

PAPER • OPEN ACCESS

Prospects of Quantity Surveyors in a dynamic world of climate change, digitalization and economic recession

To cite this article: PF Tunji-Olayeni *et al* 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **640** 012130

View the [article online](#) for updates and enhancements.



The Electrochemical Society
Advancing solid state & electrochemical science & technology

The ECS is seeking candidates to serve as the
Founding Editor-in-Chief (EIC) of ECS Sensors Plus,
a journal in the process of being launched in 2021

The goal of ECS Sensors Plus, as a one-stop shop journal for sensors, is to advance the fundamental science and understanding of sensors and detection technologies for efficient monitoring and control of industrial processes and the environment, and improving quality of life and human health.

Nomination submission begins: May 18, 2021



Nominate now!

Prospects of Quantity Surveyors in a dynamic world of climate change, digitalization and economic recession

PF Tunji-Olayeni^{1&2} OO Oyeyipo³ and EE Nnadi⁴

¹Department of Building Technology, Covenant University, Ota, Nigeria

²Regional Centre of Expertise, Ogun State, Nigeria

³Department of Quantity Surveying, Bells University of Technology, Nigeria

⁴Department of Quantity Surveying, Enugu State University of Science and Technology, Nigeria

E-mail: pat.tunji-olayeni@covenantuniversity.edu.ng

Abstract. Environmental, social and economic challenges cause serious changes that can affect the sustainability of businesses. Climate change, digitalization and economic recession have become topical in recent times. These issues are shaping the way businesses operate. Empirical and anecdotal evidences show that businesses can become worse off, if they do not embrace change. This paper is a desk research which focuses on the prospects of Quantity Surveying businesses in an era of climate change, digitalization and economic recession. It concludes that Quantity Surveyors can thrive in the face of climate change, digitalization and economic recession if they adopt sustainable construction, leverage on Information, Communication and Technology (ICT) and practice Value Management.

Keywords: climate change, construction industry, digitalization, economic recession, sustainable development, value management

1. Introduction

Climate change, digitalization and economic recession are global phenomenon having influence on business processes. Climate change is a challenge confronting not only businesses but humanity at large. Climate change increases global warming and atmospheric greenhouse gases. Even though climate change can be a natural occurrence, there are empirical evidences to show that it is also human induced [1;2 and 3]. Several climate change and mitigation strategies have been advanced to combat its occurrence and reduce its effects [4 and 5]. Because climate change is also triggered by manmade activities, altering the way developmental activities are done can mitigate its effects. Construction activities contribute significantly to climate change. Its processes and products cause environmental pollution, loss of biodiversity and affect the health and wellbeing of humans. Moving away from conventional construction will deliver environmental and social dividends which can significantly mitigate climate change effects.

Digitalization has changed the way businesses are run globally. It is powered by Information, Communication and Technology (ICT) and it includes all forms of factory automation, cloud computing, big data analysis [6], mobile apps and software used to enhance and optimize business



operations. Digitalization is also occurring in the construction industry and it can be used for capturing data, storing data, processing data, displaying data, communication and collaborating with project team members [7]. Although there are several Critical Success Factors (CSFs) required for the digitalization of the construction industry, firms which do not embrace ICT will find it difficult to compete.

Economic recession is another issue that businesses contend with. It is a season of great decline in business activities which lingers for a couple of months, usually obvious in growth of Gross Domestic Product, industrial production, income levels of households, wholesale retail sale and employment [8]. In the last forty years several economic recessions have taken place, with negative impacts on both developing and developed nations. The last economic recession of 2008/2009 originated from the United States of America. The recession was due to state and market failure [9]; imbalances in national assets globally [10] and the 'Triffin paradox'[11]. The recession had a global effect because nations have become more connected as a result of international trade and linkages. In Nigeria, many sectors were affected by the economic crisis. The construction sector in particular had its own share of the economic crisis. For instance, new projects were hardly awarded; plants could be seen lying idly on most construction sites and newly constructed facilities were left unoccupied [12].

The business landscape is becoming more challenging with climate change, digitalization and economic recession determining the way businesses are run. Hence Quantity Surveyors need to understand what it takes to survive in the midst of these challenges. This paper presents a review of the prospects of Quantity Surveyors in a dynamic world of climate change, digitalization and economic recession. It attempts to answer the following pertinent questions:

- i) What opportunities do Quantity Surveyors have in a new regime of climate change?
- ii) How can Quantity surveyors compete successfully in an era of digitalization?
- iii) What skill can quantity surveyors leverage on during periods of economic recession?

