University of Reading

Built environment research in West Africa current trends and future directions

Conference or Workshop Item

Accepted Version

Laryea, S. and Leiringer, R. T. F. (2011) Built environment research in West Africa current trends and future directions. In: CIB-W107 International Conference on Innovation and Sustainable Construction in Developing Countries, November 1-3, 2011, Daewoo Hotel in Hanoi, Vietnam. Available at https://centaur.reading.ac.uk/23094/

It is advisable to refer to the publisher's version if you intend to cite from the work. See Guidance on citing.
Published version at: http://cibw107.ncat.edu/index.php/conferenceflyer.html

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the End User Agreement.

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

Built environment research in West Africa: current trends and future directions

Samuel Laryea

School of Construction Management & Engineering, University of Reading, P.O. Box 219, Reading, RG6 6AW, UK. s.laryea@reading.ac.uk

Roine Leiringer

Dept. of Civil and Environmental Engineering, Chalmers University of Technology, Gothenburg, SE-41296 Sweden. Roine.leiringer@chalmers.se

The countries in West Africa (WA) are pushing for socio-economic development. The construction sector has an important part to play in helping to realise these aspirations. This necessitates an increased emphasis on research in the built environment, as a key contributor to developing capacity, knowledge and technologies for the sector. The West Africa Built Environment Research (WABER) conference was initiated in 2008. The objective was to: help young built environment researchers in West Africa (WA) to develop their research work and skills through constructive face-to-face interaction with their peers and experienced international academics; supply a platform for interaction among more senior academics and an outlet for disseminating their research work; and to serve as a vehicle for developing the built environment field in Africa. Three conferences have so far been organised, 2009 - 2011, bringing together ~300 academics, researchers and practitioners from the WA region. This paper draws on content analysis of the 189 papers in the proceedings of three conferences: 2009 (25); 2010 (57) and 2011 (107). These papers provide a window into current research priorities and trends and, thus, offer an opportunity to understand the kinds of research work undertaken by built environment researchers in West Africa. The aim is to illuminate the main research themes and methods that are currently pursued and the limitations thereof. The findings lay bare some of the many challenges that are faced by academics in WA and provide suggestions for alternative directions for future research and development work with indications of a potential research agenda.

Keywords: built environment, research, WABER conference, West Africa

Introduction

The countries in West Africa (WA) are developing fast and pushing for socio-economic development. Growth rates have in recent years been hovering around 6% (The Africa Competitiveness Report, 2011). It is evident that the construction sector has an important part to play in this development. To enhance the achievement of socioeconomic development aspirations, countries need to develop modern built environments where people can live healthily, go about their work and economic activities and enjoy a good quality of life. This in turn necessitates investment in almost all types of construction, such as new infrastructure including highways; hospitals; housing; power plants; and maintenance of existing infrastructure. For example, research on the relationship between construction and economic growth in Ghana showed that construction is the third largest sector of the economy, hence a

major driver of economic growth (Anaman and Osei-Amponsah, 2007). It is equally evident that these developments necessitate an increased emphasis on research in the built environment in order to develop the necessary capacity, capabilities, knowledge and technologies for the sector. This paper takes as its point of departure that such research work is not trivial and is liable to be highly context driven. Accordingly, it is of interest to look more closely at the kind of problems and issues WA researchers are working on at present. It is also of interest to look at how the research is carried out and if the research methods used are appropriate and adequate for the research problem at hand. Or put slightly differently, does the research that is undertaken match the socio-economic aspirations of countries in the region and is it aligned with international research endeavours and our current common knowledge?

To answer these questions, we examine and analyse research work carried out by built environment researchers in WA over a three year period between 2009 and 2011 by analysing the proceedings of three conferences. The aim is to illuminate the main research themes and methods that are currently pursued, to discuss some of the many challenges faced by academics in WA and to provide suggestions for alternative directions for future research and development work with indications of a potential research agenda. Initially a very brief overview is given of the current socio-economic and academic context in which the academics operate.

