Federal University of Technology Minna, Niger
State, Nigeria**

BOOK OF PROCEEDINGS

**EDITOR IN CHIEF
B. J. Olawuyi**

ISBN 978-978-54580-8-4



**Proceedings of the 4th School of Environmental Technology International
Conference (SETIC 2022)**

Published by

School of Environmental Technology,
Federal University of Technology Minna.
PMB 65, Minna,
Niger State Nigeria.

© School of Environmental Technology, Federal University of Technology Minna 2021

ISBN 978-978-54580-8-4

Editor-in-chief:	Dr. Olawuyi, Babatunde James	Federal University of Technology Minna. Niger State, Nigeria
Editors:	Dr. Ogunbode, Ezekiel Babatunde	Federal University of Technology Minna. Niger State, Nigeria
	Surv. Adesina, Ekundayo A	Federal University of Technology Minna. Niger State, Nigeria
	Dr. Sule, Abass Iyanda	Federal University of Technology Minna. Niger State, Nigeria
	Dr. Ajayi Oluibukun Gbenga.	Namibia University of Science and Technology, Namibia
	Dr, Akande Olufemi K.	Department of Architecture, Federal University of Technology, Minna
	Mr. Morenikeji, Gbenga	Federal University of Technology Minna. Niger State, Nigeria
	Mr. Akande, Olaide S.	Department of Urban and Regional Planning, Federal University of Technology, Minna
	Mrs. Odine, Linda	Department of Quantity Surveying, Federal University of Technology, Minna
	Prof. James O.B. Rotimi	Massey University New Zealand
	Asst. Prof. Dodo Yakubu Aminu	Architectural Engineering Department, College of Engineering, Najran University, Najran, 66426, Kingdom of Saudi Arabia
	Dr. Renuka Thakore	Founder, Institute for Global Sustainable Futures, Progress through Partnership, UK

No responsibility is assumed by the Publisher for any injury and/or any damage to persons or properties as a matter of products liability, negligence or otherwise, or from any use or operation of any method, product, instruction, or idea contained in the material herein.

Copyright © 2021 by School of Environmental Technology, Federal University of Technology Minna, Nigeria. All rights reserved.

This publication is protected by Copyright and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise.



PREFACE

The 4th edition of School of Environmental Technology International Conference (SETIC2022) is organised by School of Environmental Technology, Federal University of Technology Minna, Nigeria. In collaboration with Massey University New Zealand, University of Namibia, Namibia, Department of Architectural Technology, Najran University, Saudi Arabia, Department of Civil Engineering, Stellenbosch University, Stellenbosch, South Africa and the Global Sustainable Futures, UK.

The main theme for this year conference is “**Sustainable Development and Resilience of the Built Environment in the Era of Pandemic**” and is of interest to everyone going by the fact that housing is a necessity following only after food and clothing while living in crowded places and poor sanitation is a concern and possible cause of spread of diseases and occurrence of epidemic/pandemic. This promotes and encourage innovative and novelty for emerging property management strategies in a pandemic era; modern geospatial tools for epidemiology; architecture, resilience and healthy buildings in pandemic era; planning for sustainable resilient neighbourhoods and cities in COVID-19 era; sustainable and resilient cities; sustainable cost management of built environment projects in the era of covid-19; wellbeing and resilience of the built environment.

The responses from participants for this conference are overwhelming, well attended, and successful. The operation mode was virtual for all participants with presentations in mode Our participants are from various Universities and other sector across the globe, from countries like United Kingdom, New Zealand, Saudi Arabia, South Africa, Namibia, Ethiopia and Nigeria just to mention a few. Hence, this conference provides a good platform for professionals, academicians and researchers to widen their knowledge and approach on latest advances in research and innovation. Papers presented in this conference cover a wide spectrum of science, engineering and social sciences.

Finally, a note of thanks must go to SETIC 2022 Local Organizing Committee (LOC) for their remarkable dedication in making this conference a success. We hope the event will prove to be an inspiring experience to all committee members and participants.



ACKNOWLEDGEMENTS

The effort put together in achieving the success of SETIC 2022 is predicated on the feat of the previous three edition of School of Environmental Technology International Conference held in 2016, 2018 and 2021, respectively. The support and goodwill from Vice-Chancellor of Federal University of Technology, Dean School of Environmental Technology, Dr. Renuka Thakore, Dr Dodo Y. A., Prof. James O.B. Rotimi and many other highly motivated people are highly appreciated.

It is also my privilege and honour to welcome you all, on behalf of the Local Organizing Committee (LOC) to the 4th edition of the Biennial School of Environmental International Conference (SETIC2022). This Conference which was earlier schedule for April, 2022 is holding now (6th to 8th February, 2023) due to the prolonged ASUU-FGN crisis which made our public Universities in Nigeria to be closed for over Eight Months. Our experience in the 3rd edition held in 2021 after the COVID-19 Pandemic has thought us on new ways of doing things with the Virtual Conferencing offering us a wider coverage, it is our hope that SETIC2022 will be an improvement on the Participants experience of opportunity available for global networking and interaction at Conferences via the Virtual mode of presentation.

The conference provides an international forum for researchers and professionals in the built environment and allied professions to address fundamental problems, challenges and prospects of **Sustainable Development and Resilience of the Built Environment in the Era of Pandemic**. The conference is a platform where recognized best practices, theories and concepts are shared and discussed amongst academics, practitioners and researchers. This 2022 edition of SETIC has listed in the program a Round Table Talk on on Housing Affordability Beyond COVID-19 with selected Speakers from across the globe available to do justice on the topic of discussion. Distinguished Conference participants, permit me to warmly welcome our Keynote:

- Dr. Ibrahim Idris, *Director Public health, State Ministry of Health, Niger State, Nigeria;*
- Dr. A.A. Bilau, *Lecturer and expert in Disaster Risk Management, Department of Building, Federal University of Technology, Minna, Nigeria and;*
- Dr. Yakubu Aminu Dodo, *Ass. Prof. Architecture Engineering Department, Faculty of Engineering, Najran University, Najran, Saudi Arabia;*

And the lead Discussants for the Round Table Talk:

- Prof. James O.B. Rotimi, *Professor of Construction Economics & Management, School of Built Environment, College of Sciences, Massey University of New Zealand;*
- Prof. O.A. Kemiki, *Professor of Estate Management and Valuation, Federal University of Technology, Minna, Nigeria;*
- Dr. Renuka Thakore, *Founder, Institute for Global Sustainable Futures, Progress through Partnership, UK;*
- Dr. Guillermo Delgado, *Senior Lecturer, Architecture and Acting Director, Institute of Land, Livelihoods and Housing (ILIH), Namibia University of Science and Technology, Namibia;*
- Prof. Adewumi John Babafemi, *Associate Professor and Head of Construction Materials and Unit; Stellenbosch University, Stellenbosch, South Africa;*
- Dr. Yakubu Aminu Dodo, *Ass. Prof. Architecture Engineering Department, Faculty of Engineering, Najran University, Najran, Saudi Arabia.*



for accepting to share from their knowledge, wealth of experience and be available to interact with participants on varied issues on “**Sustainable Development and Resilience of the Built Environment in the Era of Pandemic**”.

As reflected on the Conference program, the Conference activities will be Virtual for all presenters to run in four parallel sessions on the Zoon platform. With a total of Seventy (70) articles captured in the Conference Proceedings covering the six subthemes of the Conference, I have no doubt that we are all in for an impactful experience at SETIC2022 as we brainstorm, exchange ideas, share knowledge and participate in evolving more approach to sustainable housing and land management drives.

I implore us all to enjoy every moment of the deliberations and ensure we maximize the great opportunity offered by the Conference to network for better research and career development as we also make new friends.

I also on behalf of myself and the LOC express our appreciation to the Dean, School of Environmental Technology and the entire Staff of the School for giving us the opportunity to steer the ship for SETIC2022. To the Reviewers and various Committees that served with us, I say thank you for helping us through despite the pressure of work.

Thanks, and God bless you all.

Olawuyi, B.J. (PhD)
Chairman, LOC
SETIC2022



COPYRIGHT STATEMENT

© Copyright. School of Environment International Conference (SETIC2022). The copyright for papers published in the SETIC Conference Proceedings belongs to authors of the papers.

Authors are allowed to reproduce and distribute the exact format of papers published in the SETIC2022 Conference Proceedings for personal and educational purposes without written permission but with a citation to this source. No unauthorized reproduction or distribution, in whole or in part, of work published in the SETIC2022 Conference Proceedings by persons other than authors is allowed without the written permission of authors or organizers of the SETIC2022 Conference.

We have taken all necessary cautions to comply with copyright obligations. We make no warranties or representations that material contained in the papers written by authors do not infringe the intellectual property rights of any person anywhere in the world. We do not encourage, support or permit infringement of copyrights / intellectual property rights by authors. Should you consider any violation of your copyrights please do not hesitate to contact the conference secretariat at setic@futminna.edu.ng

SETIC2022 accepts no liability for copyright infringements or inappropriate use of material in any paper published. All authors developed their papers in line with the guiding principles of academic freedom and are responsible for good academic practice when conducting and reporting scientific research.

Correspondence relating to copyrights and requests for permission to use material from the SETIC2022 Conference Proceedings should be made to: Secretariat of SETIC Conference email: setic@futminna.edu.ng



DECLARATION

PEER REVIEW AND SCIENTIFIC PUBLISHING POLICY STATEMENT

6th February, 2023

TO WHOM IT MAY CONCERN

I wish to state that all the papers published in SETIC2022 Conference Proceedings have passed through the peer review process which involved an initial review of abstracts, review of full papers by minimum of two referees, forwarding of reviewers’ comments to authors, submission of revised papers by authors and subsequent evaluation of submitted papers by the Scientific Committee to determine content quality.

