Civil and Environmental Research
ISSN 2224-5790 (Paper) ISSN 2225-0514 (Online)
Vol.3, No.12, 2013 

# The Impact of Innovation of the Construction Industry in Ghana

Okae Adow, A-A. M[1]. ; Allotey, S. E[2]. ; Arthur-Aidoo, B. M[3].
[1, 2&3]Department of Building Technology:
Accra Polytechnic, P.O. Box GP 561, Accra, Ghana.
*E-mail of the corresponding author: mickeyadow@yahoo.com

**Abstract**

The essence of this paper therefore, is to bring out the impact of innovation of the Construction industry in Ghana and also to establish tangible and intangible benefits associated with innovation. Analysis of the relevant literature indicates the impact and the problem of slow adaptation of innovation and new ways of working within the construction industry is a great concern to most organization that operates within and outside the industry. To bridge this conservatism attitude of innovation in the industry, it is fundamental to explore the impact and for that matter the benefits of innovation within the industry. This paper however, seeks to embark on this investigation on the impact of innovation and to bring to light its related benefits and how these would be achieved. Data were collected among construction professionals (Consultants) and Contractors via questionnaires supported by informal interviews. Analysis of the data was done using simple percentage method and the findings were represented in the form of pie-chart and bar-chart using micro-soft excel programme. The study established that innovation within an industry brings about increased in economic growth and profitability. The study also revealed that ease of working at a lower cost with much precision is assured when there is innovation Recommendation of effective coordination between Consultants and Contractors must exist to facilitate innovation beginning from research and development set-up within the firms.
**Keywords**: Impact; innovation; Construction; industry; Ghana

## Introduction

Innovation within any industry reflects on the dynamism of the industry and its continual research and development activities. This dynamism of innovation within such industry tends to reduce barriers to the implementation any such identified novelty. Therefore if any organization operating within an industry is to accomplish its set corporate strategies with innovation, it must continually improve its services, products and new ideas. The industry must also endeavour to embark on persistence search and also develop more efficient innovative ways to work. Innovation has long been recognised for its contribution to national economic growth, competitiveness and higher living standard and is at the heart of modern knowledge-based economy (OED, 2005: EC 2010).

Innovation and its slow adaptation within the Construction industry of Ghana and the entire built environment had developed a great apprehension to all industry players and its would-be individuals and organizations. Impact of ensued innovations and its benefits within other sectors of the economy such as the pharmaceutical and automobile industries pose a lot of challenge on the construction industry. The need to innovate within the Construction industry in Ghana is essential if the challenges of future Construction trends are to be realized. According to Carmona (2001, p.111), Building Technologist argued that the inherent conservative of the sector leads to failure to innovate in construction the result being stagnation when new construction techniques have potential both to drive down cost of Construction. It is against this background that this research seeks to spar a debate on the impact and benefits that innovations within construction industry of Ghana would bring. The essence of this paper therefore, is to bring out the impact of innovation of the Construction industry in Ghana and to establish tangible and intangible benefits associated with innovation.

## Problem Statement

Innovation activity has generally been characterised with a high degree of efficiency and precision. Innovation however within an industry brings about novelty this makes the industry more vibrate and competitive. It is on these bases that assessment on the impact of innovation on the construction industry in Ghana has been embarked.

## Aim

The aim of the research is to examine the impact and benefits of innovation within the Construction industry of Ghana.

## Objectives

The objectives of this research are therefore:

i. To establish the direct and indirect benefits of innovation within the Construction industry.

 

ii. To determine the critical factors required for the implementation of innovation.
iii. To assess how innovation influence the operations of an industry.

**Literature review**

The aim of literature review is to identify areas, which require further investigation .The literature was organized into four main sections, firstly by defining innovation as argued by various authors. Barriers of implementing innovations were also captured. Thirdly, the literature focused on the impact of innovation within the construction industry and its associated benefits. Finally the literature stressed on views of previous research calling on the construction industry to innovate.

In recent era construction, companies are keen on innovation. Due to the escalating labour charges, construction companies identified innovation as a means of competitive in the international markets. (Nam & Tatum 1997).The Construction industry in Ghana and the entire built environment is characterised by its nomadic nature, effect from adverse weather conditions, recruiting large volume of human resource of an the economy of its activities. Nevertheless, these identified features make the Industry try unique and does not make any significant consequence on the implementation of innovation.

