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Strengths, weaknesses, opportunities and threats of virtual team in Nigerian construction industry

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Abstract: The rationale behind any construction project varies; it might be to achieve value, time, quality, cost or just satisfaction for the client. Irrespective of any or all of these reasons, the team members involved in conception, inception, construction and delivery of a project are aware that a good teamwork is of essence. This is in the context of growing needs of client and the ever-growing improvement in methods of project delivery as influenced by technology. This article looks into the team type in the Nigerian construction industry from the angle of a virtual team (VT) using the mixed-method research design. VT is simply a type of team wherein the members operate from different geographical regions and function majorly with the aid of information and communications technology media. Data for the study were collected from relevant literature, interviews were conducted with 20 selected professionals in the construction industry and, thereafter, a questionnaire was drafted from the results of the interviews and administered to selected relevant professionals. The study revealed that communication among team members, flexibility of operation and decision making are usually the most influencing strengths of the VT, while some of its weaknesses are a need for special training, conflict among team members and client's acceptance of team type. Reduction in time-to-market, collaboration ability of team members and delivery time of project were seen as opportunities, while recognized threats were members' performance level and complexity of technical application. The study concludes that the success of the VT depends highly on exploiting the opportunities opened to it.

Keywords: strengths, weaknesses, opportunities and threats, team, traditional team, virtual team

1 Introduction

Economic activity of all types is moving in the direction of globalization (Acs and Preston 1997); as such, effective and efficient cooperation across disciplines and distributed teams become essential for the success of engineering projects (Zhang et al. 2008). This is because organizations are currently facing challenges in an ever-dynamic, constantly revolving technical environment (Rezgui 2007). Nigeria, similar to many other countries, mainly uses the traditional team type (face-to-face team) in the execution of construction works; meanwhile, in the built environment, research on virtual teams (VTs) is still in its nascent stages (Badrinarayan and Arnett 2008; Prasad and Akhilesh 2002) and because of this, Camarinha-Matos and Afsarmanesh (2003) conclude that, for a VT to work, there is a need for intense engineering effort.

1.1 Purpose

The motivation to conduct this study arose from the fact that there is a transition from working with people of close visual proximity to working with people around the globe (Johnson et al. 2001). The newness of this team type has called for the need to exploit its strengths, weaknesses, opportunities and threats it faces, which is the SWOT analysis (Kotler and Keller 2006, Grant 2005). SWOT is an alphabetization of strengths, weaknesses, opportunities and threats (Adeniyi et al. 2011). This strategic planning tool is being used for analyses of VTs with the aim of recognizing its chances of success in the Nigerian construction industry. SWOT analysis draws its information from an environmental analysis and separates it into internal (strengths and weaknesses) and external issues (opportunities and threats) (Ommani 2011).

2 Literature review

2.1 SWOT analysis

A SWOT analysis framework is used for identifying the strengths, weaknesses, opportunities and threats.

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Enterprises' strengths and weaknesses are usually considered as internal factors that are controllable, while opportunities and threats are external factors over which enterprises have no direct control, but to which they can react to their own advantage (Pearce 1992). A number of researchers have used SWOT analyses in the examination of construction-related organizations (Zhao and Shen 2008).

2.2 Internal analysis (strengths and weaknesses)

Marina (2012) argued that internal analysis of a subject at hand should lead to an assessment of internal strengths/weaknesses that could be to its competitive advantage/disadvantage. For the purpose of this research work on the advantages and disadvantages of VT, strengths and weaknesses are the internal factors because they are connected to a company's or sector's resources, capabilities and core competencies. The internal analysis of strengths and weaknesses focuses on the internal factors that give an organization certain advantages and disadvantages in meeting the needs of its target market. Strength refers to core competencies that give the firm an advantage in meeting the needs of the target market.

2.3 External analysis (opportunities and threats)

Erica (2010) describes that external analysis focuses on the environmental characteristics that could produce opportunities as well as threats relative to the use of VT in the construction industry. It takes a look at the existing opportunities and threats. Opportunities are external factors that may be beneficial for the VT. Opportunities and threats are external factors that depend on the external environment (Marina 2012). This team type can gain advantage by making use of these opportunities. Threats arise when conditions in the external environment jeopardize the reliability and functionality of this team type in the Nigerian construction industry. Although the threats are inevitable, this team can take some actions to reduce their impact. Internal weaknesses are factors causing a concern that directly affects the viability and progressiveness of the use of the VT. Weaknesses are generally VT-domain-related problems that can be directly addressed to improve the overall advantage (Table 1).

