

ID 44

Factors Influencing Selection of a Project Manager for Energy Retrofit Projects in Ghana

John Dadzie¹, Brookman Asare-Dadzie², Susan Djokoto³

^{1&3} Department of Building Technology, Kumasi Technical University, Kumasi, Ghana

²Managing Director, AMS And Sons Ltd, Kumasi, Ghana

eedadzie@gmail.com

Abstract

Project management is a complex process that requires commitment, strong will and teamwork to ensure success in terms of cost, time, quality, safety and client satisfaction. The concept of green renovation is new as actions to reduce CO₂ continue to capture the attention of the world. The main aim of the study is to align the concept of green renovation to the selection of competent project managers/consultants. A survey of selected district assemblies in Ghana was undertaken. The nature of green renovation influenced the selection of the district as those with no records of such renovations were not included. District assemblies are motivated to select project managers with adequate working experience and knowledge of sustainable technologies. The results indicate ability to work effectively in a team, evidence of adequate training and green renovation projects managed also influence selection of a project manager. The theory underpinning project management reinforces the results identified as challenges that hinder effective project delivery are addressed. The findings inform government decision to engage project managers for green renovation projects and provides literature for teaching and learning.

Keywords

Project Management, Project Manager, Green Renovation, Experience, sustainable technology, policy

1. Introduction

Green renovation is the process of using sustainable strategies and technologies to improve existing buildings and systems to deliver energy and CO₂ savings. Green renovation or sustainable upgrade generally applies to existing buildings, equipment or systems that present poor environmental outlook. The form of upgrade depends on cost of renovation, availability of technologies and technical skills to undertake renovations. The role of a project manager (PM) is critical to the delivery or execution of green renovations. Thus, a project managers' understanding of energy retrofit project contributes to improved project performance. Often, urgency of a project at hand, project duration, variations, political influence from higher authority, untimely decisions on the part of the consulting team and a lack of experience of the design team affect the performance of consultants (Dadzie et al., 2012).

Attitude and general personal characteristics of a project manager and success were linked by Ha and Tran (2018) and the role of project managers by Jazebi and Rashidi (2013). Sharma and Kumar (2018) highlighted enthusiasm, high self-esteem, political sensitivity, ability to delegate and evidence of capacity to mobilise as factors influencing selection of project managers. A successful project manager should be able to delegate, that is, allow subordinates to participate in decision making which is in tandem with effective project delivery. A project manager should be flexible, patient and persistent, with good communication skills, be a good planner with credible capabilities (Horvath, 2019). These factors in one way or the other ensure successful project delivery as the PM provides leadership (Sharma & Kumar, 2018). Kondalkar (2020) discussed the concept of organisational behaviour and relates that to the functions of a project manager. A client expects a project management team to deliver on time and within budget by supporting the functions of a builder. Technical understanding of all forms of construction including green renovation is therefore relevant to the success of a project manager. Clients are always looking for a consultant capable of meeting

project timelines at a reasonable cost. To be successful as a project consultant requires strong commitment, capacity to work with different people and the ability to work effectively in a team (Sankaran et al., 2020).

A methodology for selecting project managers is studied and extensively reported in the literature. Jazebi and Rashidi (2013) developed an automated procedure for selecting project managers in construction firms. The model used 15 field data and fuzzy rules to develop a predictive model. Moradi et al. (2020) presented a competency model for the selection and performance improvement of project managers in collaborative construction projects using behavioural characteristics. Chaghooshi (2016) proposes the joint use of the Fuzzy DEMATEL (FDEMATEL) and Fuzzy VIKOR methods of a decision-making process for selecting the most suitable managers. The FDEMATEL method is used to prioritise the importance of various criteria and the FVIKOR is used to rank the alternatives in a preferred order to select the best project manager from several alternatives. Similarly, Çelikbilek (2018) proposes a Grey Analytic Hierarchy Process (G-AHP) for engineering and managerial problems with grey systems to make objective decisions. The results of the case study concluded with the effectiveness and applicability of the proposed G-AHP method for science, engineering and management. These methods are for the selection of a project manager, not providing detailed information of factors that influence selection, particularly for green renovation. The main aim of the study is to investigate factors influencing the selection of a project manager for green renovation projects. To date, the extent to which project managers are assessed with green related parameters to motivate selection is lacking. Many studies are aligned to the conventional construction approaches as the concept of green renovation is often not addressed. Identifying and investigating these factors, the concept of green renovation is reinforced and tied to reductions in CO₂ emissions.

2. Settings and Methods

2.1 Theoretical framework

PMBOK® defines a project as a temporary endeavor to create a unique product, service, or result. Levy (2018) defines project management as “application of knowledge, skills, tools and techniques to meet project requirements”. Project management is accomplished through the application and integration of concepts such as project initiation, planning, executing, monitoring and controlling and closing. It is the process of planning, directing and controlling resources to ensure high level of project performance which is normally expressed in terms of time, cost, quality and stakeholder satisfaction (Meredith, 2020).

Factors that influence selection of a project manager

The role of a project manager is distinct from that of a functional manager or operations manager. Typically, a functional manager focuses on providing management oversight for a function or business unit. Operations managers are responsible for ensuring that business operations are efficient. A project manager is a person assigned to lead a team that is responsible for achieving a set of project objectives. The selection of project managers is linked to basic requirements, experience, education, communication, computer and management skills and time management. Other factors include cost, resource, quality and project management skills, planning, interpersonal skills, decision making and team development (Afshari, 2017). A project manager must manage costs, time and resources and be able to plan and develop skills of a project team (Sadatrasool et al., 2016). Also, knowledge, legal skills, communication skills, social awareness, action management, financial management, and ability to identify risk affect decisions to select project managers (Sadatrasool et al., 2016). The authors added that effective human resource management, procurement skills, time management, quality design and control and technical impact selection of a project manager. Sharma and Kumar (2018) discussed factors that influence selection of a project manager to include enthusiasm, high self-esteem and political sensitivity. Although Sharma and Kumar (2018) sought to reinforce findings of earlier studies, ability to delegate, team management good communication skills were identified and included. The position of Sharma and Kumar (2018) is in line with that investigated by Sadatrasool et al. (2016). By proposing the joint use of the Fuzzy DEMATEL (FDEMATEL) and Fuzzy VIKOR methods, Chaghooshi et al. (2016) investigated many variables including site management capacity, technical level, level of leadership and personal qualities. Management capacity include project, program and portfolio orientation, health, security, safety and environment. Earlier studies by Dodangeh et al. (2014) and Sadeghi et al. (2014) applied various selection criterion in developing selection tools and models. They are basic requirement, project management skills, management and interpersonal skills. Sadeghi et al. (2014) relied on the competencies for project managers, records of past performance and behavioural parameters.

