

# Impedance to Innovation Practices in the Ghanaian Construction Industry Consultancy Services: The Perspective of Quantity Surveying Firms

Alex Torku, De-Graft Owusu-Manu  
*Department of Building Technology, Kwame Nkrumah University of Science and Technology, Ghana [torkualex@gmail.com](mailto:torkualex@gmail.com), [d.owusumanu@gmail.com](mailto:d.owusumanu@gmail.com)*

Erika Pärn  
*Faculty of Technology Environment and Engineering, Birmingham City University, UK [erika.parn@bcu.ac.uk](mailto:erika.parn@bcu.ac.uk)*

Michael Nii Addy  
*Department of Building Technology, Kwame Nkrumah University of Science and Technology, Ghana [mljaddy@yahoo.co.uk](mailto:mljaddy@yahoo.co.uk)*

David J. Edwards  
*Faculty of Technology Environment and Engineering, Birmingham City University, UK [David.Edwards@bcu.ac.uk](mailto:David.Edwards@bcu.ac.uk)*

## Abstract

The construction industry is recognised as a universal driver of the economy, nevertheless it is berated for its reluctance to innovate. However, firms that adopt and boost innovation are bound to increase productivity and gain competitive advantage over their rivals. The rate at which innovation is adopted in Ghanaian quantity surveying (QS) firms is very slow and very alarming to the industry's stakeholders. This motivated this study to empirically identify the challenges impeding innovation adoption amongst Ghanaian QS firms. Quantitative research approach and census sampling technique was adopted for this study. Mean score analysis aided by Friedman test and Wilcoxon signed-rank tests were employed in the analysis. The results indicated that internal impediment has the highest impedance on innovation in the QS firms followed by external and demand impediments respectively. This paper importunate request for management of QS firms, Ghana Institute of Surveyors and the Government of Ghana to formulate policies, and promote measures to enhance innovation adoption. The main contribution of this study is the classification of all the challenges impeding innovation in the Ghanaian QS firms into three sets of groups and also expanding the knowledge base of these identified impediments.

## Keywords

Innovation, Quantity Surveying, Impedance to Innovation, Ghana

## 1. Introduction

The Ghanaian construction industry is the major pillar sustaining the economy of Ghana (Dadzie *et al.*, 2012; Adzroe and Ingirige, 2013). Available studies indicated that the construction industry in both developed and developing countries averagely contributes approximately 5 to 10 % of the national GDP, employs 10 % of the working population, and is also accountable for about 57 % of gross fixed capital

formation (Kikwasi, 2012; Lopes, 2012). In spite of this, it is berated for its reluctance to innovate compared to other industries (Ozorhon *et al.*, 2010), and there is no unanimity about why the innovation behaviour in the construction industry differs from other industries (Reichstein *et al.*, 2005). Ozorhon *et al.* (2010) agree that innovation in construction services is a source of competitive advantage by the industry practitioner. In order, not to be out of competition, firms are constantly introducing new ways of working and producing new products, which simply means they must innovate to compete by way of putting into practice large spectrum of new ideas (Seaden and Manseau, 2001; Blayse and Manley, 2004; Barrett *et al.*, 2007).

Innovation, which is in most cases and circumstances perceived as the successful exploitation of an idea, which is new to the unit of adoption, is a complex social process (Jones and Saad, 2003). Understanding the challenges faced or could be faced by the QS firms in the construction industry will be very useful in understanding this complexity. The construction industry sixty years ago is different from the present-day construction industry; some researchers and industry practitioners claim that the present construction environment in which the construction organisations operate is complex, chaotic, and dynamic (Jones and Saad, 2003). These complex challenges entail the several processes and operating practices the construction organisations adopt in rendering service and influenced by the major stakeholders in the construction industry (Gann, 2003; Rose and Manley, 2005). The construction organisations especially the QS firms would need to be proactive in adopting innovation in order to meet the needs, wants and expectations of the end-users (Voss and Zomerdijk, 2007). Albeit there have been very few researches that have attempted to ascertain the challenges impeding innovation in the construction industry consultancy services (Tether and Howells, 2007; Ozorhon *et al.*, 2010; Dulaimi *et al.*, 2002; Blayse and Manley, 2004; Kulatunga *et al.*, 2006), there is still a paucity of research work that enables one to appreciate the challenges impeding innovation in the Ghanaian context. Akin to this, literature is largely silent on the challenges impeding innovation in the Ghanaian construction industry consultancy services especially the QS firms and how these challenges could be effectively addressed.

