

EXPLORING KEY PERFORMANCE INDICATORS FOR JOINT VENTURE CONSTRUCTION PROJECTS IN LAGOS STATE, NIGERIA

Famakin, I. O¹ & Ogunsemi, D. R²

^{1&2}Department of Quantity Surveying, Federal University of Technology, P. O. Box 704, Akure, Ondo State
E-Mail: famibuks@gmail.com

Abstract

One acceptable way to extend company presence into a new market is through strategic alliances and joint ventures. These methods are being used with increasing frequency by engineering companies with mixed results. This research seeks to assess the key performance indicators for the performance of partners in joint ventures projects in Nigeria. Primary data were collected through the administration of questionnaire to partners and consultants who have engaged in joint venture construction project in partnership with the Lagos State Development and Property Corporation. The data obtained were analyzed using Mean Item Score, Wilcoxon-Mann-Whitney (U-test) test and Kruskal-Wallis (H-test) test and factor analysis. The study revealed that all the performance indicators identified were significant to joint venture construction projects with time performance, client satisfaction, cost performance and sharing resources ranked as the most important performance indicators for joint venture construction projects in Nigeria. A KMO value of 0.774 was gotten indicating the suitability of the data for factor analysis. The research would assist in deciding key performance indicators for joint venture construction projects for inclusion in the drafting of joint venture agreements. The three groupings from factor analysis and their relationship will help in developing a framework for joint venture construction projects. The factors extracted help to identify the high prioritized performance indicators which could be used as an assessment tool to evaluate the performance of partners and thus help to identify areas for improvement.

Keywords: Joint Ventures, Procurement, Performance, Construction Projects, Nigeria.

INTRODUCTION

The construction industry has used procurement methods and contractual arrangements that have encouraged partners in construction to see themselves as adversaries and that have reinforced differences in values, goals and orientations that exist within the construction project team (Bresnen and Marshall, 2000b). All these are expected to change as considerable attention is directed towards forms of relationship that moves away from the traditional form of contracting leading to the emergence of joint ventures as a vehicle for change within the construction industry. Lack of integration and fragmentation has continually been a source of problem in the attempt to improve project performance over the years in the construction industry thereby making the different forms of collaboration (joint ventures inclusive) a step in the right direction (Bresnen and Marshall, 2000a).

The need to overhaul the adversarial attitude associated with traditional contracting together with the need to a caring environment makes the concept of joint venture a very good alternative due to the possibility of attaining a win-win situation by all stakeholders involved in the process (Kumaraswamy and Matthews, 2000). In order to reduce the effect of the adversarial working relationship that exists between construction industry stakeholders, there is the need to introduce procurement strategies that will reduce the effect of the misnomer that have been known with the prevailing method of carrying out works, hence the need for construction joint venture.

Joint ventures arrangement which is a common feature of development and construction may take many forms and occur at different levels in the construction process (Kwok-Chun & Walker, 2000). According to Munn et al. (2000), joint ventures offers the unique benefit of integrating the complementary skills of different organization cross culturally, combined with quicker market access, and satisfying the host state's technological gap; making it a widespread form of strategic alliance in the world economy. Similarly, Walker & Johannes (2003) buttressed that large construction infrastructure projects have been delivered using the joint venture approach since it offers customer focused service package that meets the need of customers, bridging knowledge and expertise gaps, sharing risk and exploring opportunities which adds value to joint ventures organization.

Joint venture construction projects is just gaining ground as only few projects have been executed using this procurement approach in Nigeria. This study was necessitated by the need for increased collaboration among stakeholders and the resulting successes recorded by using this approach in some developing countries like Nigeria. The aim of this research is to assess the key performance indicators for the performance of partners in joint ventures projects in Nigeria.

LITERATURE REVIEW

The success of construction projects is evaluated based on measures such as production quality, scope sufficiency, social-environmental-technical functionality, safety requirements, planned completion time, and allocated budget. In order to realize these success criteria, various activities or tasks are performed throughout a project. Construction activities can be categorized as procurement, design, construction, and managerial, but cannot be standardized with typical norms because each construction project is uniquely associated with its specific conditions. If today's competitive and complex attributes of the construction sector are considered in addition to the uniqueness of each project, planning and scheduling becomes vital procedures for success, especially where target project time and budget are concerned (Okmen and Oztas, 2008).