2. Sustainable Construction

The adoption of Sustainable Construction provides a platform for quantity surveyors to remain relevant in an era of climate change. Sustainable construction is the industry's response to the environmental, social and economic challenges emanating from its operations. Sustainable construction also considers health outcomes of workers to reduce the occurrence of occupational hazards [13 and 14].

Sustainable construction originates from sustainable development which is the major focus of leaders across the globe. This study will focus on the environmental benefits of sustainable construction because climate change is largely an environmental issue with social and economic implications. The world's interest in climate change, depletion of scarce nature resources and degradation of the environment is affecting the way the construction projects are delivered and managed [15]. Even though the construction sector provides quality infrastructure for the comfort of man [16], some of its processes have negative effects on humans and the environment. Construction uses 40% of natural resources and generates about 40% greenhouse gases and wastes [17,18 and 19]. These environmental concerns emanating from construction is causing stakeholders to turn to alternative construction techniques like sustainable construction. With declining economic fortunes, leaders of developing countries approach international finance outfits for aid to develop infrastructure. But, most international establishments such as the International Monetary Fund (IMF) now include social and environmental clauses in their grants and loans policies. For instance, the Kyoto Protocol - a global treaty on climate change, commits parties to set targets that reduce emissions. The treaty also provides ten million US dollars for Clean Development Mechanisms (CDM) projects that have the potentials to reduce emissions in developing countries.

For developing countries to benefit from CDM construction projects, they need the political will and technical knowhow to adopt sustainable construction. Moreover, many corporate clients now demand for sustainable construction because they are beginning to realize the benefits therein. By adopting sustainable construction, sustainable buildings are produced which use renewable energy, have higher

rental values, have more occupancy rates than traditional buildings and improve health and safety of occupants [15]. By developing requisite technical knowhow for sustainable construction, quantity surveyors will be able to help their clients to deliver sustainable projects, thereby remaining relevant in the era of climate change.

2.1 The Cost of Sustainable Construction

As cost experts, quantity surveyors need to understand the economics of sustainable construction. There are two thought patterns as it relates to sustainable construction [20]. One thought pattern believes that sustainable construction should be at the same cost as traditional construction or that the cost of sustainable construction is reduced lower than that of traditional construction, based on the fact that integrated design and reduced life cycle cost can bring down the cost of sustainable construction. The second school is of the opinion that sustainable construction requires higher initial capital which is usually covered for from higher rental values, higher occupancy rates, lower operating cost and improved health outcomes for occupiers.

Specifically, quantity surveyors can become relevant in the era of climate change by providing solutions to the hard and soft questions construction stakeholders face. The hard questions include: How much water can be saved? How much carbon should be emitted? How much waste is recycled from construction processes? While the soft questions include: how can construction reduce its impact on the wellbeing of both construction operatives and building occupiers? Sustainable construction projects consume less energy than conventional [21]. By using Life Cycle Costing (LCC) quantity surveyors can assess both capital and operational costs thereby providing a holistic view of a buildings energy cost over its lifecycle.

Quantity Surveyors can also gain relevance in the climate change era by helping construction stakeholders quantify water and possible cost savings from waste water. Fresh water is an important natural resource on earth. But, fresh water is becoming scarce due to climate change, population increase and unsustainable consumption of natural resources [22]. Water is used during construction; it is also used during occupancy stage for cooking, drinking, cleaning and other domestic purposes. Finally, water is exported from the building as waste. If stakeholders in the construction industry reduce water consumption, the industry can help conserve available water and reduce threat to aquatic life. To achieve this, quantity surveyors can analyze the cost of traditional versus sustainable techniques of conserving water. Sustainable water conservation methods include: waste water system, rain water harvesting, high efficiency toilets and high efficiency urinals.

3. Digitalization

Quantity Surveyors can have an edge over their competitors and other construction professionals if they adopt the various forms of Information and Communication Technology (ICT). The literature is replete with evidences about the benefits of ICT on the services of construction professionals [23]. ICT has been found to enhance the job of quantity surveyors, facilitate decision making and reduce running costs. However, a lot of quantity surveying businesses need to adopt other digital technologies like electronic data transfer [24]. Construction involves significant data use and dissemination of cost data between construction team members [24]. As construction professionals, quantity surveyors also produce and manage construction data for use by other team members [25]. As a result of the large volume of data used during the construction process, quantity surveyors need to use ICT to enhance the quality of their services [26]. Information Communication and Technology can improve quantity surveying businesses and increase the popularity of the profession. Digital technologies like Building Information Modeling (BIM) can be a source of competitive advantage for quantity surveying businesses [27]. Of all the ICT tools used in the construction industry, BIM have been found to have positive impacts on quantity surveying business. BIM can be used to determine appropriate measures for energy use, day lightening air flow and carbon production rates [28]. BIM also provides cost

information of basic construction resources like material, machine and manpower [29]. [30] noted that there is an overlap between BIM 5D and available quantity surveying softwares. However, the benefits of BIM are more than the concerns raised. BIM can be described as a one stop shop for construction information service. Although high cost of ICT infrastructure affects the wide adoption of ICT, quantity surveyors will gain competitive advantage in this era of digitalization if they embrace developments in ICT.