West Africa: A socio-economic and academic context

According to the United Nations Human Development Report (2010), all of the 16 countries in West Africa are developing countries in either the 'medium human development' or 'low human development' bracket when it comes to measures or indicators such as life expectancy, literacy, education and standards of living. The average GDP of the 16 countries in the region is approximately $1400 with Nigeria ($2,398) and Ghana ($1,609) having the highest GDPs in the region and Niger ($720) and Liberia ($396) the lowest (IMF, 2010).

Country	Population (million)	Year of Independence	Official language	Number of universities
Benin	9	1960	French	3
Burkina Faso	16	1960	French	1
Cameroon	19	1960 (France) 1961 (Britain)	French and English	13
Cape Verde	0.5	1975	Portuguese	10
Côte d'Ivoire	21	1960	French	6
Gambia	2	1965	English	1
Ghana	24	1957	English	59
Guinea	10	1958	French	6
Guinea-Bissau	1.6	1973	Portuguese	4
Liberia	4	1847	English	9
Mali	15	1960	French	10
Mauritania	3.5	1960	Arabic	9
Niger	15.5	1960	French	1
Nigeria	152	1960	English	195
Senegal	14	1960	French	6
Sierra Leone	6.5	1961	English	2
Togo	7	1960	French	1
Total	320.6			336

(Table 1: *Universities in West African countries*. Source: Laryea, 2011)

There are at least 336 universities across WA for a total population of 320.6 million people (see Table 1). The University of Monrovia, which opened as Liberia College in 1862, is the

oldest degree-awarding institution in WA, and Ahmadu Bello University based in Zaria, Nigeria is the largest university in Sub-Saharan Africa. The universities in WA offer a wide range of degree programmes in the arts, education, engineering, medicine, social sciences, law, physical sciences, built environment, etc.

Less than 50 percent of the universities in WA are public universities funded by the state. The majority of universities are private-owned 'smaller' institutions most of which have to be affiliated with more established universities while they undergo the process of transforming into full-fledged autonomous universities. As can be seen in Table 1, >75% of the universities can be found in Ghana and Nigeria.

Construction research is divided between universities and research institutes. Built environment departments, i.e. architecture, building, engineering, estate management, planning, quantity surveying, exist at various universities, polytechnics, vocational and technical training institutes. These institutions provide built environment teaching, research and service to community in the countries. Examples of research institutes include, the Nigerian Building and Road Research Institute (NBRRI) which was established in 1978 to conduct integrated research and development activities into the varied aspects of the construction industry (http://nbrri.gov.ng/); and the Building and Road Research Institute (BRRI) in Ghana which was set up by the Government in 1952, as one of the 13 research Institutes of the Council for Scientific and Industrial Research (CSIR), "To provide research and development products, processes and services to the building and road sectors for the socio-economic development of Ghana" (http://www.brri.org/brri/).

From this brief overview (see Laryea, 2011 for a more extensive review), it is apparent that governments in WA realise the need for strong built environment academic, research, vocational and technical institutions. However, there are several factors that impede on many of these public institutions capacity to fulfil their mandate properly and adequately. The most obvious is funds, but there has also been a significant emigration of students and skilled professionals from Sub-Saharan Africa to developed countries since the early 1980s (Bump, 2006). Of course some of these individuals do return, but the intermediate effects of this 'brain drain' should not be underestimated. It is, for example, worth noting the paucity of articles written by authors with affiliations in the region in the main construction management journals, compared to the output of WA academics based overseas. A review of the six journals singled out by Chau (1997) and Bröchner and Björk (2009) as the most influential in construction management reveals a mere 23 publications from WA over the period 1985-2011 (Laryea, 2011). These have been written by 28 authors from 13 different WA universities (*ibid.*).

Hence, whilst it is clear that many students go abroad in search of education and many WA researchers are active across the world (some with exceptional track records) there remains a fundamental need to build up research and student capacity within countries in the WA region. In response to these needs, the West Africa Built Environment Research (WABER) conference was initiated in 2008.

The WABER Conference

The objective of the West Africa Built Environment Research (WABER) conference is to provide a vehicle for the development of built environment research in West Africa through giving young researchers and early-career scholars an outlet for developing their research work and skills through constructive face-to-face interaction with experienced international academics and their peers; and to supply a platform for networking and collaboration among more WA senior academics.