Furthermore, Howells *et al.* (2004) cautioned the service sector to avoid making blanket statements about service innovation challenges and measures to rectify them. This is because there is a significant variation amongst what the service sectors perceive as challenges impeding innovation (Howells *et al.*, 2004). This statement was also attested in a study conducted by Van Ark *et al.* (2003) which noted a vast significant difference between the degree to which individual service industries encounter challenges to innovation. It is against this backdrop that this study was conducted to further explore the impedance to adoption of innovation practices in Ghanaian construction industry consultancy service; the perspective of QS firms.

## **2. Three-Dimensional Constructs of Innovation Impedance in QS Firms**

### **2.1 Demand Impediment**

Demand impediment is mostly related to customers which include the following. Customers do not want and/or cannot pay for innovation; customers are unresponsive to innovations; and previous innovations make further innovations unnecessary; lack of end-user involvement; lack of clear benefits and impacts (Tether and Howells, 2007; Ozorhon *et al.*, 2010; Dulaimi *et al.*, 2002; Blayse and Manley, 2004; Kulatunga *et al.*, 2006). According to Tether and Howells (2007), this group of factors implies that firms do not innovate because they perceive no need to and/or no reward for innovation.

In addition, Blayse and Manley (2004) identified clients and manufactures as impeding innovation in the building and construction industry. Most of the clients are inexperienced and technically incapacitated, therefore demand less from the quantity surveyor and they are also not able to set pre-condition for innovative initiatives on a project. Similarly, manufactures fail to develop innovative products which will stimulate the quantity surveyor to adopt new innovative processes in handling these products (Blayse and Manley, 2004). Blayse and Manley (2004) further recommended that, client leadership will have to be

advanced through high levels of technical competence, advanced demand patterns, and prudent risk taking in order to improve innovation in the construction sector.

## **2.2 Internal Impediment**

All the factors that relate to the firm's own abilities, capacities and internal impediments to innovate are identified in this category. The firm lacks the financial resources to innovate; the firm lacks the key and qualified staffs necessary to innovate; organisational rigidities and unwillingness to change make innovation difficult; lack of investments in innovative procedures and practices (research and development (R&D), training and education); lack of awareness of current innovation practices; the firm lacks the required technologies; the firm is too busy to innovate; and the perception that the firm is doing well without innovation (Tether and Howells, 2007; Ozorhon *et al.*, 2010; Dulaimi *et al.*, 2002; Blayse and Manley, 2004; Kulatunga *et al.*, 2006). The implication of this group of factors is that firms would innovate more if they had more resources and time to innovate (Tether and Howells, 2007).

The low level of R&D activities in the construction industry has been noted as a significant challenge that impedes innovation thus the development of the construction industry (Dulaimi *et al.*, 2002). Investing in R&D enables local construction industry to attune to innovative practices and technologies adopted in other countries. However, several researchers have criticised the level of investment in R&D and the lack of coordination between academia and industry in research activities (Dulaimi *et al.*, 2002; Construct for Excellence, 2001). Also, the organisational resources within the industry makes it conducive to innovate. These resources include "the culture of innovation within the firm, skills to successfully adopt innovations developed elsewhere, the presence of key individuals who champion innovation, processes that facilitate the codification/retention of acquired knowledge, and an innovation strategy" (Blayse and Manley, 2004, pp. 9). The culture of innovation within a firm are the intangible organisational attributes that will flourish innovation adoption. Also, the absorptive capacity of the firm needs to be sufficient in order to gain maximum knowledge transfer essential for innovation through research and other research outcomes (Blayse and Manley, 2004). Indubitably, innovations need champions. Innovation can be easily adopted when ideas are conveyed by innovation champions within a firm (Blayse and Manley, 2004; Barlow, 2000; Winch, 1998). Finally, absorptive capacity, champions, culture, knowledge codification, and innovation brokers will have to be effectively combined into a formal innovation strategy in order to enhance performance (Blayse and Manley, 2004).