As gathered from Bamgbade et al. (2014), diverse (cultural) workers exhibit a huge disadvantage to both workers and their employer, much more a team that is virtual.

Tab. 1: SWOT Analysis Matrix (Whalley 2010).

	Strengths	Weaknesses
Opportunities	How do I use these strengths to take advantage of these opportunities?	How do I overcome the weaknesses that prevent me from taking advantage of these opportunities?
Threats	How do I use my strengths to reduce the impact of threats?	How do I address the weaknesses that will make these threats a reality?

It was also deduced that bad Internet access complicated the work of VTs. Lack of technological uptake in the construction industry (Rob et al. 2001) makes the functioning of VT very difficult. Lars (1997) also observed that most engineers (construction workers) are familiar with setting up a traditional office or engineering environment but find it very difficult to set up networked computers as a medium for communication and collaboration. Lars (1997) added that motivation and responsibility of workers affect their functionality in a virtual environment; some are contented with their manual method of operation even when there are opportunities to try new things.

Piccoli et al. (2004) opined that the cost and difficulties of video and other high media-rich technology, failure to communicate and remember information about context, uneven distribution of information, differences in what information is salient, differences in speed and timing as well as uncertainty about the meaning of silence are other hindrances to the use of VT. In concurrence with this, VTs are particularly vulnerable to mistrust, communication breakdowns, conflicts and power struggles Aspin et al. (2001), and many managers are uncomfortable with the concept of a VT because successful management of VTs may require new methods of supervision (Jarvenpaa and Leidner 1999). It is therefore important to examine the attributes of VT. This study reveals the pros and cons of VT and the possibility of its use in the Nigeria construction industry.

3 VT in Nigeria

The construction industry in Nigeria is a multibillion dollar sector wherein most contractors are successful in terms of bidding for contract (Lisa et al. 2014), irrespective of constraints of time, money, scope and quality in the construction industry, (William and Darlene 2002). This is

achieved through a functional and well-organized team. Teams are groups of employees who have at least some collective tasks and where the team members are authorized to regulate mutually the execution of these collective tasks (Delarue et al. 2003). Johnson et al. (2001) opined that there is a transition from working with people of close visual proximity to working with people around the globe. This is interpreted as a VT. Clearly, this will be a welcome innovation for the construction industry, especially in Nigeria. As stated by Nataša and Martina (2013), innovations are key factors in a construction company's pursuit of success.

Piccoli et al. (2004) provide the most widely acceptable definition for VT, which defined VTs as groups of geographically and/or time-dispersed workers brought together by information technology to accomplish one or more organizational tasks. Looking into the establishment of VTs, Ksenija and Vladimir (2009) opined that VT creates alliances and mergers between organizations. As such, Lipnack and Stamps (2000) clarified VT further by listing a range of benefits it presents, which includes improved access to high-level talent, increased flexibility for knowledge professionals, enhanced ability to serve markets on a global scale as well as reduction in travel costs and other expenses associated with traditional meeting arrangements. Additionally, communication in this team can take place either synchronously or asynchronously as influenced by the need to accomplish some task or activity (Lipnack and Stamps 2000). The authors advance their argument by stating that the nature of this task influences the communication and interaction that takes place within the virtual environment. One interesting aspect of virtual organization is that the structural features promote the ability to incorporate varying coordinating structures among distinct organizations, allowing interesting opportunities for interdependencies to take place (DeSanctis et al. 1999).

3.1 Construction and VT in Nigeria

In Nigeria, project management (an aspect of construction) is largely engrossed in traditional practice (Ekung 2012; Odusami et al. 2003). It is also noted by Ekung et al. (2015) that this is gradually transiting to VT practice. In addition, the authors address the ongoing transition from the traditional to the virtual project environment. The reason for this is not far-fetched: Nataša and Martina (2013) asserted that companies (or organizations) that are stuck in a rut and reject innovative thinking stand no chance in today's market. The Nigerian construction industry is on the move. Hence, dynamic structures such as VTs, with comparable consistent networks and well-defined roles, are emerging in the industry (Amirhossein et al. 2013).

Lars (1997) states that teamwork in a virtual environment challenges the disadvantages imposed by physical distance. This is seen in the traditional team. According to Souheil et al. (2001), VT enhances coordination and communication between various project partners and stakeholders in a planned construction better than the face-to-face team. The authors also assert that this team type evaluates the design in the early stages of the project as relating to different architectural, financial or even environmental constraints because the tools used in VT enables the design team to quickly gain insight of the project. This results in high-quality feedback on the project better than a face-to-face team.