Wen et al. (2021) developed a new method that focuses on fuzzy multiple decision-making methods in civil engineering. The outcome of the study addresses the issue of high error in decision making, which is a very common

phenomenon in the construction industry. The models were examined using a case study in a project-based organization for selecting the most suitable project construction manager. Education, planning, controlling, communication skills, experience etc., were used for the second round of a Delphi approach. The third round involves basic requirements, management skills, interpersonal skills and project management skills. Mana'an et al. (2014) demonstrated a fuzzy-based method for assessing the performance level of a project manager (PM) at the construction phase of Mass Housing Building Projects (MHBPs). Seven competencies including knowledge of appropriate site layout techniques for repetitive construction works, dedication and knowledge of appropriate technology transfer were applied (Mana'an et al. 2014).

Afshari (2018) showed that in small projects, a PM with strong communication skills is needed to maximize performance, whereas negotiation skills in medium projects and project management knowledge in large projects are the most critical. Gharouni and Noorzai (2021) propose a framework to determine the most appropriate project manager (PM) to enhance the performance of occupational groups (POGs) in large, medium and small road construction projects in warm regions. The occupational groups (OGs) in road projects were divided into three categories: workers, technicians, and engineers. Using the Pareto principle, 14 critical project manager competencies (PMCs) were extracted from a 70-item list developed by performing a comprehensive literature review. Two indexes were ranked in each size of road project using the analytic hierarchy process (AHP) technique.

Similarly, leaderships, technical skills, performance level and certification level for each project manager is a critical selection criterion (Keren et al., 2014). Other factors include computer knowledge, experience, age, education depth of the expertise, extent of comprehensive knowledge and management knowledge (Afshari & Kowal, 2017). Leadership, communication, staffing, decision making, character, psychology, physiology influence project manager selection (Afshari & Kowal, 2017). Luřaş et al. (2020) identified the profile of an ideal project manager by presenting an overview of studies regarding the profile of a good project manager. In that regard, the authors analysed the perceptions of organisations' managers and HR specialists. The empirical research provides evidence that persons involved in project managers' selection perceive the value of education, certification, experience or soft skills differently, based on their professional role. Secondly, it shows that project management certifications are relevant for project managers' selection and are much appreciated around the world. Although each project requires specific skills and competencies of a project manager, the research ascertains a preferred profile based on the perception of over one hundred respondents, involved in the selection process. Mohammadi et al. (2014) developed an approach in the form of a hybrid Quality Function Deployment (QFD) and Cybernetic Analytic Network Process (CANP) model for project manager selection. This involves the use of QFD to translate the owner's project management expectations into selection criteria and the CANP to examine the expectations and selection criteria. The research involves the development of 18 selection features in response to the owner's three main expectations of time, cost and quality. Other factors include experience, academic achievement, communication skills, Microsoft Project Software experience and planning skills were the selection criteria adopted and applied to develop the model. The survey of literature shows that planning, project initiation skills, implementation and closeout are important in the selection of a project consultant (Moradi et al, 2021). Sang et al. (2018) studied the effects of project manager competency on green construction performance in China. The study identified the position of a project manager as an important factor determining the success of a project that is complex in nature. The authors argued that with the deterioration of the environment, green buildings present better environmental outlook compared to conventional buildings. Green buildings encounter more complex problems during the construction process thus project managers are faced with greater challenges. A survey questionnaire was used to investigate the understanding of the importance of project manager skills. Structural equation modelling was applied and the results demonstrate leadership skills and emotional intelligence of project managers are important factors that affect green construction performance.

2.2 Research methodology

In line with the research questions, a quantitative approach is adopted to explore and discuss factors that influence selection of project managers for green renovation. The study is focused on projects that align to sustainable upgrade

of existing buildings. District assemblies and regional coordinating professionals in Ghana are the main respondents. A five-point Likert scale was used to understand factors that affect selection of PMs for sustainable upgrade projects. The respondents were asked to rate the items in relation to the degree of agreement or importance as 1=strongly disagree; 2=disagree; 3=neutral;4=agree;5=strongly agree. A pilot survey of experts to test the variables for suitability as the concept of green renovation is new to many professionals. A total of 15 professionals were engaged online during the pilot stage of the study. Specific modifications to the variables were proposed that helped to restructure the survey for distribution. Thereafter, potential respondents were identified through personal contacts or referrals from staff of the district assemblies. The survey was sent to 182 professionals at the district and regional assembly level with adequate knowledge and understanding of green renovation. Those with no clear insight of the concept of sustainability and related impact of green renovation on the environment were excluded. Also, poorly answered survey questionnaires were rejected. The survey covered a period of 3 months as attempts to improve the initial response contributed to extension of the survey. The last month served as a mop-up to encourage professionals to participate. Within the first month, 25 professionals had responded, this was improved in the subsequent months. Overall, 55 professionals responded, providing a response rate of 30.2%. The mean and standard deviation as applied in this study are consistent with similar studies related to environment and energy efficiency.

$$Mean = \frac{\sum_{i=1}^5 W_i \cdot X_i}{\sum_{i=1}^5 X_i}$$

where: i – responses category of a Likert scale – 1,2, 3, 4, 5. W_i – is the weight assigned to i^{th} response – (5 is Strongly agree, 4 for agree, 3 for neutral, 2 is disagree, 1 for strongly disagree); and X_i – frequency of the i^{th} response. The Chi-squared test for the study is given by:
 $X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$, Where X^2 = Chi-squared, O_i = observed value, E_i =expected value

3. Results

Calculated means provide the descriptive analysis of the study for detailed and further analysis, based on the maximum and minimum values. The standard deviation estimates become relevant as that forms basis for ranking of similar means.

3.1 Factors influencing selection of project managers for green renovation

Table 1 presents the overall results of the study on the factors that influence selection of PMs for energy retrofit projects. The Table presents the factors, mean, standard deviation, variance, rank, p-value and the hypothesis.

