Ibrahim Yahaya WUNI

BSc (Ghana), MSc (UK), PhD Candidate (HK)

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Research Output: Researchgate /Google Scholar

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Ibrahim Yahaya Wuni received a Bachelor of Science degree in Land Economy (First Class Honours) from the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana in 2016. Upon graduation, Mr. Wuni served as a Teaching/Research Assistant at the Department of Land Economy (KNUST) from 2016 to 2017. Ibrahim won the competitive and prestigious Commonwealth Shared Scholarship to pursue a Master of Science in Water and Environmental Management (Civil Engineering) at the Heriot-Watt University in Edinburgh, Scotland (UK) from 2017 to 2018 where he graduated with Distinction (First position). His MSc dissertation won the first prize in the British Dam Society Dissertation competition. Mr. Wuni is an Awardee of the Hong Kong Ph.D. Fellowship Scheme and currently a PhD Candidate in Construction Management and Real Estate Economics at the Department of Building and Real Estate of the Hong Kong Polytechnic University.

Supervisor

Prof. Geoffrey Qiping SHEN (Chief Supervisor)

Area of Research

Industrialized Construction; Modular Integrated Construction; Smart Infrastructure Delivery; Public-Private Partnership; Construction Performance Measurement; Design for Excellence (DfX); and Digital Construction – Robotics, Building Information Modelling, Computer Vision, Artificial Intelligence, Deep Learning, Machine Learning, and Internet of Things.

Research Scope

Where circumstances merit and favourable conditions prevail, a well-implemented modular integrated construction (MiC) project shortens construction time, improves project quality, reduces lifecycle costs, improves productivity, improves health and safety performances, reduces construction waste, among others. However, when deciding to implement either MiC or the traditional approach in a project, stakeholders and clients require a comprehensive cost-benefit analysis of using each approach for the given project. The challenge is usually associated with how best to quantify and monetize the full benefits (tangible and intangible) and costs (direct and indirect) of each construction method, in clear and objective terms. While the tangible and direct benefits can be easily measured and quantified, the intangible and soft benefits (e.g. improved safety) of the MiC approach are obscure to measure. Yet, these benefits may constitute the aspects where MiC could offer the most prominent value in projects, but *there is limited research that measures, quantifies and monetizes the intangible benefits of MiC projects to support investment decision-making at the project level*. Consequently, this PhD research seeks to develop a comprehensive methodology for measuring and monetizing the *intangible benefits of residential MiC in Hong Kong* that captures the project-specific scale, as a validated investment decision-making tool.

Research Methodology

Overall, the research draws on robust systematic literature reviews, engagement with industry practitioners, case studies, and data from ongoing residential MiC projects in Hong Kong. Through a literature review and engagement with domain experts and practitioners in Hong Kong, the research identified, prioritized, and validated the various intangible benefits (e.g. health and safety, quality, etc.) achievable with the use of MiC in a project and developed a consistent set of metrics for measuring and monetizing each identified benefit. The research further benchmarked the performance of the various metrics in similar traditional construction projects in Hong Kong against which the improved performances of residential MiC projects would be measured. Given that several factors and conditions could improve the performance of a project irrespective of the construction method used, the research identified such key project descriptors (e.g. Use of BIM, procurement method, etc) and controlled their moderating effect on the performance of the projects. Through case study analyses of ongoing residential MiC projects in Hong Kong, the research will measure the cost-savings associated with the use of MiC in residential construction projects. The research is at the final stage of developing the methodology for measuring and monetizing the intangible benefits of using MiC in building, infrastructure, and civil engineering projects.