It is the policy of the School of Environmental Technology International Conference (SETIC) that for papers to be accepted for inclusion in the conference proceedings it must have undergone the review process and passed the academic integrity test. All papers are only published based on the recommendation of the Reviewers and the Scientific Committee of SETIC

Babatunde James OLAWUYI
Chairman SETIC2022
Federal University of Technology, Minna, Nigeria

Papers in the SETIC2022 Conference Proceedings are published on www.futminna.edu.ng,
AND ALSO SELECTED PAPERS WILL BE PUBLISHED IN REPUTABLE JOURNALS





ORGANISING COMMITTEE

CHIEF HOST

Prof. Faruq Adamu Kuta
Vice-Chancellor,
Federal University of Technology Minna, Nigeria

HOST

Prof. Olagunju Remi Ebenezer
Dean
School of Environmental Technology,
Federal University of Technology Minna, Nigeria

CONFERENCE CHAIRS

Conference Chair	Parallel Sessions
Prof. Nuhu, M.B.	Emerging Property Management Strategies in a Pandemic Era
Prof. Junaid, A	Planning for Sustainable Resilient Neighbourhoods and Cities in Pandemic Era
Dr. Opaluwa, Y.D.	Modern Geospatial Tools for Epidemiology
Dr. Anifowose, M. O.	Sustainable Cost Management of the Built Environment Projects in the Era of Pandemic
Dr. Olatomiwa, Lanre	Wellbeing and Resilience of the Built Environment
Prof. Ayuba, P.	Architecture, Resilience and Healthy Buildings in Pandemic Era

CONFERENCE ADVISORY COMMITTEE

Dr. Isah, A. D	HOD, Department of Architecture
Dr., Apeh, J. A.	HOD, Department of Building
Dr. Popoola, N. I	HOD, Department of Estate Management and Valuation
Dr. Mohammed Y.	HOD, Department of Quantity Surveying
Prof. Musa A.	HOD, Department of Surveying and Geoinformatics
Dr. Bala Banki	HOD, Department of Urban and Regional planning



LOCAL ORGANIZING COMMITTEE

Dr. Olawuyi B. J.	Chairman	Department of Building, Federal University of Technology Minna, Nigeria
Surv. Adesina E. A.	Secretary	Department of Surveying and Geoinformatics, Federal University of Technology Minna, Nigeria
Dr. Muhammad I.B.	Member	Deputy Dean, School of Environmental Technology, Federal University of Technology, Minna
Dr. Ogunbode E. B.	Member	Department of Building, Federal University of Technology Minna, Nigeria
Dr. Sule A. I.	Member	Department of Estate Management and Valuation, Federal University of Technology Minna, Nigeria
Dr. Ajayi O. G.	Member	Namibia University of Science and Technology, Namibia
Dr. Morenikeji G.	Member	Department of Estate Management and Valuation, Federal University of Technology Minna, Nigeria
Dr. Odine L.	Member	Department of Quantity Surveying, Federal University of Technology Minna, Nigeria
Mr. Akande O. S	Member	Urban and Regional planning, Federal University of Technology Minna, Nigeria
Dr. Akande O. K	Member	Department of Architecture, Federal University of Technology Minna, Nigeria
Dr. Saidu I.	Member	Department of Quantity Surveying, Federal University of Technology Minna, Nigeria

SCIENTIFIC COMMITTEE

Prof. Jimoh R.A..	Chairman	Department of Building, Federal University of Technology Minna, Nigeria
Dr Opaluwa Y.D.	Member	Department of Surveying and Geoinformatics, Federal University of Technology Minna, Nigeria
Dr. Musa D. Haruna	Member	Urban and Regional planning, Federal University of Technology Minna, Nigeria
Dr. Udoekanem N. B.	Member	Department of Estate Management and Valuation, Federal University of Technology Minna, Nigeria
Dr. Lawal L.A.	Member	Department of Architecture, Federal University of Technology
Miss Nmadu H.	Member	Department of Building, Federal University of Technology Minna, Nigeria
Miss. Hassan K.M.	Member	Department of Quantity Surveying, Federal University of Technology Minna, Nigeria
Mr. Kuma S. S.	Secretary	Department of Estate Management and Valuation, Federal University of Technology Minna, Nigeria

Acknowledgement To Keynote Speakers and Lead Discussants

SETIC 2022 organisers wishes to thank our keynote speakers, and Guest speakers for accepting to create time to share from their rich wealth of knowledge and interact with delegates and participants on varied issues being examined at this year’s conference. A brief profile of each keynote speaker is provided here, this would allow for future interaction and networking with them.

Keynote Speakers



Roundtable Talk Lead Discussants





A	SUB-THEME 1: EMERGING PROPERTY MANAGEMENT STRATEGIES IN A PANDEMIC ERA	1
1	Property Management Strategies in the Post COVID 19 Pandemic Era in Nigeria: Moving Beyond the Myths and Misconceptions	Ankeli, I. A., Salihu, N., Nuhu, M. B., Sule, I. A., Tinufa, A. A. 2
2	Developers Compliance with Urban Residential Development Control Measures in Kaduna Metropolis, Nigeria	Salihu, N., Ankeli, I. A., Nuhu, M. B. Sanni, M. L., Sule, I. A., Aliyu, A. A. Gwamna S. E., & Hamza, U. Y. 10
3	Macro Economic Determinants of Rental Values of commercial Real Estate in Ilorin, Nigeria	Abdulmalik, F.B. & Udoekanem, N. B 18
4	Real Property Management in the Era of COVID-19 Pandemic in Nigeria: Promoting Real Estate Investment Trust as an Investment Vehicle	Bokani, A.M., Ahmad, M. & Suleiman, B.Y. 27
5	Assessment of Property Management Practices During and After Covid-19 Pandemic in Lagos, Nigeria	Ogungbe, M.A., Akinwamide, D.O. & Jejelola, O. F 39
6	An Assessment of Valuation Accuracy in the Residential Property Markets in Minna and Abuja	Dangana, U.S., Udoekanem, N.B. 50
7	Biosensor Re-design requirements for Operational Facility Management in the Post-COVID workplace	Ataguba, J.O. 60
8	An Assessment of the Effect of Coastal Externalities on Residential Housing Prices in Badore, Lagos-Nigeria	Ayoola, A.B. & Akande, S.O. 73
9	Commercial Property Market Performance and Macroeconomic Indicators Amid COVID-19 in Lagos: The Causal Linkage	Wahab, M.B., Alalade, O. & Hassan, O.A. 83
10	Factors Affecting Real Estate Project Delivery and Housing Affordability in Abuja	Emokpaire, E. & Mohammed, M. 94
B	SUB-THEME 2: MODERN GEOSPATIAL TOOLS FOR EPIDEMIOLOGY	100
11	GIS Based Land Suitability Analysis for Optimal Choice of Cereal Crops Production in Kaduna State	Abdulraheem, S. & Opaluwa, Y.D. 101
12	Review on Depth Determination Bathymetry Using Remote Sensing Technique- Theoretical Appraisal	Adeleke. A., Nwadiolor I. J., Odumosu, J., Baba.M. & Bako. M 107
13	Assessment of the Hydrological Characteristics of Shiroro Dam, Nigeria	Adesina E. A., Musa A., Onuigbo, I.C., & Adesiji, A. R. 115
14	Remote Sensing and GIS-Based Vulnerabilities Assessment Over Borno State	Attahiru, I.M. & Etim, E.E. 123
15	Drought Analysis in Jega Local Government, Kebbi State, Using Geospatial Tools to Analyse Vegetation Covers	Yahaya, I. A. & Etim E. E. 132
16	Flood Vulnerability Mapping of Communities Along River Kaduna in Lavun Local Government Area, Nigeria	Mohammed, A.B. Y. & Onuigbo, I.C. 139
17	Analysis of Urban Growth Monitoring and Indicator-Based Assessment Using Remote Sensing Technique in Abuja Nigeria	Umar, I.A. & Etim, E.E. 147
18	Estimation of Leaf Area Index using geospatial methods-A review	Oleh, T. C. & Ajayi, O.G. 155
19	Assessment of Climate Change Impact and Population Growth on Concrete Bridges in Minna, Niger State Using GNSS Technology	Ladan, M.D. & Etim, E. E. 168
20	Image Fusion for Improving Spatial Resolution of Multispectral Satellite Images	Gobir, M. O. & Etim, E. E. 177
21	Point and Spatial Evaluation of Some Selected Commercial Software Used in UAV Image Processing	Aliyu, K. A. & Nwadiolor, I. J. 178
C	SUB-THEME 3: ARCHITECTURE, RESILIENCE AND HEALTHY BUILDINGS IN PANDEMIC ERA	186
22	Nigerian Prisons Reformation! Panacea for Reduction of Recidivism - Case Study of Minna Medium Security Prison	Abdul, C. I., Ekule, A. A., Idachaba, M. K., Nuhu, A. A. 187
23	Incorporating Principles of Adaptability in Spatial Configuration to Enhance Spatial Requirement in the Design of General Hospital Suleja, Niger State	Isiaka, A.S., Maina, J.J., Salihu, M.M., Saliu, O.H. 194
24	Ascertaining Daylighting Wastage in the College of Engineering Complex, Najran University, Saudi Arabia	Bal-Harith, H.M., Abdul Karim, A.N., Alotaibi, B.S., Abuhussain, M.A., Qahtan, A.M. & Dodo, Y.A. 213



25	Evaluation of Daylighting Conditions in Public Libraries: A Case Study of Kaduna, Nigeria	Ojobo, H., Tachio, A., Boyle, G.M. & Chindo, M.	220
D	SUB-THEME 4: PLANNING FOR SUSTAINABLE RESILIENT NEIGHBOURHOODS AND CITIES IN COVID-19 ERA		228
26	GIS-Based Approach to Small Hydropower Potential Assessment Along River Ogun, Nigeria		229
27	Analysis of Women Benefits from Participation in Social Networks in Gulu Vatsa Area of Niger State	Akande, S.O., Sanusi, Y.A., Sanni, L.M., Idris-Nda, A. & Santali, B.N.	240
28	Socio-Economic Characteristics of Slum and Informal Settlement in Akure, Ondo State, Nigeria	Martins V. I. & Tsado E. S.	246
29	Impact of protest in Lagos state as an emerging mega city: A Review	Adedeji A.A., Junaid, A.M. & Sanni L.M.	252
30	Performance Analysis of Railway Transportation Services on Abuja – Kaduna Route, Nigeria	Malik, A.A. & Bilau, A.A.	262
31	An Investigation into the Satisfaction Level of Student Accommodation in Students’ Living Environment of Modibbo Adama University of Technology, Yola, Nigeria	O’odoh, B. A., Owoeye, I. O., Busari, A. O., Shehu, M., Haruna, A. M., Adamu, H. N.	268
32	Bus Stop Location Considering Passengers Waiting Time and Cost	Ekule, A. A., Abdul, C. I., Idachaba, M. K. & Nuhu, A. A.	275
33	Evaluation of the Impact of COVID-19 on Public Construction Project Delivery in Nigeria- a Review on Literature	Ojidoh, C., Mohammed S. & Hawawu, A.	284
34	Appraising Household’s Sewage Management Practices in Samaru-Zaria, Kaduna State, Nigeria	Habila, S.K.1a, Itopa, W.I., Ode, I., Akan, M. & Lawal, H.	291
35	The Effect of Oil Spillage and Gas Pollution on Safety Health and Agricultural Production in Delta State	Adigwe, M.U. & Okah, C.M.	300
36	Residential Location Choice: A Study of Household Preferences in Minna, Niger State, Nigeria	Santali, B.N.	308
37	Spatial Distribution Pattern of Public Water Access in Makurdi, Nigeria	Begha, M.C., Sanni, L.M.; Akande, S.O. & Aremu, R.	317
38	Assessment of Environmental Risks in Residential Housing Bosso Niger State.	Olakunle, D.O. & Junaid, S	327
39	Assessment of Environmental Implication of Final Municipal Solid Waste Dump Site in Ilorin, Kwara State, Nigeria	Yaqub, H. A. & Morenikeji, O.O.	332
40	Residents’ Perceptions of Urban Green Spaces and Park Qualities in AMAC Abuja	Ugboh, R., Musa, H.D. & Ohadugha, C.B.	338
41	Environmental Impact of Automobile Workshop Activities on Soil Quality in Minna, Nigeria	Nagidi, B.O.; Morenikeji, O.O. & Abbas, Y.A.	346
E	SUB-THEME 5: SUSTAINABLE COST MANAGEMENT OF BUILT ENVIRONMENT PROJECTS IN THE ERA OF COVID-19		353
42	Impact of External Pressures on Adoption of BIM in Construction Organisations	Sani, S.N., Nasir, R.M. Abdullahi, A.M. & Jibril, U.S.	354
43	Assessment of Project Financing Options by Construction Micro, Small and Medium Enterprises in Nigerian Construction Industry	Yesufu, S.I., Musa-Haddary, Y.G., Gandu, J.Y., Abdullahi, I. & Momoh, N	363
44	Impact of Post-COVID Era on Contractors’ Managerial Capability towards Performance of Construction Projects in Abuja, Nigeria	Ahmed, Z	372
45	Performance of Housing Cooperatives Societies in Housing Finance in North Western Geo-Political Zone, Nigeria	Aliyu, A. & Ganiyu, B. O.	386
46	Influence of Risk Factors on Transnational Public Private Partnership Cost Performance	Waziri, A., Musa, M & Faruq, I.	394
47	Evaluating the Level of Adoption of Total Quality Management (TQM) Practices in Quantity Surveying Firms (QSFs) in Kaduna State, Nigeria	Kure, B. A., Alumbugu, P. O. & Mohammed, Y. D.	416
F	SUB-THEME 6: WELLBEING AND RESILIENCE OF THE BUILT ENVIRONMENT		429
48	Compressive Strength of Millet Husk Ash as Alternative to Silica Fume in Internally Cured High Performance Concrete	Onogwu, C.M., Apeh, J.A., Olawuyi, B.J. & Okoh, B. O.	431