Table 21. Factors influencing selection of project managers for green renovation

S/N	Factors	Mean	SD	variance	Rank	p-value	Decision
1	Academic Qualification	4.88	0.853	0.7276	1	0.002	Reject
2	Working experience	4.44	0.769	0.5914	4	0.001	Reject
3	Relationship with clients	3.94	0.667	0.4449	13	0.000	Reject
4	Human relations	3.52	0.718	0.5155	21	0.000	Reject
5	Conflict management skills	3.72	0.832	0.6922	17	0.000	Reject
6	Work effectively in a team	4.24	0.891	0.7939	8	0.000	Reject
7	History of delays	4.18	0.946	0.8949	10	0.000	Reject
8	History of payment	3.85	0.862	0.743	14	0.063	Accept
9	Records of cost overrun	3.45	0.684	0.4679	22	0.000	Reject
10	Availability of funds	3.36	0.734	0.5388	23	0.000	Reject
11	Safety records	4.01	0.647	0.4186	12	0.144	Accept
12	Green renovation projects managed	4.75	0.854	0.7293	2	0.000	Reject

13	Green certified/NABERS	3.56	0.733	0.5373	20	0.000	Reject
14	Interest in continuous green training	3.65	0.688	0.4733	19	0.000	Reject
15	Energy and Co2 emission savings	3.70	0.721	0.5198	18	0.000	Reject
16	Cleaner construction records	4.23	0.869	0.7552	9	0.070	Accept
17	Size of green renovation project	4.56	0.987	0.9742	3	0.000	Reject
18	Understanding of green renovation	4.36	0.88	0.7744	6	0.000	Reject
19	Experience of workers	3.02	0.897	0.8046	24	0.000	Reject
20	Type of technologies involved	3.74	0.875	0.7656	16	0.000	Reject
21	Quantity of technologies involved	3.81	0.779	0.6068	15	0.311	Accept
22	Location of project	4.25	0.722	0.5213	7	0.000	Reject
23	Cost of project	4.09	0.86	0.7396	11	0.000	Reject
24	Project duration	4.41	0.786	0.6178	5	0.000	Reject

In all 24 factors were affirmed after the initial pilot study that identified over 30 variables. The pilot study reinforced the initial data by contributing to the rejection and modification of variables. Table 1 presents the factors that influence the selection of project managers or consultants. Academic qualification (mean = 4.88), green renovation projects managed (mean = 4.75), size of new green renovation project (mean = 4.56), working experience (mean = 4.44), project duration (mean = 4.41), understanding of green renovation (mean = 4.36), project location (mean = 4.25), work effectively in a team (mean = 4.24), cleaner construction records (mean = 4.23) and history of delays (mean = 4.18) ranked from 1st to 10th in that order. Least ranked factors include quantity of technologies involved (mean = 3.81), type of technologies (mean = 3.74), green certification (mean = 3.56), availability of funds (mean = 3.36) and experience of workers (mean = 3.02). Chi-square test results confirm the rejection of the null hypotheses that the factors do not affect selection of project managers for green renovation projects. Table 1 shows that for each of the independent variables $X^2_{est} > X^2_{\beta}$ at $p < 0.05$. This implies that the factors do affect selection of project managers hence rejection of the null hypothesis. There is a strong statistical relationship between the variables and selection of project managers.

4. Discussion

The academic qualification provides detailed information about the level or expertise of project managers. According to the results the Ministry of Local Government is interested in the training and academic background of experts. To be successful at the expression of interest stage of a tender process, a consultant or project manager should present required and expected qualifications. Project managers without the appropriate qualification tend to perform poorly thereby negatively impacting the project in terms of cost, quality and safety. Critical verification of training and other forms of training in line with construction management ensure that delays and project failures are avoided (Alvarenga et al., 2019). The concept of green renovation makes the issue of academic qualification important as it is a unique area, new and relates closely with CO₂ emissions. The results agree with Creasy and Anantatmula (2016) in a study that indicates personal traits have a relationship with project success. The uniqueness of green renovation makes it necessary to have evidence of past projects managed and the level of success achieved. Having the qualification does not guarantee selection, however being able to present details of green renovation managed in the past presents a positive outlook. Clients are interested in the number of green renovation projects managed and the success rate. The local government officers consider a project manager or consultant qualified by looking at the nature of energy retrofit projects undertaken, records of systems adopted and the energy savings obtained. Given the technologies adopted and the volume of works executed, clients are presented with the necessary data to aid decision making processes. The results indicate the size of green renovation as a factor that motivates selection of project managers. Identifying size of projects handled provide basis to connect experience gained to a new project. New projects are complex particularly energy conservation renovation projects, thus the size also relates to experiences and selection decisions (Hadad et al., 2013). For example, a project manager with no experience of pumps, motors, cooling systems, cooling tower systems retrofit may not be able to handle similar projects.

5. Conclusions

Past studies on project manager selection are focused on conventional buildings, with little knowledge on the concept of green renovation. Indeed, the literature presents little information on the factors that influence selection of project managers for green renovation. The main aim of the study is to investigate factors influencing selection of project managers for energy conservation refurbishments. The literature review provided secondary data of various factors although there is little information on energy retrofit and selection of project managers. A survey design in the structure of a questionnaire ensured factors that influence selection of consultants are identified and investigated. As presented in Table 1, the main factors include academic qualification, green renovation projects managed, size of green renovation project, working experience, project duration, understanding of green renovation and project location. The study is limited to a developing economy thus future studies can focus on expanding the variables. The findings fill the gap in the literature and provide data for the selection of project managers. Policy makers are provided with a tool to follow in relation to appointment of project managers or consultants for green renovation projects.

