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Measures for Managing Changes on Vertical Construction Projects in Nigeria

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ABSTRACT: Measures for managing changes on vertical building construction works in Nigeria will in no small measure equip the construction stakeholders with the confidence needed to manage projects. It will also ensure minimal out-turn of negative consequences on the performance of tertiary educational building projects. The paper examines the perception of practitioners on the measures for managing construction changes, taking into consideration various factors that were sourced from published journal articles. Survey method was adopted with 131 questionnaire administered to the respondents in tertiary educational institutions in Ondo state, Nigeria. Mean item score was employed to analyze the data collected via questionnaire survey. 14 factors, which were rated on 5-point likert scale by the respondents, were significant. Kruskal Wallis H test was also adopted in testing opinions of the respondents, in order to ascertain agreement or otherwise. Cronbach alpha test carried out established the reliability of the research instrument used for data collection. The findings emanating from the paper is that the respondents had divergent views i.e. statistically, no agreement in the opinions of the respondents on the measures for managing changes in tertiary educational building projects. This is not unconnected to the uniqueness and peculiarities possessed by each construction projects. Out of the 14 significant measures, the most highly ranked three are; involvement of professionals at the initial stage of project, strict compliance with statutory regulations and thorough detailing of design among others can effectively be used in managing changes.

Keywords: Changes, managing, construction, projects, measures, vertical

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INTRODUCTION

The propensity at which changes on construction projects are transmogrifying necessitated effective measures of management (Dairo, 2015). These changes are alarming, geometrical in nature and have invariably affected construction projects, thereby making it vulnerable to what has been broadly categorized as time and cost overruns as well as lack of quality products that hardly stand the test of time (Adedokun, Ogunsemi, Aje, Awodele & Dairo, 2013). Based on this conjecture, it is highly desirable but hardly feasible to eliminate construction changes completely on projects due to multi-layered contracting nature, an effective change management is a critical process for the construction industry's sustained survival (Zhuoyuan, Benson, & Imriyas, 2005). Anees, Mohamed and Abdel Rasek (2013) opine that a formalized management process could aid in resolving construction changes and also ameliorating a severe risk contributing to project failure.

The need for the project owners or managers to make an informed decision, one with minimal

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error, is only possible if adequate measures are put in place to safeguard construction changes (Harrison, 2012; Hao, Shen, Neelamkavil & Thomas, 2008). Managing construction changes is now recognized as important practice to improving innovation, construction project performance and client's satisfaction. It is then that the resultant effects/impacts of construction changes on project(s) can be minimized and the objectives or goals of the industry achieved. Oftentimes when construction changes are not dealt with satisfactorily, the industry tend to suffer poor performance. Based on the aforementioned, this paper is therefore aimed at appraising the measures for managing construction changes in Ondo state, Nigeria with a view to enhancing the performance of vertical tertiary educational building projects. This is not only in terms of cost and time but also quality of the end product to the client's satisfaction.

These vertical construction projects are therefore any constructions that are built from ground up, be it bungalow or multi storey buildings in tertiary educational institutions in Ondo state, Nigeria. The preference for building projects among others are; the simplicity in scope and the documentation being more detailed than other aspect of construction works (Aje, 2008). Majority of contractors operating in Nigeria are also into building construction and over 70% of construction works being executed are in the area of building works (Hussein, 1991).

GENERAL OVERVIEW

Classification of changes

Changes are to be classified adequately in order to effectively manage them and classifications of changes in general terms apply to changes in construction domain (Hao et al., 2008). Motawa, Anumba, Lee and Pena-Mora (2007) classified changes based on parameters of time, need and effect. In summary, "*based on time, change could be anticipated or emergent, proactive or reactive, or pre-fixity or post-fixity. Based on need, change could be elective or required, discretionary or non-discretionary, or preferential or regulatory. Based on effect, change could be beneficial, neutral or disruptive.*" (Motawa et al., 2007). Construction changes are inevitable on any construction projects, be it building, civil or heavy/ industrial engineering works (Hao et al., 2008; Erdogan et al., 2005; Ogunsanmi, 2013). Inclusion of variation clause in the condition of contract is also evidence that changes cannot be totally eliminated but can only be reduced or minimized to a bearable level thus having little or no impact on project performance (Ojo, 2010). The construction changes are to be managed in order to maximize the benefits, minimize the penalties, and ensure that both benefits and penalties are distributed equitably (Erdogan et al., 2005). Of all construction changes, the most frequent and most costly changes are often related to design, such as design changes and design errors (Lu & Issa, 2005).