49	Comparative Study on Rice Husk Ash and Silica Fume as Supplementary Cementitious Material in High Performance Concrete Production	Okoh, B.O., Olawuyi, B.O. & Onogwu, C.M.	438
50	Development of Scheffe’s Regression Model to Predict the Compressive Strength of Concrete Using Metakaolin as Partial Replacement of Cement	Jegede, A., Adejumo, T. W., Oritola, S. F., Shehu, M., Omojah, A., Mahmud, M. B.	445
51	Effect of Vibration on Static and Dynamic Response of Loaded Waffle Slab	Abanda, M. A., Sadiku, S. S., Mohammed, A. & Aguwa, J. I.	452
52	Optimum Particle Size of Calcium Carbide Residue Required for Effective Soil Stabilization Using Zeolite for Road Construction	Yahaya, A. U., Alhaji, M. M., Aguwa, J. I., Shehu, M., Kabiru, U. D., Mahmug, M.B.	459
53	Assessment of the Performance of Sandcrete Blocks Produced by Partially Replacing Sand with Coal Bottom Ash as a Fine Aggregate	Ojutiku, M. O., Sadiku, S., Oritola, S. F., Shehu, M., Oglekwu, F. O., Adamu, H. N.	466
54	Biogenic Possibilities of Improving Mortar Strength Using Effective Microorganisms	Olukotun, N., Abdul, C.I., Ekule, A. & Abdullahi, N.A.	471
55	Microstructure and Sorption Properties of Alkaline Surface Modified Coir Bio Fibre	Kure, M.A., Olawuyi, B.J., Ogunbode, E.O. & Apeh, J.A.	477
56	Nanotechnology Application in the Development of Fonio Husk Ash and Calcium Carbide Waste Based-Binder Mortar	Abeku, D. M., Olawuyi, B.J., Apeh, J. A., & Hassan I.O.	483
57	Investigating the Adoption Level of Building Information Modelling for Post-Construction Management in Nigeria	Bello, O.Y. and Ayegba, C	492
58	A Study of the Productivity of Permanent Staff and Contract Staff for POP Workers and Tilers in Abuja	Agada, D.I. & Ayegba, C	502
59	An Investigation of the Satisfaction Level of Student Accommodation and Resilience of Students’ Living Environment of Modibbo Adama University of Technology, Yola, Nigeria	Ekule, A. A., Abdul, C. I., Idachaba, M. K. & Nuhu, A. A.	508
60	Prediction of Water Loss in Hydraulic Distribution System in Minna, Nigeria Using Artificial Neural Network	Yaba, T., Jimoh, O.D., Adesiji, A. R.	515
61	Particulate Matter Exposure of Passengers at Bus Stops	Inufin, T., Kolo, S. S., Jimoh, O. D.	522
62	Assessment of Quality Control of Tiles Production in West Africa Ceramics Company, Ajaokuta, Kogi State	Abdullahi, D., Lawal S. S. & Abdul, C. I.	531
63	Production of Pavement Blocks Using Low Density Polyethylene Product Waste	Aboje, A. A.; Abbas, B. A.; Kolo, D. N.; Abubakar, M. & Abdulsalam A. M.	542
64	Effect of Partial Replacement of Cement with Cow Dung Ash Using Bida Natural Coarse Aggregate	Abbas, B. A., Yusuf, A., Kolo, D. N., Aboje, A. A., Mahmyd, M. B. & Ndaiji, A. U.	549
65	Performance Evaluation of Cement-Stabilized Soft Clay Admixed with Coal Bottom Ash	Zubbair, M. A., Adejumo, T. E. & Amadi, A. A.	558
66	Beneficiation and Characterisation of Kaolin Clay from Clay Deposit in Kutigi, Niger State, Nigeria	Ogundipe, F.O., Saidu, M., Abdulkareem, A.S., and Busari, A.O.	566
67	Factors Contributing to Stress Among Construction Practitioners in Kaduna	Yusuf, I. and Ola-awo, A. W.	575
68	Design Measures for Health and Safety in Pre-Construction Stage of Public Building Projects in Nigeria	Adekunle, E.O., Alumbugu, P.O., Mohammed, Y.D.	584
69	Assessment of Building Standard in Health Care Facilities in Minna, Niger State, Nigeria	Yakubu, R., Sulyman, S.O.; Ohadugha, C.B.	593



**SUB-THEME 1:
EMERGING PROPERTY MANAGEMENT STRATEGIES IN A PANDEMIC ERA**



Property Management Strategies in the Post COVID 19 Pandemic Era in Nigeria: Moving Beyond the Myths and Misconceptions

Ankeli, A.I.¹; Salihu, N.²; Nuhu, M.B.^{3a}; Sule, A.I.^{3b}; Tinufa, A.A.⁴

¹Department of Estate Management and Valuation, Federal Polytechnic, Ede, Nigeria

²Department of Estate Management, Bayero University, Kano, Nigeria

³Department of Estate Management and Valuation, Federal University of Technology, Minna, Nigeria

⁴Department of Estate Management and Valuation, Federal Polytechnic, Idah, Nigeria

¹thonyankeli@gmail.com; ²nasirusalihu44@gmail.com; ^ambnuhu@futminna.edu.ng; ^bsuleabbass76@futminna.edu.ng

Corresponding email: thonyankeli@gmail.com

Abstract:

The paper focuses on the dynamics of real property management strategies adopted by Property Managers (PM) in the post Covid-19 pandemic era in Nigeria. The outbreak of the pandemic has put more pressure on the Nigeria real estate market, especially the Osogbo rental market, which is currently pigeonholed with an array of management crises. The persistent and disturbing setback caused by this action has necessitated the call for urgent and immediate attention and the need to re-evaluate the current property management strategies in Osogbo. Quantitative survey data was collected through the administration of questionnaire on the respondents. This was analysed using descriptive statistical tools. Findings of the study revealed the myth and misconceptions attached to real estate agency practice by tenants. Moreso, there reported cases of hostile relationship between property owners and tenants occasioned by the misconception, the aftermath effect of covid 19 pandemic and the growing cases of rent arrears as the conventional strategies could no longer address the contemporary issues in the post pandemic era. Therefore, the paper recommended the need for aggressive public enlightenment campaign that could help transform tenants' psych/perceptions on the functions of PM, the supplying of more housing units to the housing market through public private partnership efforts and the domestication of basic health guidelines in property management plans, to promote healthy living and situations where landlords and tenants will interact as partners in progress that could engender sustainable rental growth and city development.

Keywords: Property, Property Management Strategies, Post-Pandemic Era, Myths, Misconception.

INTRODUCTION

The traditional perception of the role of Property Managers (PM) as mere rent collectors or caretaker among tenants and property owners have a multilateral effect on the real property market subsector of the national economy. The myth apart from encouraging animosity in the rental market especially between tenants and PM, is affecting the effectiveness of tenant selection, maintenance and rent collection procedures. It has also threatened the peaceful co-existence of the rental market participants and engendered the intrusion of quacks into the agency and management subsector of the rental market.

More recently, the outbreak of COVID-19 pandemic and the later discovery of the omicron variant across the globe, including Nigeria, brought confusion and challenges to the real property market, especially, the agency and management subsector of market. A major challenge of the property management subsector was the initial puzzle on how to respond to the then public health emergency and the modalities for curbing the further spread of the disease among occupants.

In the post pandemic era, particularly in Nigeria, the issue of how best to guard the health and safety of tenants and staff, balancing the investment objectives of the investors with the needs of workers have become a serious issue that property managers (PM) have to contend with in addition to the hostile business relationship existing between property owners/managers and tenants due to the long-standing myth and misconceptions on the role of PM in property agency practice. Rachel *et al.* (2021) suggested the need for property owners/PM to begin to think towards enacting or initiating plans (which could be emergency or scheduled) for business management and permanency as well as developing new strategies that could address or withstand outbreak of any serious public health challenges. Furthermore, Palm (2011) averred that, the competitive nature of the real property market had forced the real estate industries to develop more services-oriented strategies or approach towards property management exercises. However, Ankeli *et al.* (2021) had argued that the consequential impact of COVID-19 on the global economy, specifically the Nigeria real property subsector, has revealed the inadequacy



of the conventional property management strategy adopted by PM in the country due to the dynamic nature of the property market and the low-level knowledgeability or understanding of the pandemic.

There have been reports of changing property use dynamics that affected property management strategies even before the pandemic as property management exercise has gone beyond the mere rent collection to other more sensitive areas of real property investment. The outbreak of the pandemic and the Omicron variant, apart from exposing the unpreparedness of the subsector, have a multiplier effect on property management tactics, amplifies conflicts in the rental market and exposes the inadequacies of the conventional management strategies. Hence, keeping up with the trending pace of the shifting dynamics in real property investment horizon, the myth and misconceptions of the role of PM in the subsector in the post covid 19 pandemic era and the need to be prepared against similar health emergency will require creativeness in real estate management strategies that will reorientate the psych of the investors and property users.

The conventional duty of a PM, particularly in Nigeria, which among others include tenant selection and placement, repairs and property maintenance, compliance with dynamic government regulations, the direct monitoring and reporting of financial and operational performance evaluation of the properties requires an extension to cover other contemporary issues as they arise. With the outbreak of Covid-19 or the ‘new normal’ in December 2019 which was declared pandemic in 2020, other sensitive areas in property management have opened up. The role of the PM due to the ‘new normal’ has been extended beyond the mere rent agent to encompass adequate and proper management of the building, the tenants, security, safety and health of employees, customers/visitors to the premises. The PM is therefore to ensure that all are protected, the property is well maintained, and the aim of profit maximization is not compromised. It has become evident and expedient that to continue in the real property business or to thrive in the competitive real estate market requires the need for the development and preservation of an orientation that is in line with the contemporary occurrences within the environment become necessary.