References

- Afshari, A. R. (2017). Methods for selection of construction project manager: Case study. *Journal of Construction Engineering and Management*, 143(12), 06017003.
- Afshari, A. R., Yusuff, R., & Derayatifar, A. R. (2012, May). Project manager selection by using Fuzzy Simple Additive Weighting method. In *2012 International Conference on Innovation Management and Technology Research* (pp. 412-416). IEEE.
- Afshari, A., & Kowal, J. (2017). Decision making methods for the selection of ICT project manager. *GOSPODARKA RYNEK EDUKACJA= ECONOMY MARKET EDUCATION*, 18(4), 19-28.
- Afshari, A. R., Nikolić, M., & Akbari, Z. (2018). Review on project manager selection criteria and methods. In *8th International Symposium Engineering Management and competitiveness* (pp. 22-23).
- Alvarenga, J. C., Branco, R. R., do Valle, A. B., Soares, C. A. P., & e Silva, W. D. S. (2019). The self-perception of project managers compared to other project actors. *Interciencia*, 44(8), 444-453.
- Çelikkilek, Y. (2018). A grey analytic hierarchy process approach to project manager selection. *Journal of Organizational Change Management*.
- Chaghooshi, A., Arab, A., & Dehshiri, S. (2016). A fuzzy hybrid approach for project manager selection. *Decision Science Letters*, 5(3), 447-460.
- Chipulu, M., Neoh, J. G., Ojiako, U., & Williams, T. (2012). A multidimensional analysis of project manager competences. *IEEE Transactions on Engineering Management*, 60(3), 506-517.
- Creasy, T., & Carnes, A. (2017). The effects of workplace bullying on team learning, innovation and project success as mediated through virtual and traditional team dynamics. *International Journal of Project Management*, 35(6), 964-977.
- Dadzie, J., Abdul-Aziz, A. R., & Kwame, A. (2012). Performance of consultants on government projects in Ghana: client and contractor perspective. *International Journal of Business and Social Research*, 2(6), 256-267.
- Dodangeh, J., Sorooshian, S., & Afshari, A. R. (2014). Linguistic extension for group multicriteria project manager selection. *Journal of Applied Mathematics*, 2014.
- Gharouni Jafari, K., & Noorzai, E. (2021). Selecting the most appropriate project manager to improve the performance of the occupational groups in road construction projects in warm regions. *Journal of Construction Engineering and Management*, 147(10), 04021131.
- Hadad, Y., Keren, B., & Laslo, Z. (2013). A decision-making support system module for project manager selection according to past performance. *International Journal of Project Management*, 31(4), 532-541.
- Ha, T. P. T., & Tran, M. D. (2018). Review of impacts of leadership competence of project managers on construction project success. *International Journal of Emerging Trends in Social Sciences*, 4(1), 15-25.
- Horváth, V. (2019). Project management competence—definitions, models, standards and practical implications. *Vezetéstudomány-Budapest Management Review*, 50(11), 2-17.
- Jazebi, F., & Rashidi, A. (2013). An automated procedure for selecting project managers in construction firms. *Journal of Civil Engineering and Management*, 19(1), 97-106.
- Kondalkar, V. G. (2020). *Organizational behaviour*. New Age.
- Levy, S. M. (2018). *Project management in construction*. McGraw-Hill Education.
- Luțaș, M., Nistor, R., Radu, M., & Beleiu, I. (2020). Perceptions regarding the profile of an ideal project manager. *Amfiteatru economic*, 22(54), 608-622.
- Manaana, O. A., Ahadzie, D. K., Panford, J. K., & Proverbs, D. G. (2014). Competency-based evaluation of project managers' performance in mass house building projects in Ghana—the fuzzy set theory approach. *Journal of Science and Technology (Ghana)*, 34(1), 46-62.

- Meredith, J. R., Shafer, S. M., Mantel Jr, S. J., & Sutton, M. M. (2020). *Project management in practice*. John Wiley & Sons.
- Mohammadi, F., Sadi, M. K., Nateghi, F., Abdullah, A., & Skitmore, M. (2014). A hybrid quality function deployment and cybernetic analytic network process model for project manager selection. *Journal of Civil Engineering and Management*, 20(6), 795-809.
- Moradi, S., Kähkönen, K., & Aaltonen, K. (2020). Comparison of research and industry views on project managers' competencies. *International Journal of Managing Projects in Business*.
- Moradi, S., Kähkönen, K., Klakegg, O. J., & Aaltonen, K. (2021). A competency model for the selection and performance improvement of project managers in collaborative construction projects: Behavioral studies in Norway and Finland. *Buildings*, 11(1), 4.
- Project Management Institute. *A Guide to the Project Management Body of Knowledge (PMBOK®)*. 6th ed. Project Management Institute; 2017.
- Reza Afshari, A. (2015). Selection of construction project manager by using Delphi and fuzzy linguistic decision making. *Journal of Intelligent & Fuzzy Systems*, 28(6), 2827-2838.
- Sadatrassool, M., Bozorgi-Amiri, A., & Yousefi-Babadi, A. (2016). Project manager selection based on project manager competency model: PCA-MCDM Approach. *Journal of Project Management*, 1(1), 7-20.
- Sadeghi, H., Mousakhani, M., Yazdani, M., & Delavari, M. (2014). Evaluating project managers by an interval decision-making method based on a new project manager competency model. *Arabian Journal for Science and Engineering*, 39(2), 1417-1430.
- Sang, P., Liu, J., Zhang, L., Zheng, L., Yao, H., & Wang, Y. (2018). Effects of project manager competency on green construction performance: the Chinese context. *Sustainability*, 10(10), 3406.
- Sankaran, S., Vaagaasar, A. L., & Bekker, M. C. (2020). Assignment of project team members to projects: Project managers' influence strategies in practice. *International Journal of Managing Projects in Business*.
- Sharma, K. K., & Kumar, A. (2018). Facilitating quality project manager selection for Indian business environment using analytical hierarchy process. *International Journal of Quality & Reliability Management*.
- Wen, Z., Liao, H., Zavadskas, E. K., & Antuchevičienė, J. (2021). Applications of fuzzy multiple criteria decision making methods in civil engineering: A state-of-the-art survey. *Journal of Civil Engineering and Management*, 27(6), 358-371.



Proceedings of the 12th International Conference on Construction in the 21st Century (CITC-12)

📍 Amman, Jordan
May 16-19, 2022

Editors:

Syed M. Ahmed, Salman Azhar, Amelia D. Saul, & Kelly L. Mahaffy

CITC GLOBAL
Construction in the 21st Century

Proceedings of the 12th International Conference on Construction in the 21st Century (CITC 12)

May 16 – 19, 2022 | Amman, Jordan

Editors

Dr. Syed M. Ahmed

South Dakota State University

Dr. Salman Azhar

Auburn University, Auburn, Alabama, USA

Dr. Amelia D. Saul

East Carolina University, Greenville, North Carolina, USA

Ms. Kelly L. Mahaffy

East Carolina University, Greenville, North Carolina, USA

Foreword

While technology and innovation are shrinking, the distance between countries and industries and leadership and collaboration are actively shaping the construction industry, as well as guiding it towards success. Construction in the 21st Century (CITC) is an organization based in the Department of Construction Management at East Carolina University. The CITC-12 conference is being organized by CITC and supported by Auburn University. CITC organizes international conferences to bring together like-minded construction management professionals. The CITC-12 conference seeks to bring together an international group of practitioners, researchers, and educators to promote a novel exchange of ideas in a multidisciplinary fashion.