## **2.3 External Impediment**

External factors that impede innovation in firms includes firms that perceive regulations hinders innovation; lack of government role model and inappropriate legislation; unfavourable economic conditions; the costs and risks involve in investing in innovations are too high; innovation can easily be copied by competitors; fragmented supply chains; fragmented nature of construction business; temporary nature of construction projects; and extensive inter-organisational change required to innovate (Tether and Howells, 2007; Ozorhon *et al.*, 2010; Dulaimi *et al.*, 2002; Blayse and Manley, 2004; Kulatunga *et al.*, 2006).

Additionally, the structure and nature of production also hampers innovation in the construction industry. The uniqueness of all construction projects hinders the degree to which a developed innovation practice will be applied to other projects (Blayse and Manley, 2004; Dubois and Gadde, 2002). The industry relationship has a significant role to play in construction innovation adoption. In spite of this, the relationships between individuals and firms within the industry and between the industry and external parties are weak because individuals and firms, on temporary basis come together and split up when a particular project is completed (Blayse and Manley, 2004; Dubois and Gadde, 2002). This arrangement can enhance innovation to the extent that the various firm can take advantage of this new project as an experiment to develop new innovative measures; however, these new innovative measures are frequently not codified, thus cannot be adopted for future projects (Dubois and Gadde, 2002). Also, Blayse and Manley

(2004) posit that the procurement systems also discourage QS firms from innovating. The procurement system that select the lowest tender to execute a construction project will mostly hinder the tenderers from including innovation practices in their production process since innovation comes with additional cost (Kulatunga *et al.*, 2006; Blayse and Manley, 2004). Furthermore, the regulations and standards imposed by government may also obstruct innovation. If the designed regulations and restrictions are too strict on the existing technologies and practices, it will compel the QS firms to upgrade their existing technologies and practices so as to comply but this would end up not being successful in the industry (Blayse and Manley, 2004; Dubois and Gadde, 2002).

### **3. Methodology**

The population for this study was registered QS firms in Accra and Kumasi. The list of registered QS firms in Ghana was obtained from the secretariat of Ghana Institute of Surveyors (GhIS). The list provided 46 registered quantity surveying firms in Ghana with their respective locations and contact details. The survey was limited to firms located in Accra and Kumasi because most of the construction activities are focused in these two cities respectively (Ahadzie, 2007). Moreover, from the obtained list 84.8% of the firms were located in Accra and 8.7% were located in Kumasi and 6.5% of the firms were located at parts of the other regions in Ghana. The population for the study (QS firms in Accra and Kumasi) was finally determined to be 43. Census sampling technique was adopted for this study. Out of the 43 questionnaires that were administered to top management at each QS firm, 24 were retrieved representing a response rate of 55.81%. According to Baruch (1999), a response rate of approximately 35% is satisfactory for most academic studies targeting top management or organisations' representative.

Prior to the analysis, Cronbach's reliability test was used to verify the reliability of the measuring instrument and the collected data were screened to verify if the sample size is adequate for this study. Therefore, each group of the items were subjected to Cronbach's reliability test. The Cronbach's alpha for demand impediment construct was 0.721, internal impediment construct was 0.898 and external impediment construct was 0.876. The Cronbach's alpha for each construct was more than 0.70 justifying the reliability of the measuring instrument. Additionally, all items in each group were subjected to Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the KMO value for demand impediment construct was 0.547, internal impediment construct was 0.766 and external impediment construct was 0.608. Each construct had KMO greater than 0.5, suggesting the adequacy of the sample size for this study.