Various researchers and stakeholders have defined the insight of innovation differently. Slaughter (1998) defined innovation as 'the actual use of nontrivial change and improvement in a process, product or system that is novel to the institution developing the change. These improvements as emphasized by Slaughter (1998) would only be realized after an in-depth research on existing product or techniques has ensued with its lapses and defaults noted.

Traditional procurement system practised by Governmental Agencies in Ghana currently needs some novelty because of its numerous identified challenges which make the system though economical but very tedious, extensive and waste of time. Motwa et al (1999) however defined innovation as the process through which new ideas turn into new components of a Construction product that has economic value. In the context of the construction industry, these improvements could be in the form of new approaches to project delivery, new concepts in designs or use of new materials. These may also include informal development activities such as project based problem solving, in addition to formal research and development. Innovation process with the industry emanate mainly through the activities of design and experimental development. Every Construction firm within the industry by virtue of its size contributes to technological innovation whether as a user or prey. For instance, the traditional houses built in 1950 with unique construction methods and components are quite different from the contemporary ones in Ghana.

Dulaimi *et al* (2002) have also argued that these innovative problem within the industry is as a result of poor rates of investment in research and devolopment, fragmented supply chains and lack of co-ordination between academia and the industry in research activitiesIt is increasingly widely recognised amongst house-builders that innovation is required if the demand for new types of housing is to be fulfilled (Hughes, 2000:3). Much as other industries such as the pharmaceutical and the automobile embark on rapid innovations which controls products at the market with virtually new or improvement on existing products, the construction industry in Ghana should as well endeavour to innovate in its services and products.

The study of innovation, technological and organizational change has become a mainstream subject in economise, industrial history and business management (Gann 2003:553-555). Technological innovation within the industry would also increase Construction productivity. The Latham and Egan (1998) reports have called for improvements in the House-building delivery process to improve in efficiency, productivity and ensure value for improvement to be more rapid and sustainable. The report emphasised that these improvements cannot therefore be achieved and sustained unless there is an established culture of research, innovations and development within the industry.

**Research of method**

In order to address the study objectives, structured opened and closed ended questionnaire supported by informal interviews were used to collect information. With the application of quantitative data collection, survey questionnaire was designed and self administered to construction industry professionals whilst the qualitative aspect captured informal interview sessions with construction industry professionals and some personalities in academia.

 

The population from which the sample for the research was selected is the built environment professionals (Structural Engineers, Architects, Quantity Surveyors and Site Engineers) who work for Contractors and consultants. The sampling frame of thirty-five professionals was purposively sampled within the Construction firms and sites scattered in and around the Greater Accra municipality Questionnaire was chosen as it allows the collection of extensive amount of information such as demographic, behavioural habits, opinions and attitudes and so on from large number of people (Fowler, 2002).

The questionnaire tasked respondents to rank the importance of innovation in the range of Not-good, Good, Satisfactory and Very good. The questionnaire also requested respondents to clearly state factors required for the implementation of innovation. In addition, impacts and advantages of innovations within the entire Construction industry as well as individual's efforts by contractors and Consultants towards innovation were enquired.

**Findings and Discussion**

This section dealt extensively on the involvement of construction industry professionals working as Consultants and Contractors undertaking projects in the study areas. The response rate for the study is (71%). This is because most respondents claimed they were busy executing their projects as a result out of the thirty-five questionnaires which were sent out for the data only twenty-five were received and used for the analysis with (28%) representing Consultants and (72%) representing Contractors of varying classification depicted in ( figure 1).

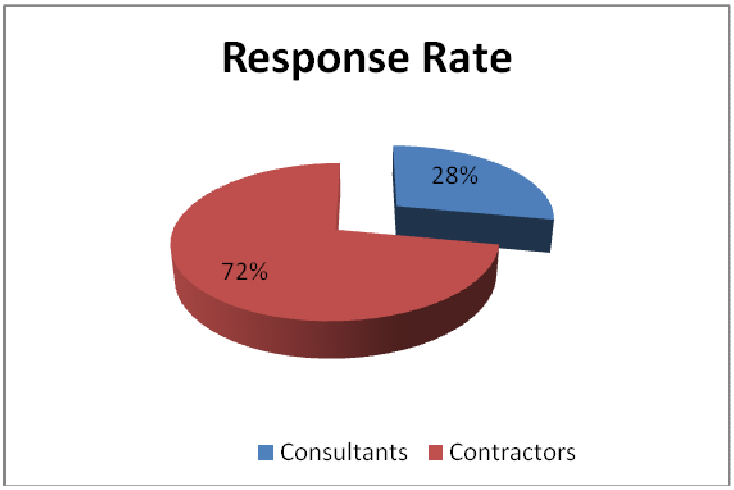


**Figure 1: Response Rate**

The years of operation of the various companies range between 10 – 20 years. Twenty-eight percent of Consultants established some innovation in the construction industry such as new products, new processes and new business systems.