CITC-12 is a peer-reviewed conference that acts as a dynamic collaboration for the exchange of knowledge. New methods and techniques must be carefully scrutinized and rigorously tested before implementation, and CITC-12 plays an integral role in this process. As the industry moves forward in an ever-complex globaleconomy, multi-national collaboration is crucial. Future growth in the industry will undoubtedly rely on international teamwork and alliance.

This May marks the twelfth CITC conference. Previous conferences include CITC-I in Miami, USA of 2002, CITC-II in Hong Kong, China of 2003, CITC-III in Athens, Greece of 2005, CITC-IV in Gold Coast, Australia of 2007, CITC-V in Istanbul, Turkey of 2009, CITC-VI in Kuala Lumpur, Malaysia of 2011, CITC-VII in Bangkok, Thailand of 2013, CITC-8 in Thessaloniki, Greece of 2015, CITC-9 in Dubai, UAE of 2017, CITC-10 in Colombo, Sri Lanka of 2018, and CITC-11 in London, United Kingdom of 2019. All conferences were tremendously successful. As with previous conferences, this effort has been greatly supported by our friends and colleagues across the globe. It is our pleasure to now present to you the Twelfth International Conference on Construction in the 21st Century (CITC-12, Amman). This three-day conference is being held in Amman, Jordan at the Inter-Continental Hotel. CITC-12 will bring together a diverse group of academics, professionals, government agencies, and students from all over the world to contribute to the future growth of the industry.

We gratefully appreciate your attendance and hope that you will support the future endeavors of CITC.

Thank you and kind regards,

Editors:

Dr. Syed M. Ahmed

Dr. Salman Azhar

Dr. Amelia D. Saul

Ms. Kelly L. Mahaffy

© 2022 by CITC-12

All rights reserved. No part of this book may be reproduced in any form, or by any means without written permission from the editors.

The views expressed in the papers are of the individual authors. The editors are not liable to anyone for any loss or damage caused by an error or omission in the papers, whether such error or omission is the result of negligence or any other cause. All and all such liability are disclaimed.

ISBN: 979-8-9865406-0-3

July 2022

Wendell, North Carolina, USA

CITC-12 Themes

- Leadership in Engineering & Construction
- Building Information Modeling
- Lean Construction Practices
- 3D Printing
- Augmented and/or Mixed Reality
- Legal Issues in Construction
- Value Engineering
- Project and Program Management
- Quality and Productivity Improvement
- Sustainable Design and Construction
- Concrete Technology
- Construction Contracts
- Construction Safety
- Construction Scheduling
- Cost Analysis & Control
- Cultural Issues in Construction
- Design-Build Construction
- Engineering & Construction Materials
- Ethical Issues in Engineering and Construction
- Information Technology and Systems
- Infrastructure Systems and Management
- International Construction Issue
- Materials and Technology Research
- Structural Design

Contents

INTERNATIONAL SCIENTIFIC REVIEW COMMITTEE.....	XI
KEYNOTE SPEAKERS	XII-XIV
WORKSHOPS.....	XV - XVII

ID 1	THE DIFFERENCE BETWEEN IRR AND NPV IN CAPITAL INVESTMENT APPRAISALS	1-12
ID 2	A REVIEW OF FACILITIES MANAGEMENT GUIDELINES FOR THE LIVING ENVIRONMENT OF THE ELDERLY	13-21
ID 3	COMPARATIVE ANALYSIS OF CRITICAL SUCCESS FACTORS FOR SMART AND SUSTAINABLE DEVELOPMENTS BETWEEN ORGANIZATIONS AND AMONG CONSTRUCTION PROFESSIONALS	22-28
ID 4	CAREER CHOICE AND IT'S INFLUENCING FACTORS: PERCEPTION OF FEMALE CONSTRUCTION STUDENTS	29-37
ID 5	MAKING THE 'AVAILABLE DESIRABLE' USING ADAPTIVE REUSE (AR) IN SUSTAINABLE CONSTRUCTION: A SYSTEMATIC REVIEW AND DIRECTIONS FROM CASE STUDIES	38-46
ID 6	SUCCESS FACTORS FOR EFFECTIVELY IMPLEMENTING LEAN PRACTICES IN THE CONSTRUCTION INDUSTRY: A CASE OF NORTH WEST PROVINCE, SOUTH AFRICA	47-47
ID 7	LEARNING FROM CONSTRUCTION ACCIDENTS: INPUT, PROCESS AND CONTEXT	54-62
ID 8	A THEORETICAL ASSESSMENT OF CAUSES FOR DEFERRED MAINTENANCE OF PUBLIC BUILDINGS IN DEVELOPING COUNTRIES-THE KINGDOM OF ESWATINI	63-66
ID 10	EXPERIMENTAL ANALYSIS OF AGGREGATE DENSITIES AND DEFLECTIONS FOR COMPACTION QUALITY CONTROL WITH LIGHT WEIGHT DEFLECTOMETER	67-76
ID 11	CRITICAL SUCCESS FACTORS FOR HUMAN RESOURCE MANAGEMENT PRACTICES IN THE NIGERIAN CONSTRUCTION INDUSTRY: A DELPHI APPROACH	77-77
ID 12	AN EVALUATION ON THE IMPLEMENT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ON SOUTH AFRICAN CONSTRUCTION PROJECTS.....	84-84
ID 13	CHALLENGES OF PUBLIC-PRIVATE PARTNERSHIPS IN LOW-INCOME HOUSING PROVISION IN NIGERIA	91-91
ID 14	ASSESSMENT OF MAINTENANCE NEEDS IN PUBLIC EDUCATIONAL INSTITUTIONS RESIDENTIAL FACILITY.....	98-98
ID 15	UNRAVELLING THE ENCUMBRANCES TO BETTER INFORMATION MANAGEMENT AMONG QUANTITY SURVEYORS IN THE 4IR: A QUALITATIVE STUDY	105-105
ID 16	PRELIMINARY ASSESSMENTS OF WASHROOMS CONDITIONS IN MALAYSIA HOSPITAL BUILDINGS	112-112
ID 18	PRODUCTION PLANNERS' SCOPE OF ACTION IN THE CONTEXT OF DIGITAL TWIN CONSTRUCTION	119-129
ID 19	AN EXPERIMENTAL INVESTIGATION ON STRENGTH CHARACTERISTICS OF CONCRETE USING WASTEPAPER SLUDGE ASH (WPSA)	130-137
ID 20	EFFECTS OF EMPLOYEE TURNOVER ON EMPLOYEE PERFORMANCE IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY-A REVIEW	138-141
ID 22	COVID-19 VACCINE MANDATES IN THE CONSTRUCTION INDUSTRY	142-147
ID 23	BIM MATERIAL PASSPORT TO SUPPORT BUILDING DECONSTRUCTION AND A CIRCULAR ECONOMY	148-156
ID 24	EXPERIMENTAL ANALYSIS OF AGGREGATE DENSITIES AND DEFLECTIONS FOR COMPACTION QUALITY CONTROL WITH LIGHT WEIGHT DEFLECTOMETER	157-166
ID 25	BIBLIOMETRIC ANALYSIS OF FACTORS INFLUENCING POOR PERFORMANCE OF WATER INFRASTRUCTURE.....	167-176