The first WABER conference took place in Accra, Ghana, in June 2009. Over the course of two days, 32 young researchers presented their work to an audience of ~100 people. At the following conference in July 2010 the presentation slots were opened up to more experienced academics. 67 presentations were given and the event brought together 120 researchers from the region and an additional 80 people from industry. The WABER 2011 conference that took place in July 2011had 206 abstracts submitted, which resulted in 107 papers, of which 93 were presented to an audience of ~160 people.

Research method and scope of study

The study draws on a sample of 189 papers presented at the WABER conferences 2009-11. In order to review the papers a broad framework was developed. This framework contained a number of key aspects considered to be indicative of the content and process of research described in the papers. Following the framework the review took the following steps: (1) the problem area that the paper addressed and any dominant and secondary literature sets that it draws upon. Each paper was assigned a single topic only. The most relied upon literature sets (if any) were recorded. (2) The geographical outlook and the potential application of the findings, i.e. were the papers dealing with local, regional, national or international issues. (3) The theoretical lens through which the problem is addressed. This explored whether or not there are any identifiable theories employed. The dominant theory (if discernable) was recorded. (4) The underlying research was categorised as either quantitative or qualitative. (5) Research methodology. This included recording: whether or not the research was empirical; the research method; the data gathering techniques; and the applied data analysis techniques. (6) If the article, and the underpinning research, was practice or theory orientated. (7) If it was a single authored paper and, if not, if the authors were from the same institution.

It is important to note that whilst WABER has been promoted across WA and we are making claims regarding WA research the conference has so far drawn more than 85% of its delegates from institutions in Nigeria and Ghana. However, given that more than 75% of the universities can be found in these two countries this is perhaps not so surprising. We also note that there are other regional *ad hoc* conferences such as ‘International Conference on Infrastructure Development in Africa’ and established conference series, e.g. ‘Built Environment Conference of the Association of Schools of Construction of Southern Africa’, as well as international conferences such as the CIB W0107, to which other active WA academics might have chosen to send their papers. As such the findings are indicative rather than absolute. Nonetheless, the three conferences have so far brought together ~300 academics, researchers and practitioners from the WA region. These delegates represent more than 50 institutions, e.g. universities, polytechnics and research institutions. The 180+ research papers so far written and presented provide a window into current research priorities and trends and, thus, offer an opportunity to understand the kinds of research work undertaken by built environment researchers in West Africa. They also provide an opportunity to further look into the how research is commonly undertaken.

Findings and discussion

Topics under investigation

It serves little purpose to list all the topics that were dealt with in the 189 papers. In the first round of analyses an attempt was made to try and categorise the papers by specific topics. This list, however, ended up having 95 entries. Instead a cruder categorisation of themes was made, as shown in Table 1.

	2009	**2010**	**2011**	**Total**
Housing and property management	3	8	21	32
Design /architecture	3	3	16	22
Construction materials and production	3	5	13	21
Procurement	4	6	7	17
Construction education & human resources	2	6	7	15
Project administration and management	2	2	9	13
Health and safety	1	4	5	10

(Table 1: *categorisation of papers in themes*)

Other themes that had less than ten papers in them are: Sustainability and environment; Urban planning and development; Economics and industry; Building services and utilities; Cost and financial management; Facilities management; Law and governance systems; Energy production systems; Disaster management.

The chosen classifications could of course be discussed, but they do nonetheless provide a rather telling story regarding what areas researchers have tended to focus on. Affordable housing and various ways of achieving it is a key theme. So too is the search for alternative construction materials. Further generalising the themes into broader subject matters: 77 of the papers can be considered to fall within physical infrastructure and environment; 59 can be classified as dealing with Economics and construction industry development.

From a content and presentation perspective, it is noteworthy that most authors tend to ground their paper in the specific context and particular sets of problems that the paper seeks to address, rather than presenting current leading thinking in the particular area of investigation. The motivation seems to be to shape and influence practice and the papers are written in a way that is sensitive to relevance and impact, commonly at the expense of theory development. Thus, the papers are almost exclusively problem driven and only in a small number of them are explicit attempts made to build on or develop our common knowledge or theory. Indeed, determining the underpinning theoretical position of papers turned out to be too difficult a task.