Despite series of attempt made by the Nigeria Institutions of Estate Surveyors and Valuers (NIESV) at both states and national levels through mandatory continuous professional development and other forms of enlightenment campaigns on the strategic role of PM in real estate agency, myths and misconceptions originating from the psycho-cultural workings or incredulous assessments of property users in the property market persist. Nigeria is a nation with a large human population and huge real property investment potential and challenges (Ankeli *et al.*, 2021a). Some of the basic challenges confronting real property owners or managers are, aside from the unimaginable changes in the property market resulting in volatile rental regime, is the inability of people to at a point freely inhabit and interact with the physical spaces as it used to be due to the pandemic outbreak. The trend gradually brought down demand for spaces, with an increasing glut in the rental market, the conversions of the few available residential housing to other land uses due to financial inducement and the lack of observance of urban land use regulations resulting in the distortions of city master plans (Salihu *et al.*, 2020; Ankeli *et al.*, 2019 and Nwachukwu & Ukpabi, 2008). The myth or misapprehensions of the ‘new normal’ was construed to be a Chinese government ploy to subjugate the world economy. To others, it was a biological weapon against the world or an offshoot of the 5G innovation. These misconceptions prevented many Nigerians from taking adequate preventive measures, thereby slowing its mitigation and eradication processes in the country (Ankeli *et al.*, 2021b). Closely related to this is the misconception on the roles of PM who was seen as a mere caretaker and nothing more. As these delusions continue, the consequences of the pandemic on the real property subsector of the national economy have extended to the post covid 19 pandemic era. The problem has soared and became enormous and disturbing with an unprecedented crisis that require professional strategy for it to be resolved.

The failure to move beyond the myths and misconceptions of the role of PM and the pandemic in the property market is dangerous and must not be allowed to continue. The acceptance and inclusions of some of the Covid-19 protocol as part of modern life practice is cheering. The development and applications of modern strategies that are sustainable and which take care of challenging contemporary issues must be encourage as Gbadegesin (2022) argued that property management processes have moved from the archaic conventional method to more modern practices. However, to achieve this in the post pandemic era, there is the need for the examination of the preparedness of PM towards the changing role, the applicability of the transformative strategies/ innovations in the management of real properties in the post pandemic era as well as the re-evaluation of the myth on the role of PM which is no longer negotiable. Findings from research of this magnitude conducted in Osogbo, could



serve as a baseline information for further future studies on property management strategy in the post pandemic era. It is on this background that, this study is considered justifiable, appropriate and timely.

It is in the light of the foregoing that the paper is set out to provide answers to the following questions: How prepared are the PM to handle property management issues in the post pandemic era? Is the current approach or strategies in use for property management in the post pandemic era adequate? How can the perception issues on the role of PM by tenants be resolved for PM and tenants to see each other as partners in progress?

LITERATURE REVIEW

The outbreak of the COVID-19 pandemic came with profound uncertainties both in the cooperate world and the private lives of individuals. Countries have reacted differently on how to curtail the issues or uncertainties raised by the pandemic. However, to solve the pandemic uncertainties, scholars across disciplines worldwide have modelled several empirical and theoretical approaches or concepts aimed at offering a permanent cure to the new normal, which have become part of our lives or succour on its effect on life endeavours. Fadare (2020) asserted that naturally, adjusting to change is usually difficult but should be taken slowly. He further stated that the pandemic had caused several sudden changes to organizational plans to survive the new normal, which caused some initial frictions in their business operations. However, Ankeli (2022), Sogbon and Olujimi (2015) had earlier argued that the complication of city management problems in Nigeria was due to change in use without recourse to relevant planning authorities. D’Ercole, (2016) reported the migration of businesses from the downtown core of Canada, thereby making the downtown business premises empty with a worrisome rising case of void or high vacancy rates. These studies have shown that, there have been property management problems even before the outbreak of the coronavirus pandemic in 2020 but none of these studies strictly addressed property management problem.

Furthermore, Akalemeaku *et al.* (2021) evaluated the strategies for property management in the pandemic era for the emerging markets to determine the possibility of digitalization of property management tasks in the country to achieve the management objectives of the property owner. However, the study concluded that the digitalization of the real estate sector might witness hindrances due to low broadband penetration and the myth or refusal of the people to accept the reality that the new change has become the new normal. The subject coverage and the blanket conclusion may not actually reflect the current trend of happenings across states or cities in Nigeria, as internet services have tremendously improved with options to choose from in many major cities in Nigeria. Also, property owners as well as users have in recent time become more aware and interested in real estate transaction than ever before. Hence, the none coverage of this aspect in the study created a knowledge gap that must be filled.

Oyedeki (2020) studied the impact of Covid-19 on Lagos property transactions, assessed the demand, supply, sales and rental market of the state property market transactions and the problems encountered in the pandemic era. It adopted a descriptive statistical tool in the analysis of the data collected. Findings from the study revealed bank related transaction problems. Since the pandemic outbreak became manifest in Nigeria in 2020 and the study was conducted in the same year, it means that, the research’s period may not be enough to gather adequate data from the Lagos property market. Data collected and used may be on the initial effect of Covid-19 or preliminary data. Again, the study did not examine the strategies for real property management in the study area as events of the post pandemic era have negated most of the study’s findings; hence, the need for a more robust and specific study to fill the observed gap. Ankeli *et al.* (2021b) evaluated rental agreement contents in some selected cities in Osun, Nigeria, to determine the adequacy or otherwise of tenancy agreements in the post-covid-19 pandemic era using a questionnaire survey approach. The study, among other things, revealed a steady dwindling rental market transaction with a deteriorating landlord/tenant relationship. The study examined an aspect of property management; hence, the need to take a deeper assessment of the all-encompassing strategies adopted in the management of real estate by PM as the myth attached to property management and the growing misconception in the public domain on the existence of the virus by property market participants become imperative.

Knowledge Gap

The literature on the subject matter has revealed that previous studies mainly investigated the impact of Covid-19 on real property transactions and the presumed operations of PM in the pandemic era. Though very few studies have theoretically discussed issues relating to real property management strategies in the post pandemic era. Besides being theoretical, these studies’ attentions were more on the presumed new strategies without



quantitatively assessing the adequacy or otherwise of the conventional methods or strategies in use by the PM. More so, the studies were conducted at the onset of the pandemic; hence determining the actual effects of the pandemic on real property transactions were difficult. While appreciating the fact that the earlier researches were period bound and the emanating findings were specific, recent happenings had shown that their findings and recommendations were vague. Previous studies on rental agreement adequacy were based on a fraction/insignificant proportion of the locality studied; thus, findings from such a study cannot be generalized to cover the whole country. Again, none of these studies considered the psycho-cultural tendencies of the market participants in the post pandemic era. A concerted effort in this direction could help debug the mindset/perceptions of the citizenry towards the role of PM in the post pandemic era. Therefore, it is necessary to contentiously identify the conventional strategies in use and the need for contemporary strategies that could take care of critical issues in the post covid 19 pandemic era.

Moving Beyond the Myths and Misconception Stance

Nations had and are still adopting and modifying processes and strategies aiming at ameliorating or supporting tenants and real property investors during and after the covid 19 era. The challenge is the determination of how these changes or modifications have so far helped in the transformations or benefit the real property market participants in the post covid 19 pandemic era. Though, the outbreak of the pandemic, came with changes that have hit harder on real property investors across the value chain and altered the traditional functions of the PM. The mitigation of health risks for tenants/customers, visitors and employees have become the latest addition to the array of functions of the PM. Operating income and rate of returns were affected with default in rent payment, delays and stoppages in construction work, agitations for concession and abatement due to the failure to meet lease obligations caused by the pandemic and void rental contracts or glut in vacancy rate.

The common misconception stance among property users in Nigeria is that, PM are mere rent collectors that often aid/influence increase in urban property rentals. In similar vein, myths and misconceptions are gradually becoming synonymous with diseases outbreak in the Nigeria. The outbreak of every disease in the country are often received with misconception. Izekor *et al.* (2020) observed that it is gradually becoming historical for myths and misconceptions on health matters in Nigeria to have connections with peoples’ culture and religious beliefs. The initial flagrant refusal to use facemasks and the none acceptance of Covid-19 vaccination by some Nigerians at the onset of the pandemic, the assumptions without medical proof that the virus cannot survive under Nigeria’s hot climatic condition, contributed to the myth linked to cultural and religious sentiments. The misconception that the vaccine is a ploy targeted at reducing or controlling population did not helped matter; neither did our background in the rich and edifying cultural practices as people, educational escapade or religious belief that influences our cognitive and affective reasoning system. The misconception stance has, however, been traced to the none transparency in the handling of the pandemic cases by the government (Keni *et al.*, 2020; Busari *et al.*, 2020; World Health Organization, 2020 and World Health Organization 2020a). The impact of the myths and misconceptions on the real property market subsector of the economy is enormous. Though, it may look as if the pandemic is over but its impact will forever remain. Hence, the earlier the PM adopt and display exemplary conventional management strategies, the quicker and better the likelihood for the diminishing effects of the myths and misconceptions in the property industry. More so, the adoption of digitalization and unconventional analytical property management approaches could help in moving beyond the myth and misconception in the post pandemic era; thereby, building a harmonious relationship between the PM and space users through trust-building and behavioural change.

RESEARCH METHOD

The study was conducted in the metropolitan city of Osogbo, the capital of Osun state. Osogbo has and still witnessing tremendous transformation in her city landscape. The rapidity of residential property development and the influx of men and business ventures into the city was attributed to the cheap cost of living and land cost (Ankeli, 2020). Residential properties managed by PM in Osogbo metropolis were enumerated based on the numbers managed by the PMs. The total number of properties in this category that were enumerated was 546 out of which, 235 of such properties constituting 43% were randomly selected for the study. The study’s target population consist of property management firm which are either professional estate surveying and valuation firms, non-professional firms/quacks that dabbles into the act of managing properties as house agents on behalf of the property owners in Osogbo Metropolis and tenants of residential properties under the management portfolios of the selected PM. The inclusion of the quacks/charlatans in the study become necessary as this



group are the most patronised by the property owners and have the highest number of properties in their management portfolio. The total number of practising estate surveying and valuation firms in the city was arrived at through consulting the 2019 directory of the Nigeria Institution of Estate Surveyors and Valuers, and the list obtained were reconciled with the list of Estate Surveyors and Valuers (ESV) practicing firms in Osogbo obtained from the Osun state branch of the Nigeria Institution of Estate Surveyors and Valuers. The reconciliation of the list became necessary as a reasonable proportion of the practicing ESV firms do not have their names listed in the directory. The study population extracted from the directory and the list obtained from the state branch was therefore put at 12 ESV firms. Actual physical enumeration of house agents/non-professional property managers with offices was done. 35 house agents were identified and used for the study; hence, a sample frame of 47 property managers was arrived at and used as the sample size for the study, since the number is within manageable size. For the tenants, 235 tenants. To get a proportionate number of respondents from the sample PMs, 5 respondents were selected from each of the management portfolio of the 47 property management firms picked for the study. Questionnaires designed and used for the study were proportionately administered to the respondents to solicit information on the strategies adopted in the management of property, the level of preparedness of PM towards property management in the post pandemic era among others. A total of 282 questionnaires, (that is, 47 questionnaires administered on PM and 235 questionnaires on tenants) was administered, but only 257 were adequately filled and returned for analysis, representing a 91% response rate.