The construction industry plays a vital role in our country's economic growth through the Gross Domestic Product (GDP) which is the indicator or yardstick of the country's economic performance comprising of mainly the general construction and the special trade works (Adnan, 2008). The construction industry unlike other industries is more complex and difficult to manage because it needs special skills and techniques (Jamil et al., 2008). Construction projects are one-off endeavours with many unique features such as long period, complicated processes, huge financial outlay and dynamic organization structures (Zou et al., 2007). Construction in the twenty-first century is shifting to different forms of strategic alliances like joint ventures as a standard practice to shorten project life cycles and makes immediate distribution imperative (Tai, 2011).

Yeung et al., (2009) opined that research into the area of key performance indicators to assess the success of relationship-based projects in construction is vital because it can help set a benchmark for measuring the performance of these projects since according to Toor and Ogunlana (2010), project success means different things to different stakeholders.

Key performance indicators are compilations of data measures used to assess the performance of a construction operation. They are the methods management uses to evaluate employee performance of a particular task. These evaluations typically compare the actual and estimated performance in terms of effectiveness, efficiency, and quality in terms of both workmanship and product (Cox et al., 2003). Evaluating the performance of international joint ventures can be realized using subjective or objective indicators or a combination. Objective measures include financial criteria, e.g. measures of profitability, growth, and cost position, and operational measures, e.g. longevity of the strategic alliance ownership and survival while a partner's satisfaction with the overall performance of international joint ventures is one of the most frequently used subjective measures of international joint ventures performance. The main advantage of subjective indicators based on respondents' perceptions is their ability to provide information regarding the extent to which international joint ventures has achieved its overall objectives (including financial, survival, or expansion objectives, or any objective as the case may be (Ozorhon et al., 2008).

RESEARCH METHOD

The target population for this study were the partners and consultants who have participated in joint venture construction projects with the Lagos State government. Prior to data collection, a preliminary survey was carried out to get a list of partners and consultants who have participated in joint venture construction projects from the Lagos State Development and Property Corporation. A list of 6 partners and 10 consultants were obtained from the corporation and these were considered as respondents for the study.

Specifically, Lagos State Development and Property Corporation (LSDPC), an outfit of Lagos State Government in Nigeria, has been chosen as a case study organization for the research.

LSDPC's mission is to provide excellent houses and related services with utmost maintenance culture with a view to satisfying customer needs (LSDPC, 2012). In order to meet its aspiration, mission and vision, it has begun to go into joint ventures with the private sector to deliver its projects. Against this background, this organization has been chosen as a case study to assess success factors for construction project joint venture operation in Nigeria. The data for the study were collected through the administration of questionnaire to respondents identified from Lagos State Development and Property Corporation. Copies of the questionnaire were sent to the partners and consultants identified based on the number of respondents who have participated in the organization and three (3) copies were also sent to the Lagos State Development and Property Corporation resulting in a total of 35 administered questionnaire out of which 21 completed questionnaire were retrieved from the partners, consultants and the corporation. The designed questionnaire was a multiple-choice type on a 5-point likert scale. The preliminary section of the questionnaire dwelt on background information while the other part was structured in sections relating to the objectives of the study. Reliability test was also conducted on the research instrument using Cronbach's alpha (α); the α value for the research instrument is 0.939 signifying that the instrument used for the study is reliable.

The data collected for the study was analyzed using descriptive statistics for the background information of respondents. Mean Item Score (MIS) was employed for ranking identified performance indicators. Wilcoxon-Mann-Whitney test was used to determine the difference in the sample means of different groups of respondents in ranking the identified factors while Kruskal-Wallis test was used to determine the difference in the sample means at the different stages of construction. Factor analysis was used in data reduction to identify a small number of factors that explain most of the variance. As a first step to performing factor analysis, the adequacy of the survey data was examined by conducting the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of specificity (Zhang, 2005) and a recommended bare minimum KMO value for a satisfactory factor analysis is greater than 0.50 (Field, 2005).