4. Value Management

A main feature of recession is the scarcity of funds. Quantity surveyors who are able to give their clients value for money spent will remain in business in times of economic recession. Value Management is an essential competence that quantity surveyors can take advantage of during times of recession. [31] explained Value Management as an organized process which focuses on analyzing project functions from start to finish, with a goal of attaining best value for the client while ensuring return on investment at the lowest possible life cycle cost. Value management is aimed at satisfying clients' project needs by ensuring that all necessary functions are attained at the lowest cost whilst maintaining their functionality [32]. Value Management is all about the identification and elimination of unnecessary designs which contribute to costs but do not have any functional benefits [33]. Value Management does not only ensure that cost targets are not exceeded, but that designs and specifications are intentionally created to achieve certain objectives for the client. Sometimes, such intentional changes may result in additional expenses which owners prefer to pay for provided the cost will be offset with other benefits such as lower operational cost, thereby providing a return on investment. The period of applying Value Management to construction project is vital if it must deliver the desired outcomes. The advantages of value management are best realized when it is applied at the project concept stage. Applying value management during construction will lead to waste of time and money. Since sustainable collaboration between clients and contractors' organization is crucial [34] for clients' satisfaction and retaining clientele, quantity surveyors need to adopt value management as an integral part of their practice particularly in economic recession.

Conclusion

The Chinese have a way of seeing opportunities in crisis. The word crisis in Chinese means both danger and opportunity. Climate change, digitalization and economic recession are dynamic phenomena that have influenced the way businesses are run today. Climate change comes with its threatening consequences on both man and the planet. However, some climate mitigation and adaptation strategies are actually opportunities for economic empowerment for individuals and organizations that can seize the opportunity. For instance, sustainable construction opens the door of continued relevance for quantity surveyors and other construction professionals in a period of climate change. Digitalization has come to stay. Many have predicted a 4th industrial revolution which is actually a technological revolution where technology will be used to enhance many processes. Quantity Surveyors also need to adopt ICT in order to remain relevant in this digital age. Finally, quantity surveyors need to make value management a core of their business operations in times of economic recession, to give their clients value for money spent on construction projects.

Acknowledgment

The authors are grateful to Covenant University Centre for Research Innovation and Discovery for sponsoring this article.

References

- [1] Trenberth K E 2018 Climate change caused by human activities is happening and it already has major consequences *Journal of Energy & Natural Resources Law* **36**(4) 463-481
- [2] Intergovernmental Panel on Climate Change (IPCC), 2013. Climate Change: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom
- [3] Melillo J M Richmond T C Yohe G W 2014 Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, Washington, DC
- [4] Seto K and Christensen P 2013 Remote sensing science to inform urban climate change mitigation strategies *Urban Climate* **3** 1–6
- [5] Cadez S and Czerny A 2016 Climate change mitigation strategies in carbon-intensive firms. *Journal of Cleaner Production* **112** 4132-4143
- [6] UNCTAD 2017 The ‘New’ Digital Economy and Development. *UNCTAD Technical notes for ICT development*.
- [7] Ibem E O and Laryea S 2014 Survey of digital technologies in procurement of construction projects *Automation in Construction* **46** (2014) 11–21
- [8] National Bureau of Economic Research Business Cycle Dating Committee. 2003. ‘Recession Dating Procedure’. Retrieved from the National Bureau of Economic Research at: <http://www.nber.org/cycles/recessions.pdf>
- [9] Priewe J 2010. What went wrong? Alternative interpretations of the global financial crisis in Dullien, S., Kolte, D.J., Marquez, A and Priewe, J. (Eds.) *The financial and economic crises of 2008-2009 and developing countries* (17-50). New York: UNCTAD.
- [10] Borio C and Disyatat P 2011 Global imbalances and the financial crisis: link or no link. *International Bank for settlement (BIS) working paper* **346** 1-45
- [11] Campanella E 2009 The Triffin Dilemma Again. *Economics* **46** 1-19
- [12] Ajanlekoko O 2016 In Uwaegbulam, C., Nwannekanama, B & Otokhine, H. Real estate, construction industry can salvage economy. *The Guardian*, Retrieved from <http://www.gaurdian.ng>
- [13] Tunji-Olayeni P F Afolabi A O and Okpalamoka O I 2018 Survey dataset on occupational hazards on construction sites *Data in Brief* **18** 1365–1371
- [14] Ogundipe K E Ogunbayo B F Ajao A M Ogundipe U and Tunji-Olayeni P F 2018 Survey datasets on categories of factors militating against safety practices on construction sites *Data in brief* **19** 2071-2078
- [15] Cartlidge D 2011 *New aspects of quantity surveying practice*. (3rd ed.) London: Spon Press
- [16] Ogunbayo B F Ajao A M Alagbe O T Ogundipe K E Tunji-Olayeni P F and Ogunde A 2018 Residents’ facilities satisfaction in housing project delivered by Public Private Partnership (PPP) in Ogun State, Nigeria. *International Journal of Civil Engineering and Technology (IJCIET)* **9**(1) 562-577
- [17] Ametepey S O Gyadu-Asiedu W and Assah-Kissiedu M 2015 Sustainable Construction Implementation In Ghana: Focusing On Awareness And Challenges. *Civil and Environmental Research* **7**(2) 109-119
- [18] Alsanad S Gale A Edwards 2011 Challenges of sustainable construction in Kuwait: investigating level of awareness of Kuwait stakeholders *World Academy of Science, Engineering and Technology* **59** 2197-2204
- [19] Chartered Institute of Building, (CIOB). 2004. Sustainability and Construction. Chartered Institute of Building, Ascot.
- [20] Kibert C J 2013 Sustainable construction: green building design and delivery.(3rd ed.). New Jersey: Wiley