It is noticed that VT displays various scenarios of some predictable happenings during the detail design phase so as to proffer solutions from different technical perspectives (Souheil et al. 2001) as well as reduce the gap between design, engineering and construction unlike the face-to-face team. As stated by the Management Study Guide (2015), compared to traditional teams, VT supports enhanced organization structure, with reduced lines of authorities and hierarchies, and information sharing is usually very rapid in VT, unlike in the traditional team, where only informal discussion gives room for information sharing.

3.2 Communication media in VT

VTs use evolving information technologies, such as the Internet, email, video conferencing, groupware, webinar and fax machine (David and Ugochukwu 2012). Building information modelling (BIM) is another strategy for communication in a virtual environment. BIM, as stated by Olatunji and Sher (2014), offers solutions to the numerous problems confronting traditional construction project management systems. Lars (1997) also opined that services such as telephone conferencing and video conferencing are also available. The author further added that Filing system, Mail, Application sharing, Workflow technology and the Web are the media of communication for VTs.

3.3 Methodology

This study used the mixed-method research design approach. The design is such that one set of data is used to

provide support for the other set, and as such, the supportive data are said to be embedded in the main data. Invariably, the qualitative methodology informed the quantitative methodology. The quantitative research was conducted by means of self-administration of a structured questionnaire. The research had to use the convenience sampling technique due to constraints encountered in terms of knowledge of professionals regarding VTs in the Nigerian construction industry. Therefore, 20 professionals consisting of seven quantity surveyors, five architects, three builders and five civil engineers in the building construction sectors were met at their various workplaces and interviewed. The questionnaire was hence drafted after the interview. Primary data were then collected systematically using the questionnaire by administration to selected team members of the construction industry, namely, quantity surveyors, architects, builders and civil engineers in Nigeria.

4 Results and discussion

4.1 Interview

Exploratory interview was used for this research. Twenty professionals were selected due to ease of access, seven of whom were quantity surveyors; builders selected were three in number, while five were architects and five were civil engineers. They were met at their various offices (construction sites for builders and civil engineers). The interviewer asked questions that were related to the SWOT analysis of VT.

The interviewees gave their response in terms of their opinion on VT and the possibility of its incorporation in the Nigerian construction industry, as listed herein:

Quantity surveyor: "VT is a new team type. It is possible to be used in our industry because the use is flexible. The team members will learn to be creative, although most of us are afraid of these new technologies, but I can guarantee more timely delivery of project."

Architect: "Team members might require special training, conflict will surely arise."

Quantity surveyor: "Trust will help this team type, although team members might have a funny perception about it. They may also have tight schedules for work."

What about client's acceptance too?

Civil engineer: "There will improved communication to foster construction activities."

Builder: "Cultural differences will bar the use of this team, its effectiveness will be low, but I think there is faster market for production and team members will have personal knowledge capture."

Builder: "There will be organizational barrier."

Quantity surveyor: "This team will help better decision making in the industry."

Architect: "There will be better productivity in the industry."

Civil engineer: "Communication will be enhanced in the industry."

Civil engineer: "Construction activities will be better coordinated since team members are far of, yet they must deliver on time."

Quantity surveyor: "Infidelity might occur among team members."

Quantity surveyor: "To a large extent, clients will be satisfied at the team performance."

Architect: "There will be a strong resistance to changes in operation of the team."

Civil engineer: "The impact of leadership on this team will be greatly felt."

Builder: "A lot of talented professionals will function better."

Quantity surveyor: "Better cohesion is guaranteed."

Quantity surveyor: "Monitoring of projects may decrease."

Architect: "The team will require technical application to function."

Civil engineer: "There will be diversity in construction activities."

Architect: "The leadership roles of professionals will be better felt through team coordination."

A larger percentage of the interviewees were familiar with VT. They pointed out the strengths of this team type if it could be incorporated in the Nigerian construction industry.

4.2 Questionnaire

Questionnaire was the other tool used for collection of primary data in this research. After carrying out thorough search of some selected literatures, the internal and external factors of VTs were outlined and a questionnaire was prepared in which the various factors were listed. The questionnaire was divided into three parts. The first part had the background information of the respondent in the design team of the construction

industry; the second part was focused on the awareness regarding the VT type, while the third part involved analysing the internal and external factors affecting the adoption of VT. The internal factors are the strengths and weaknesses, while the external factors are the opportunities and threats. The respondents, therefore, were being made to tick the space provided for each factor against a scoring factor. The levels of scoring were as follows: very high (5), high (4), average (3), low (2) and very Low or none (1).