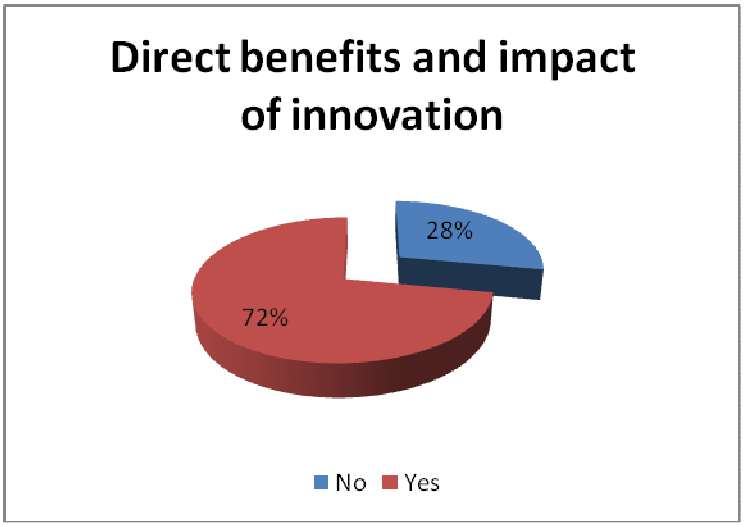


**Figure 2: Benefits and Impact of innovation**

 

Seventy-two percent respondents explicitly stated that innovation has direct impact and benefits within the industry. It follows from the discussion above that if the Construction industry in Ghana is to innovate it would contribute to significant reduction in Construction cost and delivering of services and techniques of construction methods. When innovations within the construction industry occur it will also meet the infrastructure needs of the economy. This is to say that the client needs on construction standards vary from time to time. The opinion of the respondents suggested that (28%) considered innovation as new business systems. Thirty-two percent, however, expressed that innovation that occurs are in the form of new processes. Whilst (40%) of the respondent indicated that innovation within the industry is manifested in the form of new products shown on (figure 3).