Relative Importance Index (R.I.I.) was used to rank the variables on tenants’ satisfactory level of the management strategies adopted by PM, preparedness for the task in the post pandemic era among others. Frequency counters and simple percentages were used to describe the level of awareness and perceptions of the challenges in the post pandemic era by collating the frequencies of all the variables measured and calculating their percentages and degrees. The variables/indices tested/used in the study were harvested from literature and the responses obtained from the field. The formula for R.I.I. used by Ankeli *et al.* (2020a) and Nuhu *et al.* (2022) was adopted for this study:

$$R.I.I. = \frac{\sum W}{A*N} = \frac{5n_5+4n_4+3n_3+2n_2+1n_1}{5N}$$

Where the variables are given the following weights: W= weighting is given to each of the respondents’ statements and ranges from 1 to 5, n₅ = strongly agreed; n₄ = agreed; n₃ = uncertain; n₂ = disagreed; n₁ = strongly disagreed, A=Higher response integer (5); and N=Total number of respondents.

RESULTS AND DISCUSSION OF FINDINGS

Property Managers’ Profile and Preparedness for Property Management Task in the post Pandemic Era.

To establish the level of preparedness of the PM towards real property management exercise, the suitability of the data collected were measured through information relating to the profile of the property managers and their level of preparedness. Their responses are as presented in Table 1.

Table 1: Property Managers’ Preparedness for Management Task in the Pandemic Era

Types of Property Manager	Number	%	How Prepared for the task	%
Professional (ESV)	12	25.5	10	83.3
Non-Professional	35	74.5	07	20
Total	47	100	17	

The Table shows that 25.5% of the responding firms are professional firms while 75.5% are non-professional firms. This shows the level of penetration of charlatans into the property market in Osogbo. 83% of the professional firms sampled shows high level of preparedness in their operational conduct and structures. Only 20% of the non-professional firms exhibited signs of preparedness for the challenges in the post pandemic era as the study observed that records of tenants were not properly kept, no risk assessment plan among others

Property Management Strategies adopted by Property Managers in the Study Area.

The study collected responses on the nature of the strategic management principles adopted in the management of properties by PM. Some of the conventional management strategies extracted from literature and questions were asked on are mode of inspection, tenant selection, rent collection, maintenance among others, while the contemporary strategy include the use/application of modern technology as information and communication technology in property management and the fusion of basic health guidelines in tenancy agreement. The

SETIC 2022 International Conference:

“Sustainable Development and Resilience of the Built Environment in the Era of Pandemic”

School of Environmental Technology, Federal University of Technology, Minna

6th – 8th February, 2022.



information collected was further screened to know if such strategies are adequate to take care of the contemporary challenges in the post pandemic era and how satisfied the tenants are with the management strategies adopted by the PM.

Table 2 shows the responses of the respondents on the management strategy and the percentages/degree of satisfaction. The cognitive and affective proficiencies of both the PM and tenants were tested. The data obtained on which percentages and degree were computed thereof are data on the management tactics, operational conduct and structure of the firms among others. The Table further revealed that, 65% (234°) of the PM are charlatans/quacks; hence still adopting the convention management strategy (70%). On the level of satisfaction with the management strategy, about 80% of tenants representing 288° are not satisfied with the management strategy in use. The dissatisfaction has in part led to high-level default (85% representing 306°) in rent payment.

Table 2: Management Strategies Adopted by PM and the level of Satisfactions

Management Strategies	Frequencies (N=257)	Percentage (%)	Degree
Number of Properties Managed by PM			
Professionals	90	35	126
Non professionals	167	65	234
Total	257	100	360
Management Strategies			
Conventional	180	70	252
Contemporary	77	30	108
Total	257	100	360
Provision for the Enforcement of COVID-19 Protocol			
Adequate	44	17	61
Not Adequate	213	83	299
Total	257	100	360
Property Inspection Strategies			
Inspections Rarely Done	221	86	310
Inspections Often Done	36	14	50
Total	257	100	360
Satisfaction with the Management Strategies			
Satisfied	51	20	72
Not Satisfied	206	80	288
Total	257	100	360
Observance of Rent Obligations in the post pandemic era			
Frequent rent payment	39	15	54
Accumulated rent arrears	218	85	306
Total	257	100	360

Strategic Plan Indices for Property Management in the Post Pandemic Era.

To determine the best practices for property management in the post pandemic era using the contemporary method, some variables/indices were identified and presented to the 47 property managers using Likert scale and ranked on the Relative Importance Index (R.I.I.). Table 3 presented the outcoming of findings and the standing of each of the variables for contemporary property management strategies in the post pandemic era.

Table 3: Strategic plan Indices for property management in the post pandemic era.

Variables/indices	*S.A.	*A	*N	*DA	*S.D.	ΣW	R.I.I.	Ranking
*The need for the creation of a risk assessment or contingency plan	36	8	-	2	1	216	0.919	2 nd
*Observance of basic health guidelines	25	15	2	5	-	201	0.855	3 rd
*Property protection tactics and what to outsource	15	20	2	6	4	177	0.753	5 th
*Keeping space users/tenants, visitors and employees safe	40	6	1	-	-	227	0.966	1 st
*Property management through remote security practices	24	10	7	6	-	193	0.821	4 th



*SA= Strongly Agree; *A= Agree; *N = Neutral; *DA = Disagree; *SD = Strongly Disagree

Table 3 further shows that all the variables were significant. The strategic plan that will keep space users/tenants, visitors and employees safe is the most critical variable with R.I.I. of 0.966; hence ranked first and the need for the creation of a risk assessment plan with R.I.I. of 0.919 ranking second while property protection tactics and the decision on what to outsource with R.I.I. of 0.753 is the least critical factor though significant.

Despite the myths and misconceptions on the role of PM and the new normal, there are good takeaways from the phenomenon. The pandemic had infiltrated and sapped into every sector of the economy. The real estate investors were unable to reap from their investment and the failure of space users to keep to their lease obligations within the pandemic era were in part due to the neglect of the role of PM and the effect of the pandemic. The glut in the real property market that did not allow business spaces to expand as staff work from home encourages business fund diversifications and revitalization of the need for the use of professional property managers and the adoption of contemporary management strategies. The pandemic reduced business risk but increased the prospect of future rental growth as real property is generally believed to hedge against inflation. The pandemic has increased the high demand for functional urban housing where one can perfectly combine work, leisure and living under the same roof. More so, the new normal made property investors/owners, space users/tenants and designers to recognized and appreciate the need for the integrations of technology into aesthetics and the structural frame of the building, where compact smart structures development and mixed-use properties development are encouraged with a more cautious health and safety requirements of the immediate environment. All these will further necessitate the need for contemporary real property management strategies.

CONCLUSION AND RECOMMENDATION

The study has reassessed property management strategies in the post pandemic era in Osogbo, the Osun state capital. In order to achieve the aim of the study, PM preparedness for the task of real property management in the pandemic era were determined in order to measure the degree of satisfaction tenants derived from the services provided. The outcome shows that most of the professional PM were prepared for the task. Hence, to move beyond the myths and misconceptions of the pandemic, the study recommends the need for an aggressive public enlightenment campaign that could help transform tenants’ psycho-cultural perspective on the role of PM and effect of the pandemic, the inclusion of basic health guidelines in property management plans to promoting good health, a harmonious relationship between landlord and tenants where both parties will see each other as partners in progress and ensure sustainable rental growth and city development.

REFERENCES

- Akalemeaku, O.J., Nwafor V. I and Nnamani, O. C. (2021). *Property Management in a Pandemic Era: Strategies for Emerging Markets*. 27th Annual Conference European Real Estate Society. June 2 – 5. Kaiserslautern, Germany
- Ankeli, I. A (2022). Influencing Factors of Property Use Conversion and Residential Properties Rental Value Trend in Ikeja, Nigeria. *INTREST – International Journal of Real Estate Studies* 16(2), 118-128
- Ankeli, I. A., Nuhu, M. B., Saheed, J., Akinremi, A. R., and Tinufa, A. A. (2021). Post-COVID-19 Pandemic and the Emerging Rental Housing Market in Nigeria. *European Modern Studies Journal*, 5(3) 317 – 323
- Ankeli, I. A., Adeleke, M. A., Saheed, J., Adepoju, A. S., and Adie, J. S. (2021a). Sick Building Syndrome: The Causes, Management and Effect on Residential Properties Rental Values in Osun, Nigeria. *International Journal of Innovative Science, Engineering & Technology*, 8(3), 103-114
- Ankeli, I.A., Nuhu, M.B., Popoola, N.I., Kemiki, O.A., Okoh, S.O., and Omotehinshe, J.O. (2021b). Impact of COVID-19 Pandemic on Tenancy Agreement: The Lesson from an Emerging Rental Housing Market in Nigeria. *Baltic Journal of Real Estate Economics and Construction Management*, 9, 78-93.
- Ankeli, I. A., Nuhu, M. B., Sule, A. I., Ankeli, U. C., & Bello, A. T. (2020). Residential Land Use Commercialization and Rental Value Trend in Osogbo, Nigeria. *International Journal of Creative Research Thoughts*, 8(6), 2521-2530
- Ankeli, I. A, Nuhu, M.B, Popoola, N.I, Ankeli, U.C and Ojeniyi, A.S (2020a). Gender Disparity in Land Ownership: An Invitation to National Underdevelopment. *International Journal of Creative Research Thoughts*. 8 (6) 4176 - 4185
- Ankeli, I.A., Nuhu, M.B, Sule, I.A, Ankeli, U.C and Alade, A.F. (2019). *Land Use Conversions and Rental Value Regime in an Emerging City. The Awareness, Attention and Action*. Proceedings of 74th Research fora International Conference, Hamburg, Germany, 4th - 5th December.
- Busari, S., & Adebayo, B. (2020, CNN). Nigeria Records Chloroquine Poisoning After Trump Endorses It for Coronavirus Treatment. Available: <https://www.cnn.com/2020/03/23/africa/chloroquine-trump-nigeriaintl/index.html>.
- D’Ercole, M. (2016). How Changing Dynamics in Commercial Real Estate Are Affecting Property Management. www.360visibility.com