Outlook (Geographic scope)

It is also of interest to look at how the problem statement is positioned: Local, the research problem is restricted to local markets, and do not aspire to cover an entire region or the whole country; Regional, the research problem covers one or more regions, and do not aspire to cover the whole country; National, the research problem covers the whole country; International, the research problem covers more than one country.

	2009	2010	2011	Total
Local	1	6	11	18
Regional	5	13	11	29
National	16	37	75	128
International	3	1	10	14

(Table 2: *level to which generalisation is sought*)

Of importance here is not only the level at which the problem statement is pitched, but also the level at which generalisations are sought and most importantly what kind of conclusions

that are made. Commonly the papers would pitch the problem statement as a national issue. Generalisations would typically be made to this level as well, and the conclusions that are drawn provide normative and prescriptive advice for a variety of actors. The actual research would however be conducted at local and sometimes regional levels.

Research design

The research terminologies given in Saunders *et al*. (2008: 108) were adopted. Thus, the research strategy for all papers examined and analysed were categorised into experiment, survey, case study, action research, grounded theory, ethnography, and archival research. In addition to these six, we added mathematical/analytical modelling.

	2009	**2010**	**2011**	**Total**
Survey	10	41	57	108
Experiment	5	4	17	26
Literature survey	5	0	19	24
Not specified	3	5	3	11
Case study	1	2	6	9
Modelling	5	0	0	5
Archival research	0	0	4	4
Grounded theory	0	0	1	1
Action research	0	0	0	0
Ethnography	0	0	0	0

(Table 3: *Research method*)

The very high reliance on surveys is noteworthy. There are four times as many articles drawing on surveys as there are for any other research method. Indeed, if the papers that are based on experiments with materials and those based on literature reviews are excluded, i.e. leaving only papers drawing on data collected from individuals left in the sample, a minimum of 78% of the papers are based on surveys.

80 of the 108 survey based papers use questionnaires for their data collection method. The questionnaires are predominantly designed to seek the opinions of the respondents. Most are structured and use Likert scales (1-5) to quantify the responses. The most common form of sampling is random sampling, the sample frame and response rate are fairly modest in size and the analysis is geared towards providing description.

Concluding remarks and thoughts

It should be acknowledged that there are several limitations to a study of this kind and many valid objections can be made. One of these is whether or not it is possible to draw conclusions regarding academic fields on the basis of the publications in one conference series. Whilst, the WABER conference has attracted a relatively high degree of participation, questions could still be raised regarding whether or not the papers are typical for the research carried out in WA. We do, however, remain convinced that the papers published in the proceedings 2009-2011 reflect the constitution and configuration of built environment academic field in the region. In particular, we believe that the utilised mode of research influences and shapes the research outputs in the form of publications and *vice versa.* A comparison with the previously

mentioned 23 journal papers published in leading journals in the last 25 years reveals many similarities to the conference papers in orientation and approach.

It would be rather naïve to draw too many strong conclusions from this study, but several insights can be derived from the preceding analysis. These include: 1) the two most common problem areas are 'Physical infrastructure and environment' and 'Economics and construction industry development', 70% of the published papers deal with issues within these two domains. 2) In more than 2/3s of the papers the problem formulation is given at a national level. Very few papers take a local, regional or international perspective. 3) There is a stark overrepresentation of survey studies relying on questionnaires for data collection. There are four times as many papers using surveys as there are of any other research method. 4) In a significant number of cases the chosen research method is not suitable for the problem under investigation.

That the most common problem area is related to the physical infrastructure and environment and pitched at a national level is hardly surprising and is well in line with increasing socio-economic development. The need for improvements in most parts of the built environment is obvious and 'problems' to research can be found in abundance. In such a context it is rational that the research is highly practice driven and that emphasis is put on establishing the importance of the topic and the relevance of the findings follows logically. Thus, it could be argued that WA research by necessity is extremely problem driven and that this has shaped a dominant research paradigm, as described above. An apparent downside of the heavy focus on current (mal)practice is that the research in many cases is not far removed from consultancy work. As such, the outputs are at times both valid and important yet the impact is local and predominantly short-term. More worryingly from a scientific point of view is that in some cases the end seemingly justifies the means. Normative conclusions are frequently drawn to rectify identified problems despite not always reflecting the research that has been undertaken. This apparent disconnect between the conclusions drawn and the actual research carried out is a key concern. Academics have a responsibility to reflect on their own role as knowledge producers and make clear what can and cannot be concluded from their research findings, no matter how important these conclusions can be considered to be. The cart should not be put in front of the horse.