Causes of construction changes on project

Construction changes do not just happen to building elements; it is due to various factors that made the elements to be susceptible (Babatunde et al., 2012). These factors affect each element differently with predisposing factors grouped into four categories as (i) owner related factors (ii) consultant related factors (iii) contractor related factors and (iv) natural related factors (Babatunde et al., 2012). These factors should be accurately assessed and determined during the planning stage of building elements design so as to minimize the effects of changes on the various building elements. Erdogan et al (2005) and Hao et al. (2008) maintained that changes in projects are primarily due to rework, variations (change orders), or unexpected events such as industrial action and inclement weather and lastly, construction change directives.

Impacts of construction changes on projects

The impact of construction changes may vary, but in general will fall into one of five categories according to Facilities Operations and Development (2008) of the Ohio State University. The categories include:

Financial impacts

Financial impacts may include additional costs, potential savings or revenue increases or decreases. In some cases, funding the change may require another project to be delayed or reduced in scope. This in turn may impact additional projects that depend on the one whose funding is being redirected. The loss or gain of revenue will need to be evaluated against other costs or savings (Facilities Operations and Development, 2008).

Infrastructure impacts

This may include the need for additional capacity which has not been planned for or funded or may shift the priority of projects that have been planned and funded. If additional capacity is required, additional funding may be required or existing fund redirected and other projects may be delayed, resulting in further impacts (Facilities Operations and Development, 2008).

Schedule impacts

Facilities Operations and Development (2008) described schedule impacts as delaying or accelerating a project or phase of a project. Delaying a project could impact other projects dependent on one being delayed and could also result in increased costs due to escalation. Accelerating a project may reduce costs for that project, but may be logically difficult if predecessor projects are required or if funding sources are not available to meet the accelerated schedule (Facilities Operations and Development, 2008).

Physical/logistical impacts

Physical/logistical impacts refer to constraints that make implementing a change particularly challenging. It may be physically impossible to accomplish additional projects in close proximity to ones that are planned or adding a project in an already congested area may result in a total disruption of access and activities in the immediate vicinity (Facilities Operations and Development, 2008).

Resource impacts (other than financial)

This may include the need for additional staff or for outsourced service to manage additional work or review project deliverables. Other resources which can be impacted include construction materials and labour as well as consultant services (Facilities Operations and Development, 2008).

Construction change management

Construction projects are becoming complex in nature; clients are also becoming knowledgeable, more demanding and selective in what they want from consultants (Preece, Moodley & Smith, 2003). This complexity gives rise mostly to unwanted situations leading to construction changes like variations (change orders), reworks (Erdogan *et al.,* 2005), or unexpected events such as industrial action, inclement weather (Love, Holt, Shen, Li & Irani, 2002) and construction change directives (Hao *et al.*, 2008) with their attached effects as aforementioned.

Change management is one of the priority areas of construction practitioners and concerted efforts are being made to cushion the effects of cost and time overruns that characterized construction projects be it vertical or horizontal (Harrison, 2012; Hao *et al.*, 2008). Also, significant poor project performance and quality failures (Adedokun *et al.,* 2013; Ademeso & Windapo, 2014; Baloi & Price, 2003; Elinwa & Buba, 1993; Garry, 2005; Ogunsemi & Aje, 2005; Okpala & Aniekwu, 1988) cannot be over emphasized.

Without gainsaying, effective measures for managing construction changes can improve the performance of projects (Hao *et al.*, 2008). The underlisted measures are to safeguard the effects of construction changes in building projects (Dairo, 2015).