ID 27	3D SIMULATION GAME FOR TEACHING CONCRETE FORMWORK.....	177-177
ID 28	WILLINGNESS OF USERS TO ADOPT BLOCKCHAIN TECHNOLOGY ON CONSTRUCTION PROJECTS	184-194
ID 29	SYSTEMATIC LITERATURE REVIEW ON SUSTAINABLE CONSTRUCTION STRATEGIES FOR THE DEVELOPMENT OF AFFORDABLE HOUSING	195-203
ID 30	AGIBUILD: A PROPOSED FRAMEWORK FOR AGILE BUILDING ADAPTATION PROJECT MANAGEMENT BASED ON LITERATURE REVIEW	204-212
ID 32	COLLABORATION AS A MULTIFACETED SKILL SET IN CONSTRUCTION EDUCATION	213-219
ID 33	CHALLENGES OF SUSTAINABLE CONSTRUCTION PROJECTS DELIVERY	220-227
ID 36	DECISION TREE ANALYSIS IN PROJECT RISK MANAGEMENT: A SYSTEMATIC REVIEW	230-239
ID 37	BUILDING INFORMATION MODELLING MANDATES AND GOVERNMENT EFFORTS: A SYSTEMATIC REVIEW	240-247
ID 38	KEY INDICATORS FOR SUCCESSFUL VALUE MANAGEMENT PERFORMANCE IN THE BUILT ENVIRONMENT (A LITERATURE REVIEW)	248-256
ID 39	A CRITICAL REVIEW OF BARRIERS HINDERING BIM INTEGRATION OF OPERATION AND MAINTENANCE PHASE IN EXISTING BUILDINGS	257-269
ID 40	ENVIRONMENTAL SUSTAINABILITY ASSESSMENT OF WASTEWATER TREATMENT PROCESSES: CASE STUDY	270-277
ID 42	THE IMPACT OF PROJECT CONTEXT ON MANAGEMENT PRACTICES IN THE NORTH CYPRUS CONSTRUCTION INDUSTRY	278-286
ID 43	IMPROVING HEALTH AND SAFETY (H&S) ON SOUTH AFRICAN CONSTRUCTION PROJECTS WITH INDUSTRY 4.0.....	287-294
ID 44	FACTORS INFLUENCING SELECTION OF A PROJECT MANAGER FOR ENERGY RETROFIT PROJECTS IN GHANA	295-301
ID 45	AN ASSESSMENT OF TRADE UNIONS IN THE SOUTH AFRICAN ARCHITECTURE, ENGINEERING AND CONSTRUCTION INDUSTRY	302-302
ID 46	RESEARCH METHODS IN CONSTRUCTION ROBOTICS AND HUMAN-ROBOT TEAMS: - A SCIENTOMETRIC AND SYSTEMATIC REVIEW	309-317
ID 48	EVALUATION OF ATMOSPHERIC EXPOSURE TEST ON STRUCTURAL STEEL AND HOT-DIP GALVANIZED STEEL IN THE EAST OF THAILAND.....	318-325
ID 49	CONSTRUCTION SITE TOP-VIEW GENERATION USING DRONE IMAGERY: THE AUTOMATIC STITCHING ALGORITHM DESIGN AND APPLICATION.....	326-334
ID 50	REMOTE SENSING AND NEURAL NETWORK-DRIVEN PAVEMENT EVALUATION: A REVIEW	335-345
ID 51	AN ANALYSIS OF THE CONTRACTOR'S PROJECT PERFORMANCE BASED ON FIELD PERFORMANCE RATING.....	346-353
ID 52	COVID-19 VACCINATION HESITANCY AND PERCEIVED RISK OF INFECTION AMONG CONSTRUCTION WORKERS	354-354
ID 53	EVALUATION OF BUILDING'S LIFE CYCLE CARBON EMISSIONS BASED ON BIM AND LCA: A CASE STUDY OF AFFORDABLE HOUSING IN MOROCCO	361-369
ID 54	DEVELOPMENT OF REINFORCEMENT SCHEMES FOR COLD-FORMED STEEL JOISTS WITH LARGE WEB OPENINGS	370-376