The findings presented in Table 2 show that most of the respondents are prominent professionals from the construction industry such as quantity surveyors (largest population), architects, builders and civil engineers. To ascertain the reliability and credibility of the respondents, they were asked to indicate their level of awareness and significance of the team type, which shows that they have moderate or average knowledge of the use of the team type for executing and delivery of project to cost, quality time and other requirements.

4.3 Strengths of VT

As depicted in Table 3, it was uniformly agreed by researchers that VTs possess numerous merits. Communication among team members, flexibility of operation and decision making are the factors mostly agreed upon as the strengths of VTs in the Nigerian construction industry, considering the level of awareness of professionals and their levels of significance. The works of Kayworth and Leidner (2002), Paul and Eddy (2003) and Staples and Zhao (2006) agree with the results of this study.

4.4 Weaknesses of VTs

It was also agreed upon that professionals are aware that the need for special training for members of the VT, the presence of conflict among team members and the acceptability of the team for the client whose project is to be executed are the evident weaknesses of the use of VT in the Nigerian construction industry. This is in consonance with the studies of Liu et al. (2008), Staples and Zhao (2006) and Shikha (2013). The study also found that employee's schedules, decreased monitoring, work diversity and technophobia are the major weaknesses. They are also aware of the weight of these weaknesses on the VT.

4.5 Opportunities for VTs

As seen in Table 4, irrespective of these weaknesses, respondents believe that there are very good chances for the thriving of VT in the Nigerian construction industry. In evaluating the opportunities of a VT, reduction in time-to-market, the collaboration ability of team members and delivery time of project for the client are found to be the exploitable opportunities for the VT. This agrees with results from previous studies (Hoyt 2000; May and Carter 2001; Shikha 2013; Paul and Eddy 2003). The other identified opportunities are decision making, client satisfaction and integration of talents.

Tab. 2: Analysis of questionnaire.

	Categories	Frequency
Profession	Quantity surveyor	7
	Architect	5
	Builder	3
	Civil engineer	5
	Contracting	12
	Consulting	6
Organization	Government	2
Year of experience	1–5 years	7
	6–10 years	5
	11–15 years	1
	16–20 years	2
	21–30 years	4
	31 years and above	1
Level of knowledge	Very high	7
	High	6
	Average	3
	Low	3
	Very low	1

Note: Findings: results from questionnaire.

Tab. 3: Internal factors.

	Internal factors	Awareness	Significance
		Mean	Mean
Strengths	Communication	3.78	3.92
	Decision making	3.67	3.79
	Operation flexibility	3.64	3.69
	Coordination	3.63	3.67
	Trust	3.52	3.61
	Leadership	3.48	3.58
	Managing creativity	3.45	3.55
	Operation forecast	3.32	3.31
Weaknesses	Special training	3.71	3.71
	Conflict	3.48	3.48
	Client's acceptances	3.47	3.47
	Employee schedule	3.42	3.42
	Decreased monitoring	3.39	3.39
	Work diversity	3.35	3.35
	Technophobia	3.24	3.24

Note: Virtual team: strengths, weaknesses, opportunities and strengths.

Tab. 4: External factors.

	Internal factors	Awareness	Significance
		Mean	Mean
	Decision making	3.73	3.57
	Client satisfaction	3.58	3.54
	Cohesion	3.54	3.22
Opportunities	Time-to-market	3.51	3.42
	Knowledge capture	3.5	3.32
	Productivity	3.45	3.53
	Resistance to changes	3.39	3.23
	Integration of talents	3.36	3.39
	Delivery time	3.28	3.55
	Effectiveness	3.74	3.57
	Performance	3.7	3.51
	Technical application	3.57	3.44
	Infidelity	3.56	3.42
Threats	Organizational barrier	3.55	3.4
	Participants' perception	3.44	3.39
	Accuracy	3.25	3.08
	Cultural differences	3.18	2.98

4.6 Threats to VT

According to Table 4, it was found from this research that Effectiveness of VT is a threat; this is in accordance with results reported by others (Shikha 2013; Paul and Eddy 2003). Another threat to VT identified in the research is the performance level of team members. The work of Paul and Eddy (2003) and Shikha (2013) agrees with this. Infidelity, organizational barrier, participants' perception, accuracy and cultural differences were the other identified factors. Nonetheless, for VT to stay, these identified factors must be tackled in the Nigerian construction industry.