RESULTS AND DISCUSSION

Characteristics of respondents

Table 1 shows the summary of the background information about the respondents. It is observed from the table that 52.4% of the respondents are partners to joint venture construction projects while 47.6% of the respondents are consultants. Moreover, the respondents have an average of 9 years' experience in the construction industry and have participated in about 11 projects on the average in the construction industry. The above information therefore suggests that the data provided by the respondents can be relied upon for the purpose of analysis.

Table 1: Background information of respondents

Category	Classification	Frequency	Percentage
Type of organization	Partners	11	52.4
	Consultants	10	47.6
	Total	21	100.0
Years of experience of respondents	1 – 5	8	38.1
	6 – 10	8	38.1
	11 – 15	1	4.8
	16 – 20	1	4.8
	21 – 25	2	9.5
	Above 25	1	4.8
		Mean	9.2
Number of projects handled by respondents	1 – 5	10	47.6
	6 – 10	4	19.0
	11 – 15	0	0.0
	16 – 20	2	9.5
	21 – 25	1	4.8
	Above 25	4	19.0
		Mean	11

Key performance indicators for joint venture construction projects

Table 2 shows the ranking of key performance indicators for joint ventures construction projects at the formation stage. The table reveals that the partners ranked sharing resources as the highest performance indicator for joint venture construction projects followed by sharing risks while the consultants ranked completing the project within budget and sharing resources

as the highest performance indicators both having the same mean score of 4.50. From the general opinion of respondents, sharing resources is ranked as the highest performance indicator for joint venture construction projects followed by sharing risks which is the same as the view of the partners.

In order to test if there is any significant difference in the responses of the respondents, Wilcoxon-Mann-Whitney test (U-test) was carried out. From the U-test carried out on the key performance indicators for joint venture construction projects at the formation stage, the result shows that the p-value is 0.159; therefore since the p-value is greater than 0.05, then it shows that there is no significant difference between the responses of the partners and the consultants.

Table 2: Key performance indicators for joint venture construction at formation stage

	Partners		Consultant		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank
Achieving required quality	4.18	3	4.00	8	4.10	6
Completing the project within budget	4.18	3	4.50	1	4.33	3
Completing the project within schedule	4.00	6	4.30	4	4.14	4
Creating long-term relationships	3.73	8	4.00	8	3.86	8
Decreasing costs	3.09	14	3.40	14	3.24	14
Facilitating internationalization (market entry)	3.55	11	4.11	6	3.80	9
Increasing competitiveness (get the job)	3.73	8	3.70	12	3.71	10
Learning management skills from your partner	3.27	12	3.90	10	3.57	13
Learning technical skills from your partner	3.18	13	4.30	4	3.71	10
Making more profit	4.18	3	4.10	7	4.14	4
Satisfying the client	3.91	7	3.90	10	3.90	7
Sharing resources (financial etc.)	4.45	1	4.50	1	4.48	1
Sharing risks	4.27	2	4.44	3	4.35	2
Transferring technology	3.64	10	3.70	12	3.67	12

Table 3 shows the ranking of key performance indicators for joint ventures construction projects at the implementation stage. The table reveals that the partners ranked satisfying the client as the highest performance indicator for joint venture construction projects followed by sharing resources while the consultants ranked satisfying the client and completing the project within schedule as first and second respectively.

From the general opinion of respondents, satisfying the client is ranked as the highest performance indicator for joint venture construction projects followed by sharing resources, which is the same as the view of the partners.

In order to test if there is any significant difference in the responses of the respondents, Wilcoxon-Mann-Whitney test (U-test) was carried out. From the U-test carried out on the key performance indicators for joint venture construction projects at the implementation stage, the result shows that the p-value is 0.259; therefore p-value is greater than 0.05, then it shows that there is no significant difference between the responses of the partners and the consultants.