- Fadare, T. (2020). Effective Change Management Strategies in a Workplace During a Pandemic. S.P.A. Ajibade & Co. <https://www.mondaq.com> assessed on 2/12/21
- Gbadegesin, J. T. (2022). Does the COVID-19 affect tenants’ adherence to lease obligations in rental market? Property managers’ perspective. *Journal of Facilities Management*. Advance online publication. doi:10.1108/JFM-12-2021-0165
- Izekor, E.D., Okpuzor, V. N., Morka, E., and Nnaji, P.T. (2020). A Review of COVID-19 Pandemic: Myths, Misconceptions, and Role of Media Education in Nigeria. *Asian Journal of Research in Infectious Diseases*, 5(4), 10-19.
- Keni, R., Alexander, A., Nayak, P. G., Mudgal, J., and Nandakumar, K. (2020). COVID-19: Emergence, Spread, Possible Treatments, and Global Burden. *Front. Public Health*, 8, 216. doi: 10.3389/fpubh.2020.00216
- Nwachukwu, M. U and Ukpabi, N. I (2008). The Impact of Housing Conversion on Residential Land Use Development in Nigerian Cities: A Case Study of Enugu Metropolis. *Environmental Studies and Research Journal* 1(1), 1-22
- Nuhu, M. B., Ankeli, I. A and Salihu, N (2022). Benefits of Rural-Urban Linkages in the Context of Rental Trends: Evidence from Gidan Kwano Area of Minna, Nigeria. *Tropical Journal of the Built Environment (TJOBE)* 3(2), 61 - 72
- Oyedepi, J.O. (2020). The Impact of COVID-19 on Real Estate Transaction in Lagos, Nigeria. *International Journal of Real Estate Studies (INTREST)*, 14(S1), 107-112
- Palm, P. (2013). Strategies in Real Estate Management: Two Strategic Pathways. *Property Management*, 31(4), 311-325. <https://doi.org/10.1108/PM-10-2012-0034>
- Palm, P. (2011). Customer Orientation in Real-Estate Companies - The Espoused Values of Customer Relations. *Property Management*, 29(2), 130-145
- Rachel, B.G., Horsch, A. P., Brian, E. F and Amanda, G.H. (2021). Real Estate Operations in the Coronavirus Era. Ten key Issues Property Owners and Landlords Need to Consider as they Plan to Confront the Pandemic. Pillsbury Winthrop Shaw Pittman L.L.P. www.pillsburylaw.com/en/lawyers/rachel.horsch.html
- Salihu, N., Nuhu M. B., Sanni M. L., Sule I. A. and Emmanuel S. G. (2020). *The Effect of Urban Land-Use Planning Regulations on Residential Property Investment Returns: Evidence from Literature*. Proceeding of International Conference: on Sustainable Housing and Land Management, School of Environmental Technology, Federal University of Technology, Minna 3rd – 5th, May.
- Sogbon, O., and Olujimi, J. A. B. (2015). Implications of Changing Phases of Property and Land Ownerships on the Physical Development of Akure, Ondo State, Nigeria. *International Journal of Innovation and Scientific Research*, 18(1), 81-89
- World Health Organization (WHO) (2020). Supporting Media to Bust Harmful Myths on Coronavirus Disease. Available: reliefweb.int/report/nigeria/supporting-media-bust-harmful-myths-coronavirus-disease
- World Health Organization (WHO) (2020a). Supports Scientifically-proven Traditional Medicine. Available: www.afro.who.int/



Developers Compliance with Urban Residential Development Control Measures in Kaduna Metropolis, Nigeria

Salihu, N.¹, Ankeli, I. A.², Nuhu, M. B.³, Sanni, M. L.⁴, Sule, I. A.³, Aliyu, A. A.¹, Gwamna S. E.⁵, & Hamza, U. Y.⁶

¹Department of Estate Management, Bayero University, Kano, Nigeria.

²Department of Estate Management and Valuation, Federal Polytechnic, Ede

³Department of Estate Management and Valuation, Federal University of Technology, Minna, Niger State.

⁴Department of Urban and Regional Planning, Federal University of Technology, Minna, Niger State.

⁵Department of Estate Management and Valuation, Niger State Polytechnic, Zungeru, Nigeria

⁶Department of Estate Management, Waziri Umaru Federal Polytechnic Birnin Kebbi

¹Snasiru.esm@buk.edu.ng; ²thonyankeli@gmail.com; ³mbnuhu@futminna.edu.ng; ⁴Sanni.lekan@futminna.edu.ng;

⁵suleabbass76@futminna.edu.ng; ⁶aaaliyu.esm@buk.edu.ng; ⁷emshega@gmail.com; ⁸Hamzayaro002@gmail.com

Corresponding author: Snasiru.esm@buk.edu.ng,

Abstract:

This study critically assesses the level of compliance with urban planning and physical development control measures of residential property in Post Covid-19 era in some selected neighbourhoods in Kaduna metropolis. Quantitative research approach was used to collect survey data from real estate firms' portfolio's using Open Data Tool Kit application. Data collected were analysed with the aid of descriptive (percentage, cluster bar-graph) and inferential (ANOVA) statistical techniques. The results show among others that compliance with regulations on numbers of people in a room, room size and setbacks is low this negates part of covid-19 guidelines. Dilapidating housing and ancillary service negatively affects staying at home strategy and clients' willing to pay, thus limiting investors' ability to make repairs and increases the chance of mortgage default because of increasing stunted rental growth. Consequently, the study recommends that with the consistent rise in mutation of the virus, policy makers should formulate and holistically implement policies that capture new residential demand trends that improve quality of life in post pandemic environment. Also, sustainable and all-inclusive campaign strategy is required that accommodate covid-19 protocol for residential building guidelines with a view to curtailing surge in infection rate and decrease mortality rate now and in the future.

Keywords: Compliance, land use, development control measure, residential property, pandemic

INTRODUCTIONS

Population growth in most cities in Sub-Saharan Africa has increased demand for housing. The phenomenon has stimulated squalid residential development in nooks and cranny of cities (Salihu *et al.*, 2021) overwhelming most local and central government. This has resulted in inadequate and overstretched basic infrastructure. The mutating nature of the dreaded coronavirus of December 2019 (Covid-19) has gone beyond national and international boundaries including Nigeria. Total/partial lockdown was the first protocol employ by government of many nations in line with World Health Organisation (WHO) guideline Nigeria inclusive. The policy guidelines particularly emphasised total/partial lockdown and social distancing in order to reduce mortality rate by restraining the virus spread. In fact, Covid-19 has globally stress-tested urban system within and across all sectors (particularly the housing sector) and regions and has been exacerbated by the volatile economic shock. Total/partial lockdown and social distancing in Nigerian cities has affected the housing sector (Olanrele and Thontteh 2020) by creating Volatility and hostility in the property market trends living the operators in mystery of tackling the lacuna caused by the global health pandemic. Unquestionably investing in residential properties upturn the disposable income of households (Arimah & Adeogbo, 2000). The pandemic's effect on housing is visible particularly on the income streams of investors and, more pronounced where deteriorating basic housing infrastructure is evidently increasing and overstretched by the Work from Home (WFH) strategy.

Undoubtably, with the new normal the taste and preference of client in terms of housing will be to a large extent guided by social distance-induced demand change (Organization for Economic Cooperation and Development, 2020) which is hoped to address the current health crisis. In simpler terms, consumer's decision in terms of renting or buying a house is anchored primarily on the dynamics of a property type that meets the work from



home functionality (Salihu, 2022; Chiwuzie et al., 2019) and have the wherewithal to safeguarding (lower density homes and working remotely) a household from the dreaded pandemic. Hence, household decision is based on the supposition that poor housing condition particularly overcrowding worsens the public health impact of the pandemic (Brandily et al., 2020).

On the other hand, modification/alteration of new, on-going or existing housing in compliance with the specification (spacious housing) of Covid-19 protocol are ways stakeholders might respond to the household social distance induced demand change. In this era, “new normal” consumers’/clients’ preference for housing will consistently evolve over time. In fact, the Covid-19 pandemic has unsettled construction efforts in two-folds. First, in terms of new construction and on-going plans for developers’ and second distorted real estate plans in terms of inability to pay for habitable housing accommodations (OECD, 2020; Ankeli et al., 2021). Alteration of developers’ plans and affordability problem of clients will vary according to regions and also depends on the level of timing and strictness of confinement, socio-economic status and public health crisis. Therefore, compliance scenario will differ across region. Thus, there is need for more research in this domain to unearth regional peculiarity.

It is in the light of the aforementioned, this paper contributes to the body of knowledge that investigate Post Covid-19 in terms of compliance with housing development regulations in the Nigeria property market by assessing the level of compliance of developers to urban planning and physical development control measures in Post Covid-19 era in four selected residential neighbourhoods in Kaduna metropolis, Nigeria.

LITERATURE REVIEW

The outbreak of the Covid-19 pandemic has stress-tested all nations, irrespective of their socio-economic and political status. In fact, the developed nations are worst hit. Uncertainty and economic disruption have been striving both in the corporate and private sphere owing to how to subdue transmission of the virus. In Nigeria, the effect is enormous in the housing sector (Olanrele and Thontteh 2020), these effect might be attributed to non-referral to the planning authority or building regulations in the initial property development stage particularly in the urban areas where development is vivid. Non-adherence to planning regulations affect the intrinsic and extrinsic attributes of housing that are used in determining price (Salihu et al., 2021; Nuhu et al., 2022).

Equally, laxity in implementing planning regulations give developers the latitude to develop property based on profitability index only, allowing for development of property at an extreme latitude (small dwelling unit) which create great concern (Ogbonna et al., 2017) while on the other hand the pandemic is a respiratory infectious disease that require social distancing (spacious environment) as a control measure. For example, structural design standard if not sternly enforced may result to overcrowding (Salihu, 2022). However, overcrowding has demonstrated to worsen the public health impact of the pandemic (Brandily et al., 2020). This is dangerous especially in Nigeria where extended family ties are accommodated. With this recent development Covid-19 can adversely strive and distort the residential property subsector of the economy hence the need for renewed interest in this domain to curtail the unprecedented rental crisis that is looming ahead.

Theoretical framework

This study’s theoretical underpinning is the Public Interest Theory on Regulation “PITR” (Christensen, 2010). Applying the theory relative to this study, PITR reinforce the certainty that building development in Kaduna metropolis requires adherence to stipulated planning standards which are mostly enforced by the local or central government through compulsory directive, absolutely issued to improve the inhabitants’ overall quality of life in terms of health and economy.

In the past two decades, a number of studies have surface and provide important information relative to compliance with residential urban planning regulations. For example, Odekunle et al. (2019) studied the effect, challenges and way forward in development control, Abubakar et al., (2013) reviewed model of compliance, Bogoro and Nghalmi, (2014) studied knowledge, practice and attitude of development control, Adeogun et al. (2017) concentrated on development control and rental value, Jimoh et al. (2017) did research on nature, extent and effect of development control contravention, Matey et al. (2017) studied zoning standards in areas under



customary land tenure, Popoola et al. (2017) worked on legal and institutional framework for development control practice, Ogbonna et al. (2017) did research on compliance with property development, Salihu et al. (2018) studied development control measures and sustainable development goal, Ojo-Fajuru and Ambrose (2018) centred their study on encroachment and causal factors affecting compliance, Ngetich et al. (2016) and Omollo, (2019) concentrated on efficiency of development control, Osuizugbo, (2019) and Onaiwu, (2020) study the public adherence to 'structural' development control while Omollo and Opiyo (2021) did study on urban road planning. But one of the most significant current discussions is the multi-faceted effect of Covid-19 on cooperate and private lives of occupant of the built environment. This multi-faceted effect has triggered further research questions and investigation.