5 Conclusion

The research has shown the strengths, weaknesses, opportunities and threats of VTs in the Nigerian construction industry, as obtained from relevant literature reviews and the results from questionnaires administered and interviews conducted. The following were observed. A large number of the population have middling knowledge of the team type, which is largely dependent on their level of awareness and level of significance of the team type as it relates to the traditional team type. Managing the creativity of the team, leadership of team and operation forecast are strengths of VTs that can be worked on; VT is weak because the influence of technophobia decreased monitoring and lack of control over the work is very high. The delivery time of projects and working at higher level of cohesion are areas that VTs in the Nigerian construction industry should harness; VTs are highly weakened by cultural differences and some level of organizational barrier.

6 Recommendation

Based on these conclusions, for the Nigerian construction industry to adopt VT as it relates to its SWOT Analysis, the researchers wish to make the following recommendations:

- Construction professionals should be more flexible and open to the use of VTs due to the present age of globalization.
- More often, there is a need to improve on an existing method of executing projects; there is need to properly utilize the recognized strength of VTs in terms of exploiting its opportunities. This is necessary for the team to thrive.
- Clients and every other professional involved in teamwork (especially the design team) should give an encouraging outlook to the use of VTs by working on the identified weaknesses of the team type. In the long and the short terms, the project will achieve its objectives of time, quality, value and satisfaction. This is also of immense benefit to the teamwork mechanism as obtainable in the construction industry.
- The problem of cultural differences can be solved by actively understanding and accepting differences in cultures. This will boost the adoption of VT in Nigerian construction industry.

References

Acs, Z., & Preston, L. (1997). Small and medium-sized enterprises. *Technology and Globalisation, 9*(9), pp. 1-6.

Adeniyi, O., Aje, I., & Ogunsemi, D. (2011). Strengths, weaknesses, opportunities and threats for public, private partnership in infrastructure delivery in Nigeria. *Journal of Construction Project Management and Innovation, 1*(2), pp. 130-154.

Amirhossein, M., Mohammad, H. S., & Samira, H. (2013). Enhancing general contractors capacities with collaborative network. *Organization, Technology, and Management in Construction, 6*(2), pp. 784-790.

Aspin, R., DaDalto,L., Fernando,T., Gobbetti, E., Marache, M., Shelbourn, M., & Soubra, S. (2001). A conceptual framework for multi-modal interactive virtual workplace. *Information Technology Conference*, *7*, p. 149.

Badrinarayanan, V., & Arnett, D. (2008). Effective new product development teams: An integrated framework. *Journal of Business & Industrial Marketing, 4*, pp. 242-248.

Bamgbade, A. A., Jimoh, R. A., & Kuroshi, P. (2014). Cultural diversity management of construction firms in Abuja Nigeria. *Organization, Technology, and Management in Construction, 6*(2), pp. 1047-1057.

Camarinha-Motos, L., & Afsarmanesh, H. (2003). Elements of a base in infrastructure. *Computers in Industry, 51*(2), pp. 139-163.

David, I., & Ugochukwu, M. (2012). Gender, teamwork and management: A glimpse into the Nigerian situation. *Journal of Research in National Development, 10*(3), ISSN: 1596-8308.

Delarue, A., Stijin. G., & Van, H. G. (2003). Productivity outcomes of teamwork as an effect of team structure. *Working Paper*. Steunpunt OOI, Catholic University of Leuven.

DeSanctis, G., Staudenmayer, N., & Wong, S. (1999). Interdependence in virtual organizations. *Trends in Organizational Behaviour, 6*, pp. 81-104.

Ekung, S. B. (2012). Leadership Traits of Construction Project Managers and its Impact on project outcome in Akwa Ibom State. Msc Dissertation, Department of Building, University of Uyo, Uyo, Nigeria.

Ekung, S. B., Olubanjo, O., & Ubong, E. (2015). Influence of leadership Traits on Team performance as correlates of success in construction project delivery. *Civil Engineering and Urban Planning: An International Journal, 2*(2), pp. 19-28.

Erica, O. (2010). *Internal and External Analysis*. OnStrategy Publication.

Grant, R. M. (2005). *Contemporary Strategy Analysis,* 7th edn. John Wiley and Sons Ltd, Chichester, West Sussex, United Kingdom.