The collected data were further analysed using descriptive statistics (mean score) after passing all the preliminary tests. In addition, the mean scores of the responses were used to rank each of the challenges to provide a clearer understanding of the agreement reached by all the respondents as shown in Table 1. The challenge with the highest mean score was ranked highest and the challenge with the lowest mean score was ranked lowest. In cases where two or more variables have the same mean score, the one with the lowest standard deviation was assigned the highest ranking (see Field, 2005; Ahadzie, 2007). The standard error provides a further insight to how likely a sample represents the population.

### **4. Survey Results and Discussion**

The internal impediment group of challenges as depicted in Table 1 was ranked to have the highest impedance to innovation in Ghanaian QS firms. It is interesting to note that these top five challenges cover the internal inputs of innovation. Therefore, it can be concluded that most of the QS firms find it very challenging to provide resources that will meet the very first stages of innovation decision process. This finding largely agrees with the survey conducted by Adow *et al.* (2013) who pointed out that the rate at which innovation is adopted in Ghanaian construction industry is slow because the resources available are not enough to encourage innovation. Furthermore, the argument raised by Dulaimi *et al.* (2002) that

innovative problems within the construction industry is as a result of the poor rates of investment in R&D has also been confirmed by the findings of this study. The impediment group of challenges was ranked second as shown in Table 1. The problem of unfavourable economic conditions has been highlighted as the most significant challenge impeding the uptake of innovation in the construction industry (Ozorhon *et al.*, 2010). The findings of this research further strengthen the need for the Government of Ghana to critically study this alarming challenge before it gets out of hand. The QS firms in Ghana perceived the demand impediment as least significant when it comes to challenges impeding innovation as shown in Table 1. It is worth mentioning that both government and private clients who are the major clients in Ghana (Field Survey, 2016) are less experienced and technically incapable therefore demand less from the QS firms and are also not able to set pre-condition for innovative behaviour on a project (Blayse and Manley, 2004). This plausibly explains the reason why the QS firms in Ghana find their clients as impediment to innovation. The findings of this study largely agree with that of Howells *et al.* (2004) who ranked customers' unwilling or inability to pay for innovation as the most significant barrier impeding innovation in the design activities service sector, road transport service sector, and information processing service sector.

**Table 1: Ranking of challenges impeding innovation**

Challenges	Mean	Rank	Std. Deviation	Std. Error of Mean
<b>Demand impediment</b>	<b>2.83</b>	<b>3<sup>rd</sup></b>	<b>.847</b>	<b>.173</b>
Lack of customer involvement in innovation	3.38	1 <sup>st</sup>	1.209	.247
Clients do not want and/or cannot pay for innovation	3.00	2 <sup>nd</sup>	1.022	.209
Lack of clear benefits and impacts of innovation	2.96	3 <sup>rd</sup>	1.233	.252
Clients are unresponsive to innovations	2.79	4 <sup>th</sup>	.932	.190
Previous innovations make further innovations unnecessary	2.00	5 <sup>th</sup>	.885	.181
<b>Internal impediment</b>	<b>3.52</b>	<b>1<sup>st</sup></b>	<b>.963</b>	<b>.197</b>
Lack of organisational resources (culture of innovation, innovation adoption skills, key individual who champion innovation, innovation strategy)	3.88	1 <sup>st</sup>	0.900	.184
Lack of investments in innovative procedures and practices (R&D, training and education)	3.83	2 <sup>nd</sup>	1.239	.253
Lack of financial resources to innovate	3.79	3 <sup>rd</sup>	1.215	.248
Lack of required technologies to innovate	3.67	4 <sup>th</sup>	1.435	.293
Lack of key and qualified staffs necessary to innovate	3.46	5 <sup>th</sup>	1.250	.255
The perception of doing well without innovation	3.33	6 <sup>th</sup>	1.204	.246
Lack of awareness of current innovation practices	3.33	7 <sup>th</sup>	1.341	.274
Too busy to innovate	3.29	8 <sup>th</sup>	1.398	.258
Organisational rigidities and unwillingness to change	3.13	9 <sup>th</sup>	1.154	.236
<b>External impediment</b>	<b>3.37</b>	<b>2<sup>nd</sup></b>	<b>0.779</b>	<b>.159</b>
Unfavourable economic conditions	3.92	1 <sup>st</sup>	1.018	.208
The costs and risks involve in investing in innovations are too high	3.71	2 <sup>nd</sup>	1.160	.237
Innovation can easily be copied by competitors	3.58	3 <sup>rd</sup>	1.018	.208
Fragmented nature of construction business and fragmented supply chains	3.38	4 <sup>th</sup>	1.056	.215
The procurement systems	3.33	5 <sup>th</sup>	1.007	.206
Temporary nature of construction projects	3.29	6 <sup>th</sup>	1.268	.259