1. Involvement of professionals at the initial stage of project
2. Owner's involvement at the planning & design phase
3. Strict compliance with statutory regulations
4. Clear and thorough project brief
5. Thorough detailing of design
6. Value engineering at initial stage of project
7. Comprehensive site investigation
8. Review of contract documents
9. Use of collected and organized project data compiled by owner, consultant and contractor
10. Having knowledge-base of previous projects
11. Involvement of contractor at planning and scheduling stage
12. Use of project scheduling/management techniques
13. Restricted pre-qualification system for awarding projects
14. Avoiding of the use of open tendering

RESEARCH METHODOLOGY

The population for this research work includes 131 key construction stakeholders comprising 44 Contractors/ representatives, 32 Quantity Surveyors, 28 Architects and 27 Structural Engineers, in the tertiary educational institutions in Ondo state, Nigeria according to Table 1. The construction professionals used are both in-house professionals within the client organisation and the consultants outside the client's organisation but working on client's projects and the contractors executing the projects for clients. The targeted respondents were involved in the tertiary educational building projects from 2010 – 2014. The choice of the duration is to enable the respondents to quickly remember the activities that transpired during the course of the projects, knowing too well that records are seldom kept in a retrievable manner (Tarr & Car, 2000), hence taking too long a duration will allow guess work to set in.

The adequacy of a sample is assessed by how well such sample represents the whole

Table 1: Population breakdown of the respondents

S/N	Institutions	CLIENTS REPRESENTATIVES						Nr. of Ktors/Rep	Total
		In-House Professionals			External Consultants				
		QS	Arch	S/Eng	QS	Arch	S/Eng		
1	Tert. Ins. 1	2	2	4	5	4	4	10	31
2	Tert. Ins. 2	3	1	2	4	3	3	5	21
3	Tert. Ins. 3	0	0	0	1	2	2	5	10
4	Tert. Ins. 4	2	2	2	9	7	6	10	38
5	Tert. Ins. 5	0	0	0	0	0	0	0	0
6	Tert. Ins. 6	0	0	0	4	4	3	8	19
7	Tert. Ins. 7	2	3	1	0	0	0	6	12
	Total	**9**	**8**	**9**	**23**	**20**	**18**	**44**	**131**

Key:
Tert. Ins. – Tertiary Institution; Nr. of Ktors/ Rep – Number of Contractors/ Representatives;
QS – Quantity Surveyors; Arch – Architects; S/Eng – Structural Engineers.

Table 2: Population of the respondents

S/N	Respondents	Population
1	Quantity Surveyors	32
2	Architects	28
3	Structural Engineers	27
4	Contractors/ Representatives	44
	Total	**131**

population of participants from which the sample is drawn (Bell, 2005; Kothari, 2009). In order to achieve this, the lists of relevant construction professionals were collected from physical planning unit (PPU)/ works and services department of their respective tertiary educational institutions. Table 2 shows that the entire population of 131, which is referred to as census method, was used in the study being that the population was finite and not expansive in nature.

Data Collection Instruments

The research instrument used for collecting data from the respondents was a structured questionnaire. It was administered using a set of predetermined questions. The questions designed for this research were such that first section dwelt on the background information of the respondents while the other section focused on matters relating to the research study. Questions inherent in the structured questionnaire were multiple-choice type with different checkboxes and tables posed on a 5-point likert scale for ease and uniformity of response.

DATA PRESENTATION, ANALYSIS AND DISCUSSION

Tables were employed in this paper for data presentations while the analyses were carried out using percentile, mean item score, Cronbach alpha test and Kruskal Wallis H test. The results of the analyses were presented as follows under the various headings

Background Information of Respondents

Out of the 131 questionnaires administered, 87 were filled, returned and found suitable for the analysis. The analyzed questionnaires represent 66.41% of the total questionnaires sent out. This is considered sufficient for the study base on the assertion of Moser and Kalton (1999) that the result of a survey could be considered as biased and of little significance if the return rate was lower than 20-30%.

From Table 3, it can be seen that majority of the respondents in this case are Quantity Surveyors with 43.7% and this was followed by 29.9% being the Structural Engineers. The least was Architects with 26.4%. The professional membership status of the respondents shows that 47.1% are graduate members, 50.6% are corporate/ associate members while the least was 2.3% being fellow of the professional bodies.

As for the years of working experience possessed by the respondents, it can be seen that 26.4% falls within 1 - 5, 54% of the respondents are within 6 – 15 years of experience, while 8% falls within 16 - 20. On the average, the respondents have 10 years of working experience and the information supplied by this category of professionals is considered adequate and relied upon. These set of respondents have their establishment in existence for an average of 13 years.