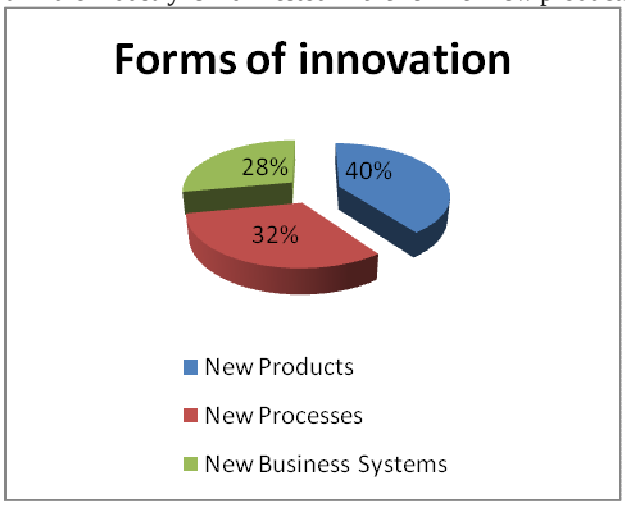


**Figure 3: Forms of Innovations**

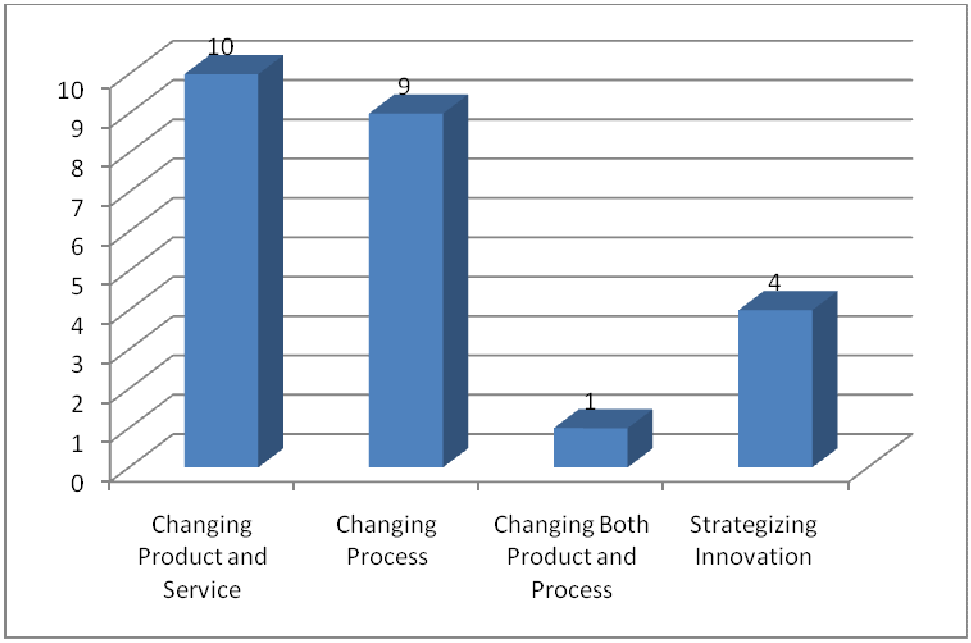


**Figure 4: Indicators that drives of innovation**

Figure (4) shows the indicators that drives innovation in Ghanaian Construction industry. From the survey it was obvious that (40%) respondents stressed that the best drive of innovation within the industry would be by changing the product or service being provided. (36%) indicated that the best drive of innovation is by changing the process by which the product or service is created. (4%) however reported that innovation within the construction industry would best be driven by promoting both process and product. (16%) of the respondents indicated that innovation would best be driven when it is strategized.

 

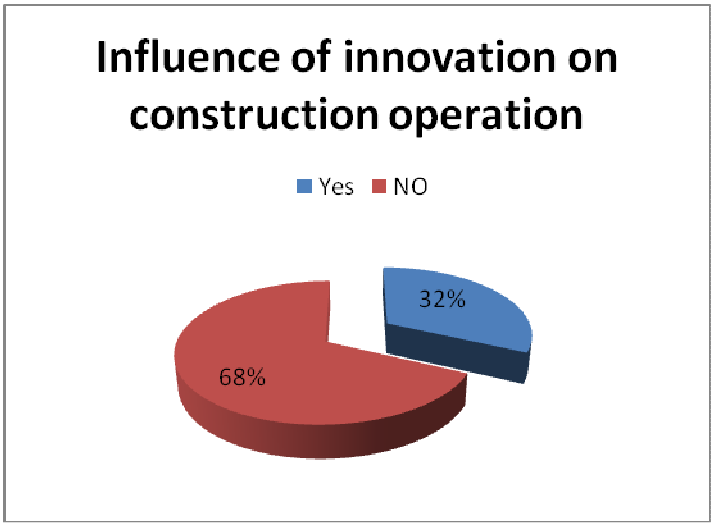


**Figure 5: Influence of innovation on construction operation**

Innovation within the Construction industry was enquired whether it influences its operation. Sixty-eight percentage responded No indicating that innovation does not influence its operations whilst (32%) indicated responded Yes as depicted on (figure 5). This follows the low rate of innovation that ensued within the industry that established reduced environmental degradation and had promoted the use of local materials in construction thereby reduced importation in foreign currency.