Lack of government role model and inappropriate legislation	3.13	7 <sup>th</sup>	.947	.193
Perceive regulations and standards	3.00	8 <sup>th</sup>	.780	.159
The uniqueness of all construction project	3.00	9 <sup>th</sup>	1.142	.233

The main findings on a broader level on the barriers to innovation survey conducted by Howells *et al.* (2004) indicated that external impediment is the most significant group of challenges impeding innovation in the service industry which is quite contrary to this study. However, Howells *et al.* (2004) adopted the evidence from the Second European Community Innovation Survey (CIS-2) which covered innovative activities within service enterprises in 13 western European countries over the 1994-1996 period (Commission of the European Communities, 2001). The result was that internal impediment was the most significant challenge impeding innovation in the service sector. Moreover, Van Ark *et al.* (2003) also employed Structural Provision of Information on Innovation in Services which was initiated in 1998 to improve the understanding of innovative activities in service industries (den Hertog and Bilderbeek, 1999). The result of the study rated internal impediment higher than the other impediments impeding innovation in the service sector in the Netherlands (Van Ark *et al.*, 2003). Therefore, the findings of Howells *et al.* (2004) and Van Ark *et al.* (2003) to somewhat agrees with the findings of this study that internal impediment is the most significant impedance impeding innovation adoption in the Ghanaian QS firms.

The findings of this study also buttress the statement that there is a significant varying difference in the challenges impeding innovation amongst individual service industries; no two service industry will encounter the same degree of challenges impeding innovation (Howells *et al.*, 2004; Van Ark *et al.*, 2003). For example, this study identified that lack of organisational resources and lack of investments in innovative procedures were the top two challenges impeding innovation amongst the internal impediment group of challenges in the Ghanaian QS firms. However, based on the evidence from the CIS-2 database, Howells *et al.* (2004) identified that lack of qualified personnel and organisational rigidities were the top two challenges impeding innovation amongst the internal group of challenges in a ‘Four Sectors’ survey in Europe. This example can confirm the statement that there is actually a significant variation amongst service industries in terms of what they perceive as significant impediments to innovation.

## 5. Analysis of Significance Difference: Friedman Test and Wilcoxon Signed-Rank Tests

A Friedman test was then conducted to check if there was a statistically significant difference between the various items measuring the challenges impeding innovation practices. That is, if the respondents find any of these group of impediment more challenging than the other. The Friedman test shown in Table 2 provides the test statistics ( $\chi^2$  value (“Chi-square”), degree of freedom (“df”) and the significance level (“Asymp. Sig.”). It can be observed from Table 2 that there is a statistically significant difference between the mean ranks for demand impediment,  $\chi^2(4) = 20.432$ ,  $p = 0.000$ ; there is statistically significant difference between the mean ranks for internal impediment,  $\chi^2(8) = 23.540$ ,  $p = 0.003$ ; and there is also a statistically significant difference between the mean ranks for external impediment,  $\chi^2(7) = 27.312$ ,  $p = 0.000$ . This means that the respondents found some of the items under their respective groups (demand, internal and external impediment group) more challenging than others. Finally, the overall statistical significant difference between the three (3) groups of items is,  $\chi^2(2) = 21.028$ ,  $p = 0.000$ . This result also indicate that the respondents perceived different level of impediment amongst the three (3) groups of challenges.