Analysis in Table 6 reveals that majority of the respondents are Postgraduate Diploma holder with 40.2% and this is followed by respondents

Table 3: Demographic information of the respondents

Background Information	*Frequency*	*Percentage*	*Cum. Percentage*
Profession of respondents			
Quantity Surveyors	38	43.7	43.7
Architects	23	26.4	70.1
Structural/ Civil Engineers	26	29.9	100.0
Total	***87***	***100.0***	
Years of experience			
1 – 5	23	26.4	26.4
6 – 10	32	36.8	63.2
11 – 15	15	17.2	80.4
16 – 20	7	8.0	88.4
Above 20	10	11.6	100.0
Mean	**9.7**		
Total	***87***	***100.0***	
Highest Qualifications			
HND	17	19.5	19.5
BSc/BTech	18	20.7	40.2
PGD	35	40.2	80.5
MSc/MTech	16	18.4	98.8
PhD	1	1.2	100.0
Total	***87***	***100.0***	
Type of firm/ Sector			
Client organization	26	29.9	29.9
Contracting firm	46	52.9	82.8
Consulting firm	15	17.2	100.0
Total	***87***	***100.0***	
Year/ length of establishment of firm			
1 – 5	13	14.9	14.9
6 – 10	23	26.5	41.4
11 – 15	18	20.7	62.1
16 – 20	11	12.6	74.7
Above 20	22	25.3	100.0
Mean	***12.6***		
Total	***87***	***100.0***	
Membership grade			
Graduate	41	47.1	47.1
Corporate/ Associate	44	50.6	97.7
Fellow	2	2.3	100.0
Total	***87***	***100.0***	
Professional body of affiliation			
NIQS	37	42.5	42.5
NIA	21	24.1	66.6
NSE	24	27.6	94.2
Others (NICE, COREN)	5	5.8	100.0
Total	***87***	***100.0***	

Table 4: Test of reliability for measuring scale

Scale of measure	Cronbach ∝-value
Measures for managing construction changes	0.873

with BSc/ BTech qualification representing 20.7% followed by 19.5% and 18.4% representing HND and MSc/ MTech. Only one of the respondents has a PhD as the highest qualification and this translated to 1.2%.

Reliability of the research instrument

Reliability according to Kothari (2009) is an important aspect of research instrument and must be considered to ensure that accurate results are obtained. One of the most commonly used reliability coefficients according to Kothari is Cronbach's alpha test (á). Cronbach alpha test was employed in this study to test the reliability of the questionnaire administered to the respondents during the survey carried out.

Table 4 shows that the Cronbach's á value for scale of measures of the research instruments is 0.873. Since the degree of reliability of the instrument is more perfect as the value tends towards 1.0 (Kothari, 2009), it can then be concluded that the instrument used for this research is significantly reliable.

Analysis shown in table 5 reveals that all measures posed for managing construction changes are significant and can be reliably adopted to manage construction changes while the most highly ranked factors among other are the involvement of professionals at the initial stage of the project followed by strict compliance with statutory regulations and thorough detailing of design by the consultants with the mean score values of 4.56, 4.35 and 4.34 respectively. The least ranked factors, though significant, are avoidance of the use of open tendering (Mean Score = 3.24), restricted pre-qualification system

Table 5: Measures for managing changes on projects

Measures	Mean	Rank
Involvement of professionals at the initial stage of project	4.56	1
Strict compliance with statutory regulations	4.35	2
Thorough detailing of design	4.34	3
Clear and thorough project brief	4.28	4
Owner's involvement at the planning & design phase	4.27	5
Comprehensive site investigation	4.23	6
Value engineering at initial stage of project	4.09	7
Use of project scheduling/ management techniques	4.06	8
Review of contract documents	4.04	9
Having knowledge-base of previous projects	4.02	10
Use of collected and organized project data compiled by owner, consultant and contractor	4.02	10
Involvement of contractor at planning & scheduling stage	3.76	12
Restricted pre-qualification system for awarding projects	3.58	13
Avoidance of the use of open tendering	3.24	14

Table 6: Test of significance on the measures for managing changes

	Profession	Group	Mean
Chi-square	1.063	Quantity Surveyors	22.14
Df	2	Architects	18.86
Asymp. Sig	0.588	Structural/ Civil Engineers	23.50

for awarding projects (Mean Score = 3.58) and involvement of contractor at planning and scheduling stage (Mean Score = 3.76).
Table 6 shows the respondents' divergent opinions on the measure for managing construction changes on projects. The result of Kruskal Wallis test carried out shows a low chi-square value of 1.063, P value is > 0.05 i.e. 0.588, hence statistically, it can be inferred that there is no significant agreement in the opinions of respondents on the measures for managing construction changes. The divergent views may be as a result of divers peculiarities that each of the construction projects exhibit; therefore, measures for managing changes are project specific. Hence no one size fits all in terms of management measures.