Hoyt, B. R. (2000). Techniques to manage participation and contribution of team members in virtual team. *WebNet Journal, 2*(4), p. 16.

Jarvenpaa, S., & Leinder, D. (1999). Communication and trust in global virtual teams. *Organisational Science, 10*, pp. 791-815.

Johnson, P., Heimann, V., & O'Neill, K. (2001). The "wonderland" of virtual teams. *Journal of Workplace Learning, 13*, pp. 24-30.

Kayworth, T., & Leinder, D. (2002). Leadership effectiveness in global virtual teams. *Journal of Management Information Systems, 18*(3), pp. 7-40.

Kotler, P., & Keller, L. K. (2006). *Marketing Management,* 14th edn. Pearson Prentice Hall, New Jersey.

Ksenija, C. V., & Vladimir, S. (2009). Paradigms of virtual teams in the communication process. *Informatologia, 42*(3), pp. 197-204.

Lars, L. (1997). Virtual engineering teams: Strategy and implementation. *Information Technology Conference*, *2*, pp. 1-16.

Lipnack, J., & Stamps, J. (2000). *Why The Way to Work, Virtual Teams: People Working Across Boundaries with Technology.* John Wiley and Sons, New York, NY.

Liu, Y., Lou, I., & Wei, X. (2008). The effects of cultural diversity, conflict. In: *4th IEEC International Conference on Wireless Communication, Networking and Mobile Computing in Global Virtual Team*, Dalian, China, *4*, pp. 1-4.

Marina, D. (2012). SWOT analysis of Serbia's raspberry sector in the competitive marketplace. Masters thesis, Norwegian University of Life Science.

May, A., & Carter, C. (2001). A case study of virtual team working in the European automotive industry. *International Journal of Industrial Ergonomics, 27*, pp. 171-180.

Odusami, K. T., Iyagba, R. R., & Omirin, M. M. (2003). The relationship between project leadership, team composition and construction project performance in Nigeria. *Journal of International Project Management, 21*, pp. 519-527.

Olatunji, O., & Sher, W. (2014). Perspectives on modelling BIM-enabled estimating practices. *Australasian Journal of Construction Economics and Building, 14*(4), pp. 32-53.

Ommani, A. (2011). Strengths, Weaknesses, Opportunities and threats (SWOT) analysis of farming system business management: Case of wheat farmers of Shadervan District, Shoushter Township, Iran. *African Journal of Business Management, 5*(22), pp. 9448-9454.

Paul, S., & Eddy, M. (2003). Virtual teams: Guide to successful implementation. *Journal of Management in Engineering, 19*(3), pp. 98-106.

Pearce, P. (1992). *Construction Marketing: A Professional Approach*. Thomas Telford, London.

Piccoli, G., Powell A., & Ives, B. (2004). Virtual teams: Team control structure, work processes. *Information Technology and People, 17*(4), pp. 359-379.

Prasad, K., & Akhilesh, K. (2002). Global virtual teams: What impacts their design and performance. *Team Performance Management, 8*, pp. 102-112.

Rezgui, Y. (2007). Exploring Virtual team-working effectiveness in the construction sector for collaborative research projects. *Journal of Innovation Learning, 19*, pp. 96-112.

Rosen, B., Furst, S., & Blackburn, R. (2007). Overcoming barriers to knowledge sharing in virtual teams. *Organizational Dynamics Journal, 36*(3), pp. 259-273.

Shikha, G. (2013, May-June). Virtual teams versus face to face teams: A review of literature. *IOSR Journal of Business and Management, 11*(2), pp. 01-04.

Staples, D., & Zhao, L. (2006). The effects of cultural diversity in virtual teams versus face-to-face teams, group decision and negotiation. *Group Decision and Negotiation, 15*(4), pp. 389-406.

Whalley, A. (2010). *Strategic Marketing*. Whalley and Ventus Publishing APS, London.

William, B. J., & Darlene, M. S. (2002). *Teambuilding in the Construction Industry*. AACE International Transactions.

Zhang, Y., Gregory, M., & Shi, Y. (2008). Global Engineering Networks (GEN): Drivers, evolution, configuration, performance and Key patterns. *Journal of Manufacturing Technology Management, 19*, pp. 299-314.

Zhao, Z., & Shen, L. (2008). Are Chinese contractors competitive in international market? *Construction Management and Economics, 26*(3), pp. 255-236.