Furthermore, it was of importance to the researcher to examine where the differences actually exist to enhance the reliability and validity of the findings of this study. A post hoc test was conducted using Wilcoxon signed-rank tests on the different combination of the grouped challenges as shown in Table 3. Since the comparison is between multiple groups, it is more likely to declare the result significant when it is not (Type 1 error). Bonferroni-adjusted significance level was calculated to rectify this error.

$$\text{Bonferroni-adjusted significance level} = \frac{\text{Initial significance level}}{\text{Number of tests conducted}} = \frac{0.05}{3} = 0.017$$

From Table 3 it can be observed that at the  $p < 0.017$  significance level, only the items grouped under internal impediment and demand impediment was statistically significantly different. However, there were

no statistically significant difference between external impediment and demand impediment group of items ( $Z = -2.235$ ,  $p = 0.025$ ), or between external impediment and internal impediment group of items ( $Z = -2.295$ ,  $p = 0.022$ ).

**Table 2: Friedman Test on Challenges Impeding Innovation**

Group	Mean Rank	N	Friedman Test Statistics		
			Chi-Square	df	Asymp. Sig.
Demand impediment	1.44	24	20.432	4	.000
Internal impediment	2.58	24	23.540	8	.003
External impediment	1.98	24	27.312	7	.000
All groups			21.028	2	.000

**Table 3: Wilcoxon signed ranks test on challenges impeding innovation**

	Internal impediment - Demand impediment	External impediment - Demand impediment	External impediment - Internal impediment
Z	-4.119 <sup>a</sup>	-2.235 <sup>a</sup>	-2.295 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000	.025	.022

- Based on negative ranks
- Based on positive ranks

## 6. Conclusion

This paper was set out to ascertain the underlying challenges impeding innovation practices in QS firms in Ghana. In order to achieve this objective, respondents were asked to indicate the level of impedance of three groups of challenges (Demand impediment, Internal impediment and External impediment) on innovation practices on a five-point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”. The result showed that internal impediment group of challenges have the highest impediment to innovation adoption in Ghanaian QS firms. Also, external impediment group of challenges was ranked the second highest followed by demand impediment. The outcome of this result was confirmed using Friedman test to check if there was a statistically significant difference between the various items measuring the challenges impeding innovation practices. This study also echoed the statement that there is a significant varying difference in the challenges impeding innovation amongst individual service industries; no two service industry will encounter the same degree of challenges impeding innovation. The main contribution of this study is the classification of all the challenges impeding innovation in Ghanaian QS firms into three set of groups and also expanding the knowledge base of these identified impediments within the Ghanaian QS firms. In line with the ascertained challenges impeding innovation in the Ghanaian QS firm, this paper importunate request for management of QS firms, GhIS, and the Government of Ghana to formulate policies, and promote measures to enhance innovation adoption. A follow-up empirical research should be conducted to identify and establish the effectiveness of the key drivers of innovation in the QS firms in Ghana.

## 7. References

- Adow, O., Allotey, S.E., and Arthur-Aidoo, B.M. (2013). “The impact of innovation of the construction industry in Ghana”. *Civil and Environmental Research*, Vol. 3, No. 12, pp 120-126.
- Adzroe, E. K., and Ingirige, M. J. B. (2013). “Exploring e-business technology to support improvement in



the infrastructure procurement process in the Ghanaian construction industry”.