There is, therefore, a need to reassess how research problems can be formulated and look at what appropriate research methods can be used, so that knowledge can be created and distributed, thus providing a foundation for a more long term impact. We would not go as far as advocating a paradigm shift in a Kuhnian sense, but we do believe that it would be beneficial if the current research *modus operandi* is extended to include other epistemological, ontological and methodological perspectives. At the very least the high degree of reliance on surveys and how they are commonly designed needs to be rectified. There are several potential explanations to the prevalence surveys in WA research. Some of which are more convincing than others, e.g. practicality and the relative resource efficiency, and a degree of pragmatism does of course have to be maintained. However, a key issue that needs to be taken into account, and an area in which improvements can be made, is moving from surveying 'perceptions' to surveying 'actions'. Also, a more thorough engagement with the literature/theory would allow for the surveys to be based on clearly stated theoretical propositions. These propositions guide the questions asked, data gathering technique used and the subsequent analysis. Through WABER and other conferences such as this current one, it seems likely that some of these issues would be taken up and addressed over the long-term. The aim is for the research to be rigorous both methodologically and theoretically and centred on issues that are of focal concern to a wide range of stakeholders. This can help to improve

built environment research output, which should ultimately help to develop relevant knowledge and technologies for advancing socio-economic development in a region that is currently pushing for rapid economic growth and better quality of life for its population.

References

Anaman, K. A. and Osei-Amponsah, C. (2007). Analysis of the causality links between the growth of the construction industry and the growth of the macro-economy in Ghana, *Construction Management and Economics*, 25(9), 951 – 961.

Bröchner, J, Björk, B-C. (2008). Where to submit? Journal choice by construction management authors. *Construction Management and Economics*, 26(7),739-749.

Bump, M. (2006). Ghana: Searching for Opportunities at Home and Abroad, Migration Policy Institute. [available online at: http://www.migrationinformation.org/USFocus/display.cfm?ID=381]

Cotton, A.P., Sohail, M. and Scott, R.E. (2005). Towards improved labour standards for construction of minor works in low income countries. *Engineering, Construction and Architectural Management*, 12(6), 617–32.

Devarajan, S., Miller, M.J., Swanson, Eric V. (2002). Goals for development: history, prospects and costs, Volume 1, *World Bank Policy Research working paper series*, Report No:WPS2819.

International Monetary Fund (IMF) (2010). World GDP (PPP) & Country population. World Economic Outlook Database-October 2010, [Accessed: March 12, 2011].

Laryea, S. (2011) Built environment education and research in West Africa *In:* Laryea, S., Leiringer, R. and Hughes, W. (Eds) *Proceedings West Africa Built Environment Research (WABER) Conference*, 19-21 July, Accra, Ghana, 203-214.

Ministry of Finance and Economic Planning (MoFEP) (2010). Budget Statement and Economic Policy of the Government of Ghana for the year ending 31st December, 2011. Read to the House of Parliament by the Minister of Finance Dr Kwabena Duffuor on 18 November 2010.

Ofori, G. (2010). Built environment research and the millennium development goals In: Laryea, S., Leiringer, R. and Hughes, W. (Eds) Procs West Africa Built Environment Research (WABER) Conference, 27-28 July 2010, Accra, Ghana, 9-25.

Saunders, M.N.K., Lewis, P. and Thornhill, A. (2007) *Research methods for business students*, 5ed., Pearson Education, Harlow.

World Economic Forum, the World Bank, and the African Development Bank (2011). *The Africa Competitiveness Report 2011*, Geneva: World Economic Forum, ISBN-13: 978-92-95044-97-5, [available online http://www3.weforum.org/docs/WEF_GCR_Africa_Report_2011.pdf]