Table 3: Key performance indicators for joint venture construction at implementation stage

	Partners		Consultant		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank
Achieving required quality	4.36	3	4.30	5	4.33	5
Completing the project within budget	4.27	5	4.50	3	4.38	3
Completing the project within schedule	4.18	6	4.60	2	4.38	3
Creating long-term relationships	4.00	8	4.20	7	4.10	8
Decreasing costs	3.45	11	3.90	10	3.67	11
Facilitating internationalization (market entry)	3.45	11	3.90	10	3.67	11
Increasing competitiveness (get the job)	3.36	13	3.70	14	3.52	14
Learning management skills from your partner	3.55	10	3.80	12	3.67	11
Learning technical skills from your partner	3.27	14	4.30	5	3.76	10
Making more profit	4.09	7	4.20	7	4.14	7
Satisfying the client	4.73	1	4.70	1	4.71	1
Sharing resources (financial etc.)	4.45	2	4.40	4	4.43	2
Sharing risks	4.36	3	4.20	7	4.29	6
Transferring technology	4.00	8	3.80	12	3.90	9

Table 4 shows the ranking of key performance indicators for joint ventures construction projects at the reactivation stage. The table reveals that the partners ranked completing the project within budget as the highest performance indicator for joint venture construction projects followed by satisfying the client while the consultants ranked completing the project within budget and completing the project within schedule as the highest performance indicators both having the same mean score of 4.40 indicating the cost and time performance of the project which is a very important factor in construction projects.

From the general opinion of respondents, completing the project within budget was ranked as the highest performance indicator for joint venture construction projects followed by satisfying the client, which is the same as the view of the partners.

In order to test if there is any significant difference in the responses of the respondents, Wilcoxon-Mann-Whitney test (U-test) was carried out. From the U-test carried out on the key performance indicators for joint venture construction projects at the reactivation stage, the result shows that the p-value is 0.532; therefore p-value is greater than 0.05, then it shows that there is no significant difference between the responses of the partners and the consultants.

Table 4: Key performance indicators for joint venture construction at reactivation stage

	Partners		Consultant		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank
Achieving required quality	4.45	3	4.00	8	4.24	6
Completing the project within budget	4.64	1	4.40	1	4.52	1
Completing the project within schedule	4.27	7	4.40	1	4.33	3
Creating long-term relationships	4.00	8	4.00	8	4.00	8
Decreasing costs	3.36	14	3.60	12	3.48	14
Facilitating internationalization (market entry)	3.45	13	3.70	10	3.57	12
Increasing competitiveness (get the job)	3.55	12	3.50	14	3.52	13
Learning management skills from your partner	3.82	10	3.60	12	3.71	11
Learning technical skills from your partner	3.73	11	4.10	6	3.90	9
Making more profit	4.36	4	4.10	6	4.24	6
Satisfying the client	4.55	2	4.20	4	4.38	2
Sharing resources (financial etc.)	4.36	4	4.30	3	4.33	3
Sharing risks	4.36	4	4.20	4	4.29	5
Transferring technology	4.00	8	3.70	10	3.86	10

The average of the ranking of respondents at the various stages of construction was further ranked and shown in table 5. From the table, completing the project within budget and sharing resources was ranked as the highest performance indicator for joint venture construction projects with a mean of 4.41 followed by satisfying the client while at the lowest end is decreasing costs.

A further test was carried out to ascertain if there is any significant difference between the key performance indicators at the various stages of construction activities. In order to test the difference if any, Kruskal-Wallis test (H-test) was carried out. From the H-test carried out on the three stages identified for the study, the result shows that the p-value is 0.671, therefore since the p-value is greater than 0.05, then it shows that there is no significant difference in the responses of respondents at the three stages of construction activity.

Table 5: Key performance indicators for joint venture projects

	Formation stage		Implementation stage		Reactivation stage		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Achieving required quality	4.10	6	4.33	5	4.24	6	4.22	6
Completing the project within budget	4.33	3	4.38	3	4.52	1	4.41	1
Completing the project within schedule	4.14	4	4.38	3	4.33	3	4.29	5
Creating long-term relationships	3.86	8	4.10	8	4.00	8	3.98	8
Decreasing costs	3.24	14	3.67	11	3.48	14	3.46	14
Facilitating internationalization (market entry)	3.80	9	3.67	11	3.57	12	3.68	11
Increasing competitiveness (get the job)	3.71	10	3.52	14	3.52	13	3.59	13
Learning management skills from your partner	3.57	13	3.67	11	3.71	11	3.65	12
Learning technical skills from your partner	3.71	10	3.76	10	3.90	9	3.79	10
Making more profit	4.14	4	4.14	7	4.24	6	4.17	7
Satisfying the client	3.90	7	4.71	1	4.38	2	4.33	3
Sharing resources (financial etc.)	4.48	1	4.43	2	4.33	3	4.41	1
Sharing risks	4.35	2	4.29	6	4.29	5	4.31	4
Transferring technology	3.67	12	3.90	9	3.86	10	3.81	9