Discussion of findings

Measures for managing construction changes

In order to manage construction changes effectively, since it cannot be totally avoided, some of the measures to be put in place according to the respondents are involvement of professionals at the initial stage of project, strict compliance with statutory regulations and thorough detailing of the design on the part of the consultants. This finding gave a backing to Lu and Issa (2005) that of all construction changes, the most frequent and most costly changes are often related to design, such as design changes and design errors. The first three factors that were highly ranked by the respondents are also in support of Ibem, et al. (2011) and complimentary to Hussin and Omran (2009) that construction professionals should act as an effective manager, a generalist and a facilitator when coordinating projects asides being a good communicator in handling mediation, managing conflicts and negotiating terms with various stakeholders in the project. It is worthy of mentioning that other factors rated by the respondents after the analysis are also significant and by extension, combination of two or more of the other measures can as well yield the desired result on the projects.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Consequent to the forgoing analysis carried out, one can summarily make inferences concerning measures for managing changes on construction projects that;

1. construction changes can be managed effectively if the professionals are involved at the initial stage of project; and
2. stakeholders are complying strictly with statutory regulations with thorough detailing of the design.

Recommendations

Bearing in mind the magnitude of fund committed into the construction projects, the following recommendations are proposed for stakeholders in the construction industry so as to achieve itch free construction process that ensure value for money;

1. Professionals should be involved at the early stage of the project with thorough design detailing.
2. Consultants and the contractor should comply strictly with the statutory regulations during design and construction respectively.

REFERENCES

Adedokun, O.A., Ogunsemi, D.R., Aje, I.O., Awodele, O.A., and Dairo, D.O. (2013). Evaluation of Qualitative Risk Analysis Techniques in Selected Large Construction Companies in Nigeria. *Journal of Facilities Management,* 11(2), 123-134.

Ademeso, O.S., and Windapo, A.O. (2014). Relationship between material management approach and scheduled project completion time, available at http://www.unilag.edu.ng/opendoc.php?sno=13167&doctype=doc...$, *accessed 5th May, 2014.*

Aje, I.O. (2008). The Impact of Contractors' Prequalification and Criteria of Award on Construction Project Performance in Lagos and Abuja, Nigeria", Unpublished Ph.D thesis submitted to the School of Postgraduate Studies, Federal University of Technology, Akure, Nigeria.

Anees, M.M., Mohamed, H.E., and Abdel Rasek, M.E. (2013). Evaluation of Change Management efficiency of Construction Contractors. *Housing and Building National Research Centre Journal,* 9, 77-85, http://dx.doi.org/10.1016/j.hbrcj.2013.02.005.

Babatunde, S.O., Babalola, O., Jagboro, G.O., and Opawole, A. (2012). Assessment of building element's proneness to variation in Nigeria. *Journal of Construction Project Management and Innovation,* 2(2), 403-447.

Baloi, D., and Price, A.D.F. (2003). Modeling Global Risk Factors Affecting Construction Cost Performance. *International Journal of Project Management,* 21, 261-269.

Bell, J. (2005). Doing Your Research. A Guide for First-time researchers in Education and Social Science, 5th Edition, Buckingham: Open University Press.

Dairo, D.O. (2015). Appraisal of Construction Change Management (CCM) Practices in the Nigerian Construction Industry. An M.Tech post survey report submitted to the Department of Quantity Surveying, School of Environmental Technology, The Federal University of Technology, Akure, Nigeria.

Egan, J. J., Seder, J.E., and Anderson, D.L. (2012). Practices in Construction Change order management, available at http://www.aacei.org, accessed 15th March, 2014.

Elinwa, A., and Buba, S. (1993). Construction Cost Factors in Nigeria. *Journal of Construction Engineering and management,* 119(4), 69.