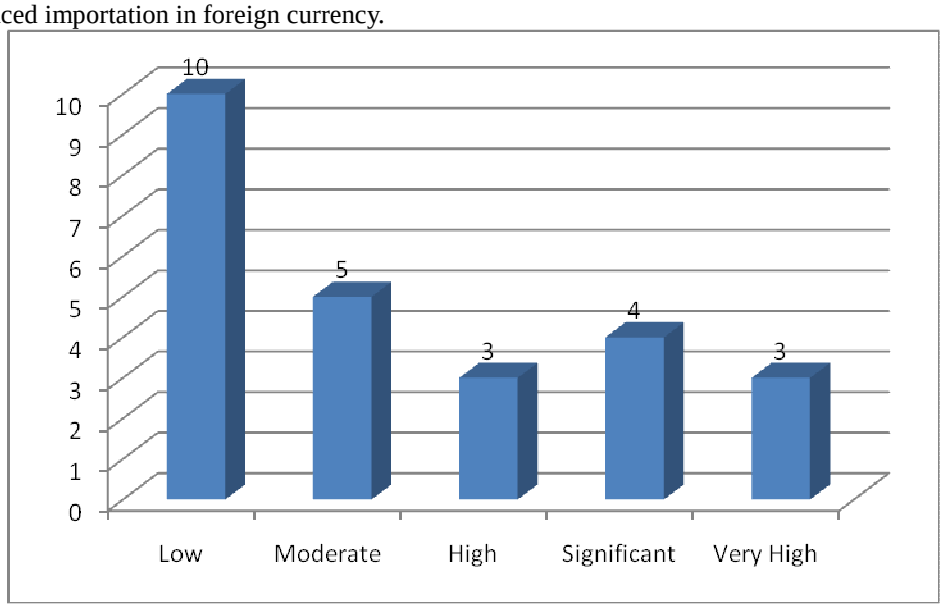


**Figure 6: Rate at which innovation**

The rate at which innovation takes place within construction is shown on (figure 6). Findings indicated that innovation does not occur at a very high rate, this is because not enough resources are available to encourage innovation. Respondents to be set aside to research into new materials, technologies or production, indicated a range between (1% - 5%) of companies' annual budget. This percentage expressed in momentary would range between GH¢ 1,000.00 - GH¢ 3,000.00 Seventy-two percentage however represented low as the level at which innovation takes place. This implies that though innovation occurs within the industry it ranges between moderate and significant represented as (4%) and (2%) respectively. Respondents however established that innovation brings about numerous benefits, which include ability to meet deadline, reduction of staff strength needed for projects. The study also revealed that (24%) of the respondent indicated that yes their firms had research development office that handles innovation. Whilst (76%) of the respondents stressed No which implies that their firms do not have a research development that facilitates innovation as shown on (figure 7).

 

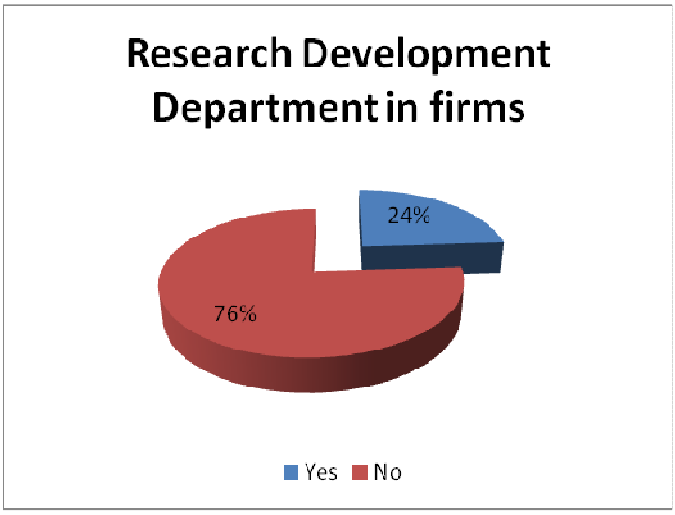


**Figure 7: Research Development Department in firms**

**Conclusion**

Having discussed the issues of innovation to the construction industry regarding its benefits and impacts it has now become apparent from the study that innovation has low impact on construction operations which reveals slow rate at which novelty develops. The study further established that innovation has direct benefit which includes competitive edge of the market, increase in the pace of industrialization, reduction of construction cost leading to profitability and establishing reduction in staff strength needed for a project execution.

Discussion and analysis concludes that, ideas for executing innovations are usually acquired from outside the firm. These ideas, which are acquired outside the firm, come with a cost, which must be borne by the firm. These costs further discourage most firms from indulging in innovations activity. The identified challenges in the implementation of construction innovation include degree of uncertainty, cost savings generation, minimizing the environment impact of its consumption of materials and elimination of waste by removal of all non-value adding activities.

Further, it was found that Construction firms are less opened to the external environment and they tend to have poorly research and development sources. The number of Construction firms that engage in product and innovation activities within the sector is lesser than other sectors.

**Recommendations**

It is therefore recommended that Construction professionals as well as its affiliated associations should adopt a comprehensive policy, which would seek to promote rapid innovation within the industry. This recommended strategy would alert and bring together all the Construction players under one umbrella, which would seek to work to address the following, encourage innovation activities within the industry in order to let the impact and benefits of innovation be fully explored.

There should be coordination so that Consultants and Contractors will set up research and developments department within their firms in order to facilitate innovation.