Factor analysis for joint venture performance indicators

Principal components analysis was used to identify underlying factors. To determine how many factors would be required to represent that set of data, the total percentage of variance explained by each factor was examined. Principal factor extraction with a Varimax rotation was carried out on the 14 identified performance indicators required for performance of partners in joint venture projects. Table 6 contains the details and initial statistics for each of the 14 performance indicators. The total variance explained by each factor was listed in the column under factor loading. The percentage of the variance and the cumulative percentage of the variance are also indicated in Table 6. Three factors were extracted that accounted for 68% of the variance in responses. The first two factors accounted for 40 and 15%.

All the factor loadings were greater than 0.5. In general, the loadings of the factors extracted were reasonably consistent with Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO value) of 0.774 indicating that the survey data is adequate for factor analysis.

Table 6: Factor structure of principal factor extraction and varimax rotation on joint venture performance indicators

Factors	Factor loading	% of variance explained	Cumulative % of variance explained
1: Establishing joint venture relationships			
3 Decreasing costs	0.744		
4 Learning management skills from your partner	0.771		
6 Facilitating internationalization	0.822		
8 Creating long-term relationships	0.559		
14 Learning technical skills from your partner	0.804	40.401	40.401
Factor 2: Joint venture management			
1 Sharing risks	0.773		
2 Sharing resources	0.824		
5 Transferring technology	0.575		
7 Increasing competitiveness	0.519		
9 Making more profit	0.685	15.130	55.531
Factor 3: Project performance			
10 Completing the project within budget	0.873		
11 Completing the project within schedule	0.896		
12 Achieving required quality	0.567		
13 Satisfying the client	0.772	12.434	67.965

Interpreting performance indicators

Establishing joint venture relationships (Factor 1)

The factor consists of five items that focus primarily on establishing relationships in a joint venture construction project. In establishing the relationship, the following factors identified include decreasing costs, learning management and technical skills from your partner, facilitating internationalization and creating long-term relationships which explain 40% of the performance indicators.

Joint venture management (Factor 2)

This factor contains five items that focuses on joint venture management. In managing the joint venture, the identified factors include sharing risks and resources, increasing competitiveness, transferring technology and increasing competitiveness explaining about 15% of the performance indicators.

Project performance (Factor 3)

This factor consists of four items that focus primarily on project performance measures which include completing project within budget (cost performance), completing the project within schedule (time performance), achieving required quality (quality performance) and satisfying the client (client satisfaction) which explains 12% of the performance indicators.

DISCUSSION OF FINDINGS

In the average ranking of the key performance indicators, completing the project within budget and sharing resources was ranked first which was closely followed by satisfying the client while learning management skills from your partner, increasing competitiveness and decreasing costs are at the lowest end. Contrariwise, Yeung et al., (2007) opined that completing the project within schedule (time performance), completing project within budget (cost performance) and completing the project with high quality were ranked as first, second and third respectively. The study also revealed that there is no significant difference between the sample mean of the parties to the joint venture and the consultants. This is expected since majority of the respondents have been involved in joint venture construction projects and they have the knowledge of key performance indicators.

CONCLUSION

The study of key performance indicators for joint venture construction projects revealed that all the identified factors are very important at any stage of joint venture construction projects with some factor being much more important at some stages than others. At the formation stage, the study revealed that sharing of resources and sharing of risks are very important for the performance of joint venture construction projects.