Prizes and Awards

1. **Best Presentation Award** in August 2019, 10th West Africa Built Environment Research Conference, Accra, Ghana.
2. **British Dam Society Dissertation Competition (First Prize)** in July 2019 for outstanding Master of Science Dissertation in reservoir planning and analysis
3. **Best Graduating MSc Student** in November 2018 for the Master of Science in Water and Environmental Management program 2017/18 cohort at Heriot-Watt University, Edinburgh, UK
4. **The Hong Kong Ph.D. Fellowship Award** in March 2018 to pursue Doctor of Philosophy in Construction Management and Real Estate Economics at the Hong Kong Polytechnic University in Hong Kong.
5. **Commonwealth Shared Scholarship** in July 2017 to pursue a Master of Science in Water and Environmental Management (Civil Engineering) at the Heriot-Watt University in Scotland (UK).
6. **Department of Land Economy Award** for top 5% graduating First Class Students in June 2016
7. **Provost's List of Undergraduate Students** with First Class Honours in June 2015 at the Faculty of Built Environment of the Kwame Nkrumah University of Science and Technology

Selected Journal Publications

1. **Wuni, I. Y.**, Shen, G.Q.P., Osei-Kyei, R. (2019). Benchmarking the critical success criteria for prefabricated prefinished volumetric construction projects. *Journal of Financial Management of Property and Construction* **(Awaiting Editor Decision)**.
2. **Wuni, I. Y.**, Shen, G.Q.P., Osei-Kyei, R. (2020). Quantitative evaluation and modelling of the critical success factors for modular integrated construction projects. *International Journal of Construction Management*. https://doi.org/10.1080/15623599.2020.1766190
3. Abille, A. B., Mpuure, D. N-N, **Wuni, I. Y.,** and Dadzie, P. (2020). Modelling the synergy between fiscal incentives and foreign direct investment in Ghana. *Journal of Economics and Development.* https://doi.org/10.1080/JED-01-2020-0006
4. Osei-Kyei, R., **Wuni, I. Y.,** Bo, X., and Trinh, M. T., (2020). Research trend on retirement village development for the Elderly: A scientometric analysis. *Journal of Housing for the Elderly.*

https://doi.org/10.1080/26892618.2019.1707738

5. **Wuni, I. Y.,** and Shen, Q. P. (2020). Critical success factors for management of the early stages of prefabricated prefinished volumetric construction project life cycle. *Engineering, Construction and Architectural Management*. https://doi.org/10.1108/ECAM-10-2019-0534
6. **Wuni, I. Y.,** and Shen, Q. P. (2020). Fuzzy modelling of the critical failure factors for modular integrated construction projects. *Journal of Cleaner Production, 264, (August), 121595* https://doi.org/10.1016/j.jclepro.2020.121595
7. **Wuni, I. Y.,** and Shen, Q. P. (2020). Stakeholder management in prefabricated prefinished volumetric construction projects: Benchmarking the key result areas. *Built Environment Project and Asset Management.* https://doi.org/10.1108/BEPAM-02-2020-0025
8. **Wuni, I. Y**., Shen, G.Q.P., Osei-Kyei, R. and Agyeman-Yeboah, S. (2020). Modelling the critical risk factors for modular integrated construction projects. *International Journal of Construction Management*. https://doi.org/10.1080/15623599.2020.1763049
9. **Wuni, I. Y**., Shen, G.Q.P., Osei-Kyei, R. (2020). Sustainability of Off-site Construction: A Bibliometric Review and Visualized Analysis of Trending Topics and Themes. *Journal of Green Building* (**Accepted-in-Press**).
10. **Wuni, I. Y.,** and Shen, Q. P. (2020). Barriers to the adoption of modular integrated construction: Systematic review and meta-analysis, integrated conceptual framework, and strategies. *Journal of Cleaner Production, 249(March), 119347*. https://doi.org/10.1016/j.jclepro.2019.119347.
11. **Wuni, I. Y.,** Shen, Q. P. and Hwang, B. G. (2020). Risks of modular integrated construction: A review and future research directions. *Frontiers of Engineering Management, 7, 63–80.* https://doi.org/10.1007/s42524-019-0059-7
12. Zafar, I., **Wuni, I. Y.**, Shen, Q. P. (2020). A decision support framework for sustainable highway alignment embracing variant preferences of stakeholders – Case of China Pakistan Economic Corridor. Journal of Environmental Planning and Management, 63(9), 1550-1584. https://doi.org/10.1080/09640568.2019.1672524
13. **Wuni, I. Y.** and Shen, Q. P. (2019). Critical success factors for modular integrated construction projects: A review, *Building Research and Information,* https://doi.org/ 10.1080/09613218.2019.1669009
14. **Wuni, I. Y.** and Shen, Q. P. (2019). Towards a decision support for modular integrated construction: An integrative review of the primary decision-making factors, *International Journal of Construction Management*, https://doi.org/ 10.1080/15623599.2019.1668633
15. Zafar, I., **Wuni, I. Y.,** Shen, Q. P., Ahmed, S., Yousaf, T. (2019). A fuzzy synthetic evaluation analysis of time overrun risk factors in highway projects of terrorism-affected countries: The case of Pakistan. *International Journal of Construction Management*, https://doi.org/10.1080/15623599.2019.1647634
16. Adeloye, A.J., **Wuni, I. Y.**, Soundharajan, B-S., Kasiviswanathan, K. S., Dau, Q.V. (2019). Height–area–storage functional models for evaporation-loss inclusion in reservoir-planning analysis. *Water,* 11(1413), 1-16., https://doi.org/10.3390/w11071413
17. **Wuni, I. Y**., Shen, G.Q.P., Osei-Kyei, R. (2019). Scientometric review of global research trends on green buildings in construction journals from 1992 to 2018. *Energy & Buildings,* 190 (May), 69–85, https://doi.org/10.1016/j.enbuild.2019.02.010
18. **Wuni, I. Y.** and Shen, Q. P. (2019). Holistic review and conceptual framework for the drivers of offsite