- [21] Zuo J and Zhao Z 2014 Green building research—current status and future agenda: A review *Renewable and Sustainable Energy Reviews* **30** 271–281
- [22] Tunji-Olayeni P F Amusan L M Ojelabi R A and Abina O G 2018 Water conservation within planetary boundaries: residents' perception of recycled water use, *IOP Conf. Series: Earth and Environmental Science* **146**
- [23] Afolabi A Ibem E Aduwo E Tunji-Olayeni P and Oluwunmi O 2019 Critical Success Factors (CSFs) for e-Procurement Adoption in the Nigerian Construction Industry *Buildings* **9**(47) 1-18
- [24] Oladapo A A 2006 The impact of ICT on professional practice in the Nigerian construction industry. *The Electronic Journal of Information Systems in Developing Countries* **24** (2) 1-19
- [25] Maqsood T Walker D H and Finegan A D 2004 An investigation of ICT diffusion in an Australian construction company Using SSM, *Proceedings of the CIB2004 Globalisation and Construction*, 17-19 November, Bangkok, Thailand, 485-496
- [26] Nkado R N 2000 Competencies of Professional Quantity Surveyors in a Developing Economy available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.199.1152&rep=rep1&type=pdf>,
- [27] Oyediran O S and Odusami K T 2005 A study of computer usage by Nigerian quantity surveyors. *ITcon* **10** 291-303
- [28] Waoj J O 2015 Predicting the future of quantity surveying profession in the construction industry, *Journal of Construction Project Management and Innovation* **5** (2) 1211-1223
- [29] Napier J 2015 Climate Based Façade Design for Business Buildings with Examples from Central London *Buildings* **5** 16-38
- [33] Aghimien D O and Oke A E 2015 Application of value management to selected construction projects in Nigeria. *Developing Country Studies* **5** (17) 8-14
- [30] Smith, P., 2016. Project cost management with 5D BIM. *Procedia - Social and Behavioral Sciences* **226** 193 – 200
- [31] Migilinskasa D Popovb V Juoceviciusc V and Ustinovichiusd L 2013 The Benefits, Obstacles and Problems of Practical Bim Implementation *Procedia Engineering* **57** (2013) 767 – 774
- [32] Oke A E and Ogunsemi D R 2011 Value Management in the Nigerian Construction Industry: Militating factors and perceived benefits. *Proceeding of the second international conference on advances in engineering and technology* at the Makerere University, Uganda, January 30 January – February 1 353-359
- [33] Towey D 2013 *Cost management of construction projects* (1st ed.). United Kingdom: Wiley Blackwell
- [34] Ojelabi R A Afolabi A O Oyeyipo O Tunji-Olayeni P F and Adewale B A 2018 Data exploration of social client relationship management (CRM 2.0) adoption in the Nigerian construction business. *Data in brief* **18** 1471-1476