**References**

Carmona, M. (2001). *Housing Design Quality Through Policy, Guidance and Review*. London, UK, Spon Press Ltd.

Construction Products Association Report (2000). *Innovation Development in Construction Products.* London, UK.

Construction Research and innovation Strategy Panel, (CRISP) *Workshop Report*: Innovation and Development in Construction Products, Held at Eland House February, 2001.

Construction Task Force (1998). *Rethinking construction*. UK, Department of the Environment, Transport and the Regions.

Dulaimi, M. F., Ling, F. Y.Y., Ofori, G., & De Sillva, N. (2002). Enhancing integrating and innovation in construction. *Building research and information*, 30(4), pp. 237- 47.

 

Fowler, J. (2002). *Survey Research Methods*. London, UK, Saga Publication.

Gann, D. M. (2003). Innovation in the built environment. *Construction Management & Economise* (September) 21, pp. 553 – 555

Motawa, I. A, Price, A. D. F., & Sher, W. (1999). Implementation of Construction innovations. *Proceedings of Association of Research in Construction Management 15th Annual Conference*, 65-74, Liverpool John Moore's University, 15-17 September.

OECD (1996). *The Knowledge-Based Economy*. Paris.

Slaughter, E. S. (1998). Models of Construction Innovation. *Journal of Construction Engineering & Management*, 124 (3), pp. 226-32.

Brown, T., & Bhatti, M. (2003). *Housing studies: Whatever happened to 'Housing and Environment'*, 18 (4), pp. 505-515. UK, Taylor & Francis Group.

Dubios, A., & Gadde, L. E. (2002). The Construction industry as loosely coupled system: implications for productivity and innovation. *Construction Management & Economics*, 20 (7), pp. 621-32.

Duncan, R. J. (2000). Meeting society and user needs for Built Environment, volume 80. *presented at APSEC*, Kulala Lumpur. September.

Egbu, C. (1999). Mechanism for the Exploring Construction Innovation to gain Competitive Advantage. *Proceedings of Association researchers in Construction Management 15th Annual Conference*, pp. 115 – 123, Liverpool John Moore University, 15 – 17 September.

Emmit, S. (2002). *Architectural Technology*. UK, London, Black science.

Finnimore, B. (1989). *Houses from the Factor, System Building and Welfare State*. London, UK, Oram Press. pp. 1942-74.

Foxon, T. (2000). Technological & institutional 'lock-in' as a barrier for sustainable innovation. *Paper for International summer school on innovation for sustainable Development: Institutional incentives and Economic Policy*, Germany, 7-11 September.

Gann, D. M., & Salter, A. (2000). Innovation in project-based, service-enhanced firms: the construction of complex products and systems. *Research policy*, 29 (7-8), pp. 955-72.

Gann, D. M., Wang, Y., & Hawkins, R. (1998) Do Regulations Regulate Encouragement of innovations? The Case of Energy Efficiency Housing Building. *Research Information*, 26(5), pp. 280-296.

Gilby, A. (2002). Low Cost Housing in UK: Responsive Designs. *Unpublished Theses* (MSc), Oxford, UK.

Golland, A., & Blake, R. (2004). *Housing Development: theory, process and practice*. Taylor & Francis Group imprint, New York, USA.

Hughes, T. (2000) *Barriers to Innovation in English Speculative Housing Cast Issues 3*, December, Nottingham University, UK.

Malpass & Murie (1998). *Housing policy & practice*. UK, London, Macmillan, pp. 22.

Naoum, S. G. (1998). *Dissertation research and writing for construction students*. Oxford, Butterworth-Heinemann.

Power, A. (1997). *Estate on the edge: Basingstoke*. Basingstoke, Macmillan.

Ravetz, A. (2001). *Council housing and culture*. London, Routledge.

Short, J. R. (1982). *Housing in Britain, The Post War Experience.* London, UK, Methuen Ltd.

Sim, D. (1993). *British Housing Design*. Essex, UK, Institute of Housing services Ltd & Longman Group Ltd.

Swenarton, M. (1981). *Homes fit for heroes*. London, Heinemann Education.

Tatum, C. B. (1991). Incentives for technological innovation in construction, In chang, L. M. (ed.), preparing for construction in the 21st century – *Proceedings of the construction conference*, New York, ASCE, pp. 447-52.

Woodhead, R., & Downes, C. (2001). *Value Management Improving capabilities*. London, UK, Thomas Telford imprint.