construction: A total interpretive structural modelling approach, *Buildings, 9*, (117), https://doi.org/10.3390/buildings9050117

19. **Wuni, I.Y.**, Shen, G.Q.P., and Mahmud, A. T. (2019). Critical risks factors in the application of modular integrated construction: A systematic review. *International Journal of Construction Management,* https://doi.org/10.1080/15623599.2019.1613212
20. **Wuni, I. Y.,** Boafo, H., Owusu Yeboah, M., Dinye, R. (2018). Probing the drivers of housing deficit in ghana: A fresh scoping review. *Journal of Sustainable Rural Development.* 2(1), 3-16. https://doi.org/10.32598/jsrd.01.03.260
21. **Wuni, I. Y.,** Boafo, H.K., Agyei-Kumi, S. (2018). Poor facility management in the public institutions of ghana: recent empirical discoveries. *Journal of Sustainable Development Studies*,11(1), 1 – 30
22. **Wuni, I. Y.**, Boafo, H.K., Dinye, R.D. (2017). Examining the non-participation of some youth in agriculture in the midst of acute unemployment in Ghana. *International Journal of Modern Social Sciences*, 6(2), 128-153.

Workshops/Conference Research Publications

1. **Wuni, I. Y**. (2020). McDonaldization of modular building systems in Ghana: Exposing the beauty of design for excellence. Workshop #10. *Professional Services Advancement Support Scheme (PASS) Workshop Series: Improving and Exporting Hong Kong Industrialized Construction Services under the Belt and Road Initiative.*
2. **Wuni, I. Y.** and Shen, Q. P. (2020). Evaluating the critical failure factors for implementing residential modular integrated construction projects. *Proceedings of the 2020 International Conference on Construction and Real Estate Management (ICCREM2020)*, Jun. 4 - 5, 2020, Stockholm, Sweden *(**Accepted**).*
3. **Wuni, I. Y.** and Shen, Q. P. (2020). Key success factors for implementing modular integrated construction projects - A literature mining approach. *Proceedings of the 8th International Conference on Construction Engineering and Project Management (ICCEPM2019), December 8-10, 2019, Hong Kong (**Accepted**).*
4. **Wuni, I. Y.** and Shen, Q. P. (2019). Making a case for modular integrated construction in west Africa: Rethinking housing supply in Ghana. *Proceedings of the 10th West Africa Built Environment Research Conference 2019, Accra, Ghana.* https://doi.org/*10.33796/waberconference2019.55*
5. **Wuni, I. Y**., and Shen, Q. P. (2019). Risks identification and allocation in the supply chain of modular integrated construction. *Proceedings of the 2019 Modular and Offsite Construction (MOC) Summit, Banff, Alberta, Canada*; https://doi.org/10.29173/mocs93

Hobbies

Public Speaking; Soccer; Hiking; Swimming

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