ID 55	A CRITICAL REVIEW OF WOOD WASTE CEMENT COMPOSITE PROPERTIES (THE MECHANICAL AND PHYSICAL PROPERTIES) AND ITS USE AS BUILDING CONSTRUCTION MATERIAL	377-386
ID 56	DEVELOPING A VR RESEARCH INSTRUMENT FOR PARTICIPATORY DESIGN OF EDUCATIONAL SPACES	387-395
ID 58	THE LAST PLANNER SYSTEM®: STATE OF THE ART	396-404
ID 59	ENERGY PERFORMANCE: EFFECTS OF AIR DISTRIBUTION SYSTEMS AND BUILDING ENVELOPE DESIGN ON INDOOR AIR QUALITY AND ENERGY EFFICIENCY	405-415
ID 60	INVESTIGATING DESIGN AND DEPLOYMENT OF ECO-FEEDBACK DASHBOARDS	416-421
ID 61	AN INVESTIGATION ON THE IMPACT OF 4D BIM ON CONSTRUCTION SCHEDULING	422-422
ID 62	INDOOR LOCALIZATION AND TRACKING OF BUILDING COMPONENTS AND FIXTURES USING ULTRA-WIDE BAND.....	429-436
ID 63	SUPPLY CHAIN MANAGEMENT IN CONSTRUCTION: STATE OF THE ART.....	437-444
ID 65	INTRODUCING CONSTRUCTION 4.0 INTO CONSTRUCTION MANAGEMENT CURRICULA	445-453
ID 67	EXPLORING THE CHALLENGES OF ATTAINING THE REQUIRED COMPETENCIES FOR SUSTAINABLE CONSTRUCTION PROJECTS: A CASE OF BUILT ENVIRONMENT PROFESSIONALS IN SOUTH AFRICA	454-461
ID 68	OFFSHORE CONSTRUCTION PROGRESS MANAGEMENT BY INDOOR GIS POSITIONING: POST-COVID-19 NEW NORMAL.....	662-470
ID 70	EVALUATING THE AWARENESS, BARRIERS, AND LEVEL OF ADOPTION OF INNOVATIVE DIGITAL TECHNOLOGIES IN THE HEALTH AND SAFETY OF HIGH-RISE CONSTRUCTION IN SOUTH AFRICA	471-479
ID 71	THE EMBODIED ENERGY ASSESSMENT OF VARIOUS BUILDING ASSEMBLIES IN RESIDENTIAL BUILDING CONSTRUCTION.....	480-487
ID 72	CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) IN PAKISTANI CONSTRUCTION INDUSTRY – BENCHMARKING OF STAKEHOLDERS’ AWARENESS	488-495
ID 73	VR-ENABLED PARTICIPATORY DESIGN OF EDUCATIONAL SPACES: AN EXPERIENTIAL APPROACH	496-496
ID 74	THE FUTURE OF AUTOMATED PLANT IN CONSTRUCTION – A UK PERSPECTIVE	503-503
ID 75	AN INVESTIGATION OF THE ADOPTION OF BIM AND VALUE ENGINEERING BARRIERS IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY	510-517
ID 76	SUSTAINABILITY CULTURE IN UAE CONSTRUCTION COMPANIES – A SNAPSHOT ASSESSMENT AND IMPROVEMENT GUIDELINES	518-530
ID 78	BUILDING INFORMATION MODELLING AT THE DESIGN CONCEPTUAL PHASE AND EFFECT ON PROJECT QUALITY AND BUDGET: A REVIEW	531-536
ID 80	RESILIENCE IN CONSTRUCTION ROBOTICS AND HUMAN-ROBOT TEAMS FOR INDUSTRIALISED CONSTRUCTION	537-546
ID 81	INFLUENTIAL FACTORS AFFECTING THE DIFFUSION OF BUILDING INFORMATION MODELING IN SOUTH AFRICAN CONSTRUCTION PROJECTS	547-555
ID 82	BIM AND BUILDING RESILIENCE: A HYBRID MECHANISM TO INTEGRATE MEASURES AGAINST FLOODING	556-564
ID 83	EARNED VALUE MANAGEMENT WITH THE USE OF BUILDING INFORMATION MODELLING	565-573

ID 84	ELECTRIC VEHICLE CHARGING STATIONS DEPLOYMENT OPTIMIZATION USING GENETIC ALGORITHMS.....	574-581
ID 85	CEMENTITIOUS PASTE DEFECTS CORRELATED TO ENGINEERING PROPERTIES OF CONCRETE	582-592
ID 86	PROBLEM-BASED LEARNING (PBL) FOR A CONSTRUCTION CAPSTONE COURSE: ASSESSMENT THROUGH COMPETING VALUES SKILL SURVEYS (CVSS)	593-601
ID 87	MAPPING THE DYNAMICS OF EMERGING TECHNOLOGIES RESEARCH TRENDS IN AFRICA VIS-À-VIS BUILT ENVIRONMENT-RELATED STUDIES.....	602-610
ID 88	EVALUATING THE RELATIONSHIP BETWEEN SOCIO-CULTURAL DIVERSITY AND COLLABORATION AMONG PROJECT TEAMS IN JOHANNESBURG, SOUTH AFRICA.....	611-618
ID 90	VARIATION ORDERS ADD OR NON-VALUE ADD - A CASE OF SOUTH AFRICA	610-627
ID 91	DRAWBACKS TO THE ATTAINMENT OF SUSTAINABLE ROAD INFRASTRUCTURE IN SOUTH AFRICA	628-634
ID 92	DIGITAL TECHNOLOGIES FOR EFFECTIVE VALUE MANAGEMENT IN THE CONSTRUCTION INDUSTRY.....	635-642
ID 93	A SMART CONTRACT FRAMEWORK AS AN ALTERNATIVE METHOD FOR LETTER OF CREDIT USE IN CONSTRUCTION PROCUREMENT	643-649
ID 98	MECHANICAL CHARACTERISTICS AND DURABILITY OF CONCRETE MADE WITH TREATED DOMESTIC WASTEWATER AND RECYCLED CONCRETE AGGREGATES	650-654
ID 99	DESIGN ERROR COSTS IN COMMERCIAL CONSTRUCTION PROJECTS: THE US PERSPECTIVE	655-661
ID 102	FRAMEWORK FOR THE CLASSIFICATION OF COVID-19 FORCE MAJEURE DELAY EVENTS	662-674
ID 103	UTILIZING THE EC3 CALCULATOR TO COMPARE THE ENVIRONMENTAL IMPACTS OF MASS TIMBER AND STRUCTURAL STEEL.....	675-682
ID 104	DRIVERS OF INDUSTRY 4.0 IMPLEMENTATION IN THE CONSTRUCTION INDUSTRY	683-691
ID 105	A NEW METRIC FOR LABOR PRODUCTIVITY: CASE STUDY OF A MULTI-FAMILY RESIDENTIAL PROJECT.....	692-701
ID 106	THE IDENTIFICATION OF UNDERPINNING CRITERIA OF EMPLOYEE MENTAL HEALTH AND WELLBEING IN THE CONSTRUCTION INDUSTRY.....	702-710
ID 107	AN ANALYSIS OF CONTRACT MODIFICATIONS: USACE JACKSONVILLE DISTRICT, JACKSONVILLE, FLORIDA.....	711-718
ID 108	ARTIFICIAL NEURAL NETWORKS FOR PREDICTING CONVENTIONAL COST OF INDUSTRIAL CONSTRUCTION PROJECTS	719-727
ID 123	A COMPARATIVE STUDY ON DISPUTE RESOLUTION IN INDUSTRY AND THE DEPARTMENTS OF TRANSPORTATION	728-737
ID 124	EVALUATING THE BENEFITS EXPERIENCED BY PROFESSIONAL WOMEN WORKING IN THE CONSTRUCTION INDUSTRY IN SOUTH AFRICA	738-745
ID 125	REENGINEERING PROJECT MANAGEMENT PROCESSES FOR EPC CONTRACTORS: A SAUDI ARABIA CASE STUDY	746-752
ID 128	AUTOMATED CONSTRUCTION PROGRESS MONITORING – INDUSTRY PERSPECTIVE	753-760
ID 129	3D CONCRETE PRINTING; THE MATERIAL POINT	761-766