The significance of adherence to housing planning standard in surmounting, aiding and controlling overcrowding cannot be over-emphasised, there has been very little quantitative assessment of compliance level relative to Post Covid-19. More so, taste and preference of consumers in terms of housing changes over a time horizon (Chiwuzie et al., 2019; OECD, 2020). Therefore, it has become imperative to critically assess developers' compliance level with residential development control and physical planning regulations in Post covid-19 era in Kaduna metropolis.

RESEARCH METHODOLOGY

Quantitative research strategy was used for this study; in which primary data (neighbourhood, physical and location attribute) of residential properties were collected from Estate survey and valuation firms in Kaduna metropolis with the aid of cross-sectional survey method. The property type employed for this study comprises one, two and three-bedroom residential property in Uguwan-rimi, Barnawa, Malali and Sabon-tasha. By June 2020 countries were progressively recouping expansionary territory caused by Covid-19 (OECD, 2020) hence this study's data collection time span started from July 2021 to August, 2021. In this study, purposive random sampling technique was used to select 580 residential properties for data collection in these locations (Kjercie and Morgan, 1970; Salihu, 2022). On-site measurement of geometric variables and their out-door spaces were used to collect the primary data. Open Data Tool Kit application checklist was used to enter the data. The collected primary data were subsequently downloaded and put to cleaning and filtering test to check for half-filling of the checklist form. 12 forms were deleted because they were below 85% filled (Pallant, 2011), hence could not be used for further analysis.

Also, criteria for assessment were based on the basic minimum standard of residential development as enshrined in KASUPDA manual of 2017. Consequently, on-site direct observation/checklist were scored based on the principle that where a developer complied with basic minimum standard 1 point is scored and otherwise 0 “non-compliance to basic minimum standard” (Ogbonna et al., 2017). More so, the on-site survey data were ordinal data which later were converted to percentages (percentages data are often treated as continuous data, because the percentage can take on any value along the continuum from zero to 100%) to achieve the study aim. Aggregate horizontal multiple bar-chart were used, for ease of assessing and reporting the level of aggregate compliance of a developer within a neighbourhood or if not to a given regulation while the inter-rate compliance to the regulation were classified as follows 0 - 49% = low compliance, 50 – 100 = High compliance (Ogbonna et al., 2017). Also, one – way ANOVA was further performed on percentage data (continuous data) in order to demonstrate if there is statistically significant difference in mean score of level of compliance among the neighbourhoods.

FINDINGS/DISCUSSIONS

Figure 1 shows the aggregate level of compliance with structural regulations standard in Uguwan-rimi, Barnawa, Malali and Sabon-tasha in the study area. Data indicates that compliance with basic minimum standard of building coverage, fire extinguisher, colour code, store size, certificate of fitness and habitation and, as built drawing are below 50% compliance rate. This indicates that the basic requirement of social distancing was partially achieved because the basic requirement of spaciousness of housing in term of reducing overcrowding to achieve social distancing was below 50%. Regrettably, overcrowding worsens the public health impact of covid-19 (Brandily et al., 2020). This finding on continual reductions in dwelling space by developers in Nigeria property market validate Ogbonna et al. (2017). More so, small room size traps and increases thermal heat which

lessens the chances of reducing cross ventilation and overcrowding so as to achieve social distance. Hence in part, contributed to the rate of infection in Kaduna metropolis.

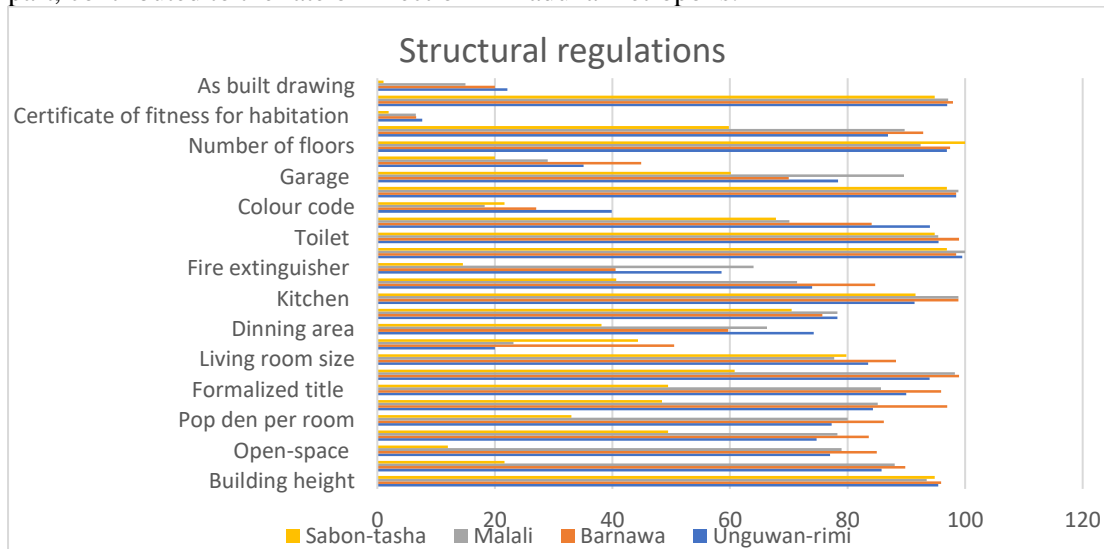


Figure 1: Relative horizontal bar-chart of structural regulations

Figure 2 Compliance with basic minimum standard on neighbourhood regulations in study areas. Inferences from the Figure indicates that regulations on garbage receptacle, drainage system, waste disposal system and security in Sabon-tasha and a general change in use and habitation is below 50% compliance rate. This suggest that the proliferation of waste within Sabon-tasha neighbourhoods is vivid most especially during the lockdown. Also, insecurity is shown to have been at 32.05% suggesting the need for a sustainable security measure in the study area.

Figure 3 presents compliance with location regulations in the study neighbourhoods. Result from the Figure indicates that numbers of trees are below 50%, though the KASUPDA manual of 2017 proscribes that each property should have at most four to six trees depending on the plot size. Tree shade are multi- beneficial to occupants; hence it improves their quality of life (Bello and Yacim, 2013). The shortfall in numbers of trees might have increased the indoor thermal heat of the residential properties to the detriment of the occupants during the total lockdown and work from home approach employed by the Covid-19 presidential task force within Nigeria.

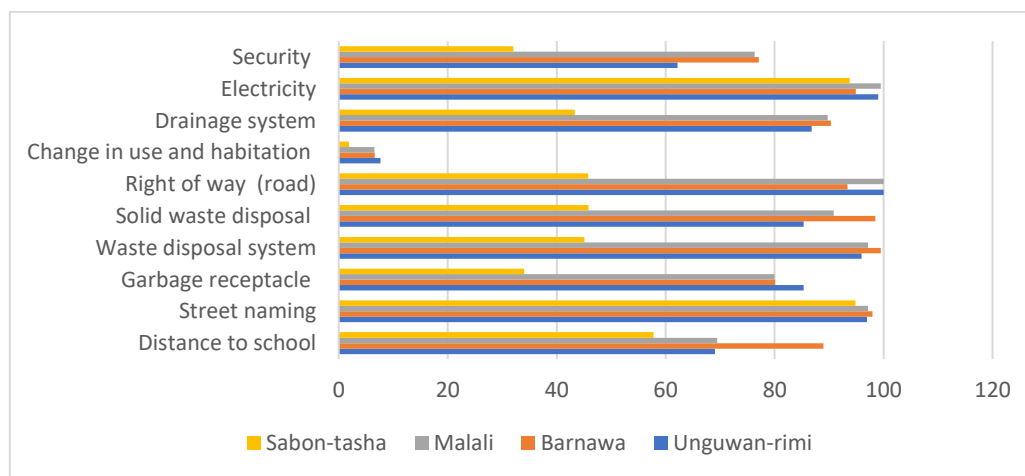


Figure 2: Relative horizontal bar-chart of neighbourhood regulations

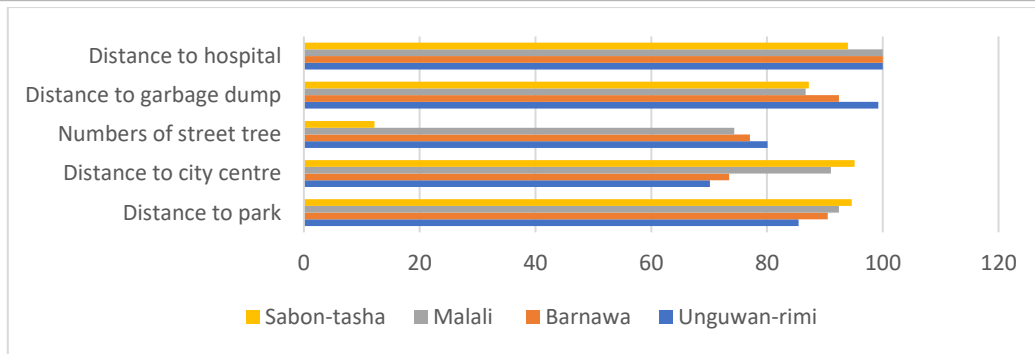


Figure 3: Relative horizontal bar-chart of location regulations

Observation from the results (Figures 1, 2 and 3) on the level of compliance with urban land use planning regulations induced the need for further evaluation of the data obtained from the study areas. ANOVA was further used to establish whether there is equal mean in the level of adherence to ULUPR within the study areas and the results are presented in Tables 1-6.

Table 1 Analysis of variance for compliance with structural regulations

Source	DF	SS	MS	F	P-value
Factor	3	8598	2866	3.50	0.018
Error	104	85099	818		
Total	107	93698			

The result from Table 1 shows that there is significant

difference in the mean rate of compliance with structural regulation attributes in the study areas of Unguwan-rimi, Barnawa, Malali and Sabon-tasha with p-value = 0.018.

Table 2. Mean score of structural regulations

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Unguwan-rimi	27	74.44	26.35	(-----*-----)
Barnawa	27	76.57	27.24	(-----*-----)
Malali	27	72.95	28.54	(-----*-----)
Sabon-tasha	27	54.26	31.97	(-----*-----)

Pooled StDev = 28.61

Also, the means score Table 2 shows Barnawa has higher mean of 76.57 in compliance with structural regulation attributes as compared with Unguwan-rimi, Malali and Sabon. In simpler terms, Barnawa has a better compliance level in the study area.