- Ahadzie, D.K. (2007). "A model for predicting the performance of project managers in mass house building projects in Ghana". Ph.D. Thesis, University of Wolverhampton.
- Barrett, P., Abbott, C., Ruddock, L., and Sexton, M. (2007). "Hidden innovation in the construction and property sectors". RICS Research Paper Series, Vol. 7, No. 2.
- Baruch, Y. (1999). "Response rates in academic studies – a comparative analysis". *Human Relations*, Vol. 4, No. 52, pp 421-38.
- Blayse, A. M., and Manley, K. (2004). "Key influences on construction innovation". *Construction Innovation*, Vol 4, No. 3, pp 143-154.
- Dadzie, J., Abdul-Aziz, A. R., and Kwame, A. (2012). "Performance of consultants on government projects in Ghana: client and contractor perspective". *International Journal of Business and Social Research*, Vol. 2, No. 6, pp 256-267.
- den Hertog, P., and Bilderbeek, R. (1999). Conceptualising service innovation and service innovation patterns, Research programme on innovation in services (SIID) for the Ministry of Economic Affairs, Dialogic, Utrecht.
- Dubois, A., and Gadde, L-E. (2002). "The construction industry as a loosely coupled system: implications for productivity and innovation". *Construction Management and Economics*, Vol. 20, No. 7, pp 621-32.
- Dulaimi, M. F., Ling, F. Y. Y., Ofori, G., and De Silva, N. (2002). "Enhancing integrating and innovation in construction". *Building Research and Information*, Vol. 30, No. 4, pp 237-47.
- Field, A. (2005). *Discovering Statistics, Using SPSS for Windows*, Sage Publications, London.
- Gann, D.M. (2003). "Innovation in the built environment, Guest Edition" Vol. 21, No. 6, pp 553-555.
- Ghana Statistical Service. (2016). Revised gross domestic product 2014. Statistics for development and progress.
- Howells, J., Tether, B., Gallouj, F., Djellal, F., Gallouj, C., Blind, K., ..., and Banach, D. (2004). "Innovation in services: issues at stake and trends, Research Report", European Commission.
- Jones, M., and Saad, M. (2003). *Managing Innovation in Construction*, Thomas Telford.
- Kikwasi, G.J. (2012). "Causes and effects of delays and disruptions in construction projects in Tanzania". *Australasian Journal of Construction Economics and Building*, Conference Series, Vol. 1, No. 2, pp 52-59.
- Kulatunga, U., Amaratunga, R. D. G. and Haigh, R. P. (2006). "Construction innovation: A literature review on current research".
- Lopes, J. (2012). "Construction in the Economy and its Role in Socio-Economic Development". In Ofori, G. (Editor), *New perspectives on construction in developing countries*, Spon, Abingdon, pp 40-71.
- Ozorhon, B., Abbott, C., Aouad, G., and Powell, J. (2010). "Innovation in construction: a project life cycle approach". SCRI Research Report, SCRI, UK.
- Rose, T., and Manley, K. (2005). "A conceptual framework to investigate the optimisation of financial incentive mechanisms in construction projects", CIB W92, *International Symposium on Procurement Systems: The Impact of Culture Difference and Systems on Construction Performance*, 7 – 10 February, Las Vegas, NV, Paper Ref. No. 125.
- Seaden, G., and Manseau, A. (2001). "Public policy and construction innovation". *Building Research & Information*, Vol. 29, No. 3, pp 182-196.
- Tether, B., and Howells, J. (2007). "Changing understanding of innovation in services". *Innovation in Services*, Vol. 9, pp 21-60.
- Van Ark, B., Broersma, L., and den Hertog, P. (2003). "Service innovation, performance and policy: A review". Ministry of Economic Affairs, The Hague.
- Voss, C., and Zomerdijk, L. (2007). "Innovation in experiential services – An empirical view", In: DTI (ed). *Innovation in Services*, London: DTI, pp 97-134.