These are very important at this stage because the purpose of relationship-based procurement like joint ventures is an opportunity for organization with various weaknesses and strengths to come together to share resources (financial, risk, etc.) for better construction performance. At the implementation stage, the study revealed that satisfying the client and sharing resources are very important at this stage because it will enhance the performance of partners. At the reactivation stage, the study showed that cost performance (completing the project within budget) and satisfying the client will enhance the desire for partners to work together in future projects. The study further revealed using extracted three (3) factors to explain the performance indicators for joint venture construction projects which include: (1) establishing joint venture relationship (2) Joint venture management and (3) project performance. Establishing the joint venture relationship is very important to the performance of partners as it explains about 40% of the variance in the responses. Based on the findings of the study, the following recommendations are proposed:

- There is the need for construction professionals to work assiduously on completing projects within time and cost and also seek to satisfy clients as these are key performance indicators that contribute significantly to the performance of partners in joint venture construction projects.
- There is the need for construction professionals and procurement experts to keep themselves abreast of the collaborative approach of construction which is becoming widely accepted in the international community due to its ability to reduce the adversarial relationship experienced in construction since it is based more on trust among partners.

REFERENCES

- Adnan, H. (2008). An assessment of risk management in joint venture projects in Malaysia. *Asian Social Science*, 4(6), 99-106.
- Bresnen, M. & Marshall, N. (2000a). Partnering in construction: a critical review of issues, problems and dilemmas. *Construction Management and Economics*, 18, 229-237.
- Bresnen, M. & Marshall, N. (2000b). Building partnerships: case studies of client–contractor collaboration in the UK construction industry. *Construction Management and Economics*, 18, 819-832.
- Cox, R. F., Issa, R. R. A. & Ahrens, D. (2003). Management’s perception of key performance indicators for construction. *Journal of Construction Engineering and Management*, 129(2), 142-151.

- Field, A. (2005). *Discovering statistics using SPSS* (6th ed.). London: Sage
- Jamil, M., Mufti, N. A. & Khan, A. H. (2008). Risk identification for international joint venture construction projects. *First International Conference on Construction In Developing Countries (ICCIDC-I) on Advancing and Integrating Construction Education, Research & Practice*. August 4-5, 2008, Karachi, Pakistan.
- Kumaraswamy, M. M. & Matthews, J. D. (2000). Improved subcontractor selection employing partnering principles. *Journal of Management in Engineering*, 16(3), 47–57.
- Kwok-Chun, W. & Walker, A. (2000). Property rights implications of public-private joint ventures. *Construction Management and Economics*, 18, 131-138.
- LSDPC (2012). Lagos State Development and Property Corporation. Retrieved April, 28, 2012, from <http://www.lsdpc.gov.ng/index.php/about-us/about-lsdpc>
- Munns, A. K., Aloquili, O. & Ramsay, B. (2000). Joint venture negotiation and managerial practices in the new countries of the former Soviet Union. *International Journal of Project Management*, 18, 403-413.
- Okmen, O., & Oztas, A. (2008). Construction project network evaluation with correlated schedule risk analysis model. *Journal of Construction Engineering and Management*, 49-63.
- Ozorhon, B., Arditi, D., Dikmen, I. & Birgonul, M. T. (2008). Implications of culture in the performance of international construction joint ventures. *Journal of Construction Engineering and Management*, 134(5), 361-370.
- Tai, F. (2011). The case of Thai joint venture with Japanese partner in construction business. Retrieved March 24, 2011, from <http://ezinearticles.com/?The-Case-of-Thai-Joint-Venture-With-Japanese-Partner-in-Construction-Business&id=1264179>
- Toor, S. & Ogunlana, S. O. (2010). Beyond the iron triangle: stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects. *International Journal of Project Management*, 28, 228-236.
- Walker, D. H. T. & Johannes, D. S. (2003). Construction industry joint venture behaviour in Hong Kong – designed for collaborative results? *International Journal of Project Management*, 21(1), 39-49.
- Yeung, J. F. Y., Chan, A. P. C. & Chan, D. W. M. (2009). Developing a performance index for relationship-based construction projects in Australia: Delphi study. *Journal of Management in Engineering*, 25(2), 59-68.
- Zhang, X. (2005). Concessionaire's financial capability in developing build-operate-transfer type infrastructure projects. *Journal of Construction Engineering and Management*, 131(10), 1054-1064.
- Zou, P. X. W., Zhang, G. & Wang, J. (2007). Understanding the key risks in construction project. *International Journal of Project Management*, 25, 601-614.