Erdogan, B., Anumba, C., Bouchlaghem, D., and Nielsen, Y. (2005). *Change Management in Construction: The Current Context, In: Khosrowshashi, F (Ed.),* 21st Annual ARCOM Conference, 7 – 9 September, SOAS, University of London, Association of Researchers in Construction Management 2, 1085 – 95.

Facilities Operations and Development (2008). University Project & Capital Planning: Change Management Process, available at https://fod.osu.edu/planning/change_mgt.pdf, retrieved 5th May, 2015.

Garry, C. (2005). *Risk factors leading to cost over-run in highway Projects.* The conference proceedings of the Queensland University of Technology Research week international conference 4th – 8th July, 2005, Brisbane, Australia.

Hao, Q., Shen, W., Neelamkavil, J., and Thomas, R. (2008). *Change Management in Construction Projects.* CIB W78, 2008, International Conference on Information Technology in Construction, Santiago, Chille.

Harrison, C. (2012). Managing Change in Manufacturing and Production Facilities, available at http://www.asse.org/professionalsafety/docs/Carl%20Harrison%20Article.pdf, accessed 30th May 2014.

Hussin, A.A. and Omran, A. (2009). Roles of Professionals in Construction Industry. The International Conference on Economics and Administration, Faculty of Administration and Business, University of Bucharest, Romania ICEA – FAA Bucharest, 14th-15th November.

Hussein, A.A. (1991). Construction in an ailing economy. *The Quantity Surveyors*, 11(2), 1-3.

Ibem, E. O., Anosike, M.N., Azuh, D.E. and Mosaku, T.O. (2011). Work Stress among Professionals in the Building Construction Industry in Nigeria. *Australasian Journal of Construction Economics and Building*, 11 (3) 45-57.

Kothari, C.R (2009). *Research Methodology,* 2nd Revised Edition, New Delhi, New Age International Publishers.

Love, P.E.D., Holt, G.D., Shen, L.Y., Li, H., and Irani, Z. (2002). Using systems dynamics to better understand change and rework in construction project management systems. *International Journal of Project Management*, 20, 425-436.

Lu, H., and Issa, R.R.A. (2005). Extended production integration for construction: a loosely coupled project model for building construction. *ASCE, Journal of Computing in Civil Engineering,* 19(1), 58-68.

Moser, C.A., and Kalton, G. (1999). *Survey Methods in social investigation*, (2nd ed), Aldershot, Gower publishing Company, 256-269.

Motawa, I. A., Anumba, C. J., Lee, S. and Pena-Mora, F. (2007). An Integrated System for Change Management in Construction. Automation in Construction, 16 (3), 368-377.

Ogunsanmi, O.E. (2013). Effects of procurement related factors on construction project performance in Nigeria. *Ethiopian Journal of Environmental Studies and Management,* 6(2), 215-21.

Ogunsemi, D.R., and Aje, I.O. (2005). A model for Contractor's Selection in Nigeria. *The Quantity Surveyors,* 50, 3-7.

Ojo, A. S. (2010). *Impact of variation orders on public construction projects.* In: Egbu, C. (Ed.) Procs 26th Annual ARCOM Conference, 6 – 8 September 2010, Leeds, UK, Association of Researchers in Construction Management, 101-110; available at http://www.arcom.ac.uk/-docs/proceedings/ar2010-0101-0110_Sunday.pdf, accessed 10th January, 2015.

Okpala, D., and Aniekwu, A. (1988). Causes of High Costs of Construction in Nigeria. *Journal of Construction and Engineering Management,* 114(2), 233-245.

Preece, C.N., Moodley, K., and Smith, P. (2003). *Construction business development: Meeting new challenges, seeking opportunity*, London: Butterworth, Heinemann.

Tah, J.H.M and Carr V. (2000). A proposal for Construction project risk assessment using fuzzy logic. *Construction Management and Economics, 18, 49 – 500.*

Zhuoyuan, W., Benson, T.H.L. and Imriyas, K. (2oo5). Change Management Research in Construction: A Critical Review. *Journal of Change Management,* 5(4), 369-380, available at http://www.tandfonline.com/doi/abs/10.1080/14697010500359250?journalCo de=rjcm20#.VLKaX9LF82E, accessed 10th January, 2015.