ID 130	ANALYSIS OF PERSONNEL RETENTION STRATEGIES WITHIN SOUTH AFRICAN CONSTRUCTION INDUSTRY A CASE STUDY OF GAUTENG PROVINCE	767-771
ID 131	AN INVESTIGATION INTO THE CAUSES OF JOB HOPPING WITHIN SOUTH AFRICAN CONSTRUCTION INDUSTRY A CASE STUDY OF GAUTENG PROVINCE	772-779
ID 132	PERSPECTIVES OF WOMEN IN CONSTRUCTION TO ENCOURAGE MORE WOMEN TO JOIN CONSTRUCTION	780-785
ID 135	FATALITIES AND THEIR ROOT CAUSES IN PAKISTANI CONSTRUCTION INDUSTRY	786-790
ID 136	IDENTIFICATION OF MAJOR RISK EVENTS FOR CONSTRUCTION INDUSTRY	791-799
ID 137	AN EMPIRICAL ASSESSMENT OF DECISION MAKING IN THE PUBLIC PROCUREMENT LIFECYCLE	800-809
ID 141	OPTIMIZING COMMUTER TRAVEL TIMES ON TRAFFIC SIGNALS USING PHASING TECHNIQUES – A PATHWAY FOR COST-EFFECTIVE INTELLIGENT TRANSPORTATION SYSTEM	810-818
ID 142	IDENTIFYING BUILDING INFORMATION MODELING POTENTIALS FOR CONSTRUCTION DISPUTE AVOIDANCE AND RESOLUTIONS	819-826
ID 143	WATER AND ENERGY RETROFITTING – A CASE STUDY OF COMMUNITY BUILDING	827-834
ID 144	A BIM BASED MODEL FOR ENERGY EFFICIENT RETROFITTING OF AN EXISTING BUILDING – A CASE STUDY	835-835
ID 145	KNOWLEDGE MANAGEMENT FRAMEWORK FOR INTEGRATED PROJECT DELIVERY	842-849
ID 146	A GIS EVALUATION FOR ACCESSIBILITY TO WASH FACILITIES IN MANTAPALA REFUGEE SETTLEMENT	850-850

CITC-12 International Scientific Review Committee

We would like to express our sincere gratitude to the members of the International Scientific Committee, who participated in the review process for the CITC-12:

- Junshan Liu
- Tariq Umar
- Tawakalitu Bisola Odubiyi
- Jeff Kim
- Khalid Siddiqi
- Cosmas Ifeanyi Nwakanma
- Afshin Turk
- Syed Shujaa Safdar Gardezi
- Chioma Okoro
- Pavan Meadati
- Esra Bostancioglu
- Pinar I. Cakmak
- Ken Sivakumaran
- Adetayo Onososen
- Christtestimony Oluwafemi Jesumoroti
- Theo C. Haupt
- Mariam Akinlolu
- Jhonattan Martinez Ribon
- Motheo M Tjebane
- Gift Laolang
- C. Ben Farrow
- Malindu Sandanayake
- Mayur Shelke
- Alex Torku
- Alireza Moghayedi
- Wesley Collins
- Michele M. Herrmann
- George Aretoulis
- Kimani Thomas N.
- Tala Kasim
- Irfan Abid
- Derek Abankwa
- Samuel Adeniyi Adekunle
- Owojori Oluwatobi Mary
- Konstantinos Zapounidis
- Lincoln Forbes
- Syed Shujaa Safdar Gardez
- Ken Farnes
- Furkan UYSAL
- Pavan Meadati
- Yuhan Jiang
- Balkiz Yapicioglu
- Mohsen Garshasby
- Innocent Musonda
- Timson Yeung
- Benedict Amade
- Sanjeev Adhikari
- Thomas Ying
- Wassim AL BALKHY
- Athanasios Chassiakos
- Hamed Hyab Samir
- Iyiola Comfort Olubukola
- Toyin James Olaonipekun
- John Dadzie
- Norma Nusz Chandler
- Albena Yordanova
- Salar Ahmadi
- Rifat Sonmez
- Hakan Karabacak
- İzzet Arı
- Opeoluwa Akinradewo
- Abid Nadeem
- Dubem Ikediashi
- Darshi De Saram
- Scott Kramer
- Arun Garg
- Jackie Yang
- Thomas Kimani
- Wang Ting
- Ayodeji Oke
- Muhammad Saqib
- Farhan Saleem
- Dr. Rana Rab Nawaz
- Dr. Aslam Bhutto
- Fawwad Masood
- Mollo Lesiba
- Erlend Andenæs
- Professor Subhi Bazlamit
- Dr. Ahmad Manasrah
- Dr. Ali Othman
- Dr. Fuad El-Qirem
- Dr. Loai Dabbour
- Dr. Mahmoud Zeidan
- Dr. Malik Amairah
- Dr. Mohammad Masoud
- Dr. Mousa Bani Baker
- Dr. Nabeel Abu Shaban
- Dr. Raed Abendeh
- Dr. Rami Alawneh
- Dr. Rashid Al-Sakarneh
- Dr. Saleh Al-Jazzar
- Dr. Sami Al-Dalahma
- Dr. Ubaidallah Al-Qawabah
- Dr. Yousef Jaradat
- Dr. Zaid Hamad
- Dr. Alaa Abdou
- Dr. Pinar Cakmak
- Dr. Hamimah Adnan
- Dr. Georgios Aretoulis
- Dr. Anita Ceric
- Dr. Albert P.C. Chan
- Dr. Athanasios Chasiakos
- Dr. Abdol Chini
- Dr. Mohammed Dulaimi
- Dr. Sameh M. El Sayegh
- Dr. Theodore C. Haupt
- Dr. Julian Kang
- Dr. Abdul Samed Kazi
- Dr. Scott Kelting
- Dr. Christian Koch
- Dr. Sergios Lambropoulos
- Dr. Peter Love
- Dr. Odysseus Manoliadis
- Dr. Tayyab Maqsood
- Dr. Innocent Musonda
- Dr. Abid Nadeem
- Dr. A.C. Ogbonna
- Dr. Kleopatra Petroustou
- Dr. Mirosław J. Skibniewski
- Dr. Wellington Didibhuku Thwala
- Dr. Zeljko M. Torbica
- Dr. Bambang Trigunarsyah
- Dr. Dimitra Vagiona
- Dr. Rizwan U. Farooqui
- Dr. Rafiq M. Choudhry
- Dr. Rita Li
- Professor Jamal Khatib
- Dr. Malik M.A. Khalfan
- Dr Justus Ngala Agumba