Table 3 Analysis of Variance showing Variations in Extent of compliance with neighbourhood regulations in Unguwan-rimi, Barnawa, Malali and Sabon-tasha

Source	DF	SS	MS	F	P-value
Factor	3	7422	2474	3.17	0.036
Error	36	28098	781		
Total	39	35521			

Table 3 shows variations in extent of compliance with neighbourhood regulations in the study neighborhoods. From the Table, the p-value = 0.036 and it infers that there is a significant difference in extent of compliance with neighbourhoods’ regulations in Unguwan-rimi, Barnawa, Malali and Sabon-tasha.

Table 4. Mean score of Neighbourhood regulations

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Unguwan-rimi	10	78.83	28.02	(-----*-----)
Barnawa	10	82.74	27.79	(-----*-----)
Malali	10	80.66	28.08	(-----*-----)
Sabon-tasha	10	49.45	27.85	(-----*-----)

Pooled StDev = 27.94



In addition, the mean score Table 4 showed that, Barnawa has the highest mean = 82.74 in extent of compliance with neighbourhood regulations as compared with Unguwan-rimi, Malali and Sabon-tasha.

Table 5. Analysis of Variance showing Variations in Extent of compliance with location regulations in Unguwan-rimi, Barnawa, Malali and Sabon-tasha

Source	DF	SS	MS	F	P-value
Factor	3	458	153	0.36	0.781
Error	16	6734	421		
Total	19	7192			

Table 5 shows the result of one-way analysis of variance showing variations in extent of compliance with location regulations in the study neighbourhoods with p-value = 0.781 and it infers that there is no significant difference in extent of compliance with location regulations in Unguwan-rimi, Barnawa, Malali and Sabon-tasha.

Table 6. Mean score of location regulations/

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev			
				Lower Bound	Upper Bound	Lower Bound	Upper Bound
Unguwan-rimi	5	86.98	12.78	(74.20)	(99.76)	(74.20)	(99.76)
Barnawa	5	86.68	11.11	(75.57)	(97.79)	(75.57)	(97.79)
Malali	5	88.90	9.46	(79.44)	(98.36)	(79.44)	(98.36)
Sabon-tasha	5	76.64	36.16	(40.48)	(112.80)	(40.48)	(112.80)

Pooled StDev = 20.52

Lastly, the result from the mean score Table 6 shows that, Malali have the highest mean score = 88.90 in extent of compliance with location regulations as compared with Unguwan-rimi, Malali and Sabon-tasha.

Conclusion

Findings from the study suggest that compliance with structural regulation was partially achieved because the basic requirement of spaciousness of housing in terms of reducing overcrowding was below 50%. Overcrowding worsens public health impact of covid-19 (Brandily et al., 2020), these findings substantiate Ogbonna et al. (2017) in terms of small internal and housing space.

The findings also show that compliance with neighbourhood regulations regarding change in use and habitation is below 50% indicating that a some percentage of houses in the neighbourhoods have informal status hence aggravate formation of squalor settlements, while Sabon-tasha neighbourhood had a greater percentage of non-compliance in terms of insecurity, garbage receptacle, solid waste disposal, road drainage system suggesting the need for an inclusive sustainable measures to tackle the challenges in the study area.

More so, findings on compliance with location regulations suggest that regulation on number of trees is below 50% compliance. Tree shades are known to have positive effect on occupants hence improve their quality of life (Bello and Yacim, 2013). The short fall in number of trees most undoubtedly intensifies the indoor thermal heat composition of the rooms particularly during the lockdown. Indoor thermal heat in Kaduna metropolis hampered the rate of compliance with Covid-19 presidential task force order (social distance) put in place to reduce the spread of the dreaded virus. Similarly, rise in indoor thermal heat induced change in demand structure (taste and preference) of home seeker to a better housing type that meet their current taste and preference. It is without doubt that the pandemic had induce change in demand structure in some location, this led to voids in residential properties.

It is in view of the finding that this study recommends that policy makers should formulate and holistically implement policies that capture new residential demand trends that improve quality of life in post pandemic environment. This could be achieved through increase in public campaign on sustainable waste disposal and security, maintenance and repairs. Also, planting of trees, need for cross ventilations these will attract client and increase rental and capital appreciation. With a view to curtailing surge in infection rate and decrease mortality rate now and in the future.



REFERENCES

- Abubakar, M., Lizam, M., and Yassin, A. (2013). A review on the models of compliance with residential development standard in Nigeria. A paper Presented at the 2nd International Conference on Technology Management Business & Entrepreneurship, Melaka Malaysia. 522-531. 5th December.
- Adeogun, A. S., Salihu, N., Wahab, M. B., Raheem, W., and Kemiki, A. O. (2017). Assessment of the impact of development control measure on residential property rental values in Minna metropolis. *ATBU Journal of Environmental Technology*. 10(2), pp. 101-116.
- Arimah, B. C., and Adeagbo, D. (2000). Compliance with urban development and planning regulations in Ibadan, Nigeria. *Habitat International*. 24(1), pp. 279-294.
- Ankeli, I. A., Nuhu, M. B., Saheed, J., Akinremi, A. R., and Tinufa, A. A. (2020). Post Covid-19 Pandemic and the emerging rental housing market in Nigeria, *European Modern Studies Journal*. 5(3), pp. 317-323.
- Bello, O. Y., and Yacim, J. A. (2014). An assessment of the impact of tree shade on rental value of residential property in Maiduguri, Nigeria. *FIG Congress 2014 Engaging the Challenges Enhancing the Relevance Kuala Lumpur, Malaysia 16-21 June 2014*.
- Bogoro, A. G., and Nghalmi, S. M. (2014). Knowledge, attitude and practices of development control in millennium quarters Yelwa, Bauchi. Nigeria. *Journal of Research in Environmental and Earth Sciences*. 1(1), pp. 01-11.
- Brandily, P., Brebion, C., Briole, S., and Khoury, L. (2020). A Poorly Understood Disease? The Unequal Distribution of Excess Mortality Due to COVID-19 Across French Municipalities. Assessed on 19/01/2022 from <https://www.researchgate.net/publication/342857302>
- Christensen, G. J. (2010). Public interest regulation reconsidered: From capture to credible commitment. A paper presented at the 3rd Biennial Conference, University College, Dublin, 17th- 19th June, 2010. Retrieved December 12, 2019 from www.regulation.upf.edu/dublin-10-papers/IJ1.pdf.
- Chiwuzie, D. I., Dabara, T. M., Adenipekun, E. M. P., and Ajiboye, B. O. (2019). Tenant's demand for structural attributes in residential properties: the case of Ede, Nigeria: In Laryea, S. and Essah, E. (Eds) *Procs West Africa Built Environment Research (WABER) Conference, 5-7 August 2019, Accra, Ghana, 1063-1076*.
- Jimoh, B. A., Al-Hasan, A. Z., Imimole, W. O., and Ahmed, M. B. (2017). Contravention of development control measures in Auchi, Edo State, Nigeria, *Applied Science Reports*. 20(1), pp. 30-34.
- Krejcie, R. V., and Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*. 30(3), pp. 607-610.
- Matey, E., Lengoiboni, M., & Koeva, M. (2017). Zoning standards and compliance in the context of customary tenure system: A casesStudy of West Ashiyie, Adentan Municipality in Ghana. *Proceeding of FIG Working Week 2017 Surveying the world of tomorrow - From digitalisation to augmented reality Helsinki, Finland, May 29– June 2, 2017*.
- Ngetich, K. J., Opat, G. P., and Mulongo, L. S. (2016). Making urban planning and development control instruments work for Kenyan Cities: The case of the City of Eldoret. *Journal of Emerging Trends in Economics and Management Sciences*. 7(4), pp. 246-254.
- Nuhu, M. B., Ankeli, I. A., and Salihu, N. (2022). Benefits of Rural-Urban Linkages in the Context of Rental Trends: Evidence from Gidan Kwano Area of Minna, Nigeria. *Tropical Journal of the Built Environment*. 3(2), 61-72.
- Odekunle, J. F., Akindede D. B., and Adebayo G.O. (2019). The problems and challenges of development control in Abeokuta-west zonal planning area, Ogun State, Nigeria. *African Journal of Economics and Sustainable Development*. 2(1), pp. 9-27.
- Ogbonna, C. G., Obinkaa, A. N., and Aguguo, G. U. (2017). Property development and land use planning regulations in Nigeria, *International Journal of Environment, Agriculture and Biotechnology*. 2(4), pp.1694-1707.
- Ojo-Fajuru, O., and Ambrose, A. (2018). Development control regulations compliance: Paradigm change to reinvent disrupted public spaces and make future great place in Ado-Ekiti, Nigeria. *Civil Engineering and Architecture*. 6(1), pp.1-17.
- Olanrele, O., and Thontteh, E. (2020). COVID-19 and the 'New Normal': Implications for the Nigerian Real Estate Sector. *Centre for Housing and Sustainable Development, University of Lagos, Akoka, Lagos*.
- Omollo, W. O (2019). Application of planning standards in regulating Road reserves (Case Study: Kisii Town in Kenya). *International Journal of Architectural and Urban Development*. 12(2), pp. 1-18.
- Omollo, W. O., and Opiyo, R. O (2020). Appraisal of compliance with land subdivision planning regulations in residential neighbourhoods. *International Journal of Human Capital in Urban Management*. 5(2), pp. 125-138
- Onaiwu, D. N. (2020). Assessment of Public Compliance with Development Control Regulations in Auchi, Edo State, Nigeria. *The Indonesian Journal of Planning and Development*. 5(2), pp. 78-86.



- Organisation for Economic Cooperation and Development (2020). Housing Amid Covid-19: Policy Responses and Challenges. Accessed on 18/012/22 from <https://www.oecd.org>
- Osuizugbo., I. C. (2019). An appraisal of building control and regulations practice in Nigeria: Project managers’ perspectives. *Organization, Technology and Management in Construction*. 11(1), pp. 2022–2033.
- Pallant, J. (2011). *SPSS survival manual*. New South Wales, Sydney: Allen and Unwin.
- Popoola, A. S., Adeyemi, A. A., Arohunsoro, S. J., and Aina, O. S. F. (2017). Urban Development Practices in Ado-Ekiti, Ekiti State, Nigeria. *Donnish Journal of Geography and Regional Planning*. 3(2), pp. 010-016.
- Salihu, N. (2022). Development control measures in Post Covid-19 era in Nigeria: Emerging Rental Market. *Journal of Management Sciences*. 4(5), 83-96.
- Salihu, N., Nuhu M. B., Sanni L. M., Sule I. A., and Gwamna S. E. (2021). The effect of urban land-use planning regulations on residential property investment returns: Evidence from Literature: Sustainable housing and land management (*Proc. of 3rd School of Environmental Technology International Conference’SETIC2020’ Federal University of Technology, Minna, Nigeria 3-5 May 2021*).
- Salihu, N., Kemiki, A. O., and Gwamna, E. (2018). Urban development control as a viable measure for achieving sustainable development goals: Contemporary Issues and Sustainable Practices in the built environment. Minna, Niger State. (*Proc. of 2nd School of Environmental Technology International Conference’SETIC2018’ Federal University of Technology, Minna, Nigeria 10-12 April 2018*).
- World Health Organisation (2007). Retrieved from: <http://www.who.int/csr/resources/publications/csrpublications/en/index7.html> on 26/02/2022.