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Critical success factors influencing performance outcome of joint venture construction projects in South Africa: Comparison of first and second order models

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Abstract

Joints ventures (JVs) have become increasingly common, because of the complexity and challenges associated with the delivery of construction projects globally and in South Africa. However, it has been established that JV projects have experienced unsatisfactory performance leading to clients' dissatisfaction. The purpose of this paper is therefore to determine the critical success factors (CSFs) influencing the performance of JV construction projects in South Africa. A positivist philosophy position was adopted using a structured questionnaire survey administered to the construction professionals. Prior to the main study, a content validity of the questionnaire was achieved using a pilot study. The data was collected from 115 conveniently sampled respondents, and analysed using principal component analysis and multiple regression analysis. The exploratory factor analysis revealed two empirical models to be tested; namely the first and second order factor models. The result of the first order model revealed that, management control influenced achievement of project objective of JV, whereas, the second order model established that understanding of contractual agreement, which was explained by six components of CSFs influenced achievement of project objective. It is suggested that stakeholders who prefer to be involved in JV projects should acquire good

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understanding of the contractual agreement in managing JV projects in order to successfully achieve the project objectives. This study adds to the discourse and literature on CSFs of JVs. It provides new empirical evidence of the CSFs that influence project performance outcome of JV in the context of South Africa which can also be replicated in other countries globally. However, the study may not be generalised because of the geographical setting and respondents.

Keywords

Construction, joint venture, second order, success factors

Introduction

Joints ventures (JVs) have become increasingly common in the construction industry (Fitzpatrick, Hecker and Hazard, 2011). They are common because of the intricate and sophisticated nature of construction projects (Kamal, 2010). Hence, JVs are useful vehicles for collaborative housing development and future private rented sector projects and regarded as a source of profit where the risks and benefits are shared by two or more parties (CIDB, 2004)). The Construction Industry Development Board (CIDB) (2004) suggested that the formation of a JV mainly depends on: the size of the project, where the project requires specialist skills or abilities, and where the skills and expertise of emerging firms can be developed through their association in JVs with well-established experienced companies.

However, according to the studies by Kwok, Then, and Skitmore, (2000) and Shen, Wu, and Catherine, (2001), the risks associated with JV formation are: agreement of the contract, partner selection, potential financial distress, improper project feasibility study, project delay, inadequate forecast about market demand, loss due to bureaucracy for late approvals and design changes. Some other challenges are: time and cost variations, skills and competence issues and lack of worker participation (Govindan, 1995). Farrel (2014), estimated that at least 40 to 70 percent of JVs experienced failure. Govindan, (1995) deduced that the failure rate of JVs has been quite alarming through delays and disruptions, as well as poor site management. According to Kavishe and Chileshe, (2017) the failure of JV housing construction projects could be due to a number of challenges: inadequate financing capacity, risk sharing, loss of rental income, conflicts in getting vacant possession of plots, stalled projects and poor communication.

In order to overcome these challenges and failure rates associated with the JV construction projects. Adnan, Rosman, Rashid, Yusuwan, and Bakhary (2018) suggested that contractors need to know the factors, which are critical if they want their JVs projects to be successful. Manitshana (2012) suggested a number of critical success factors (CSFs) required for South Africa construction JV. These were: openness, transparency and clear communication; clarity of roles, responsibilities, goals and ground rules; commitment of core organizational competencies; application of the same professional rigor and discipline; respect for differences in approach, competence, timeframes and objectives of different partners; focus on achieving mutual benefits; understanding the needs of local partners and beneficiaries. However, Manitshana (2012) study did not determine the influence of these CSFs to JV project success outcome in South Africa. Furthermore, Manitshana's (2012) CSFs differed from other researchers (Hong and Chan, 2014; Kale, Patil, Hiravennavar, and Kamane, 2013; Hyun and Ahn, 2013; Lambe, Spekman, and Hunt, 2011). Further, in a current study by Adnan et al.,

(2018) they identified seven (7) CSFs, which include inter-partner trust, criteria for partner selection, mutual understanding, agreement of contract, conflict, compatibility of objective, and management control. This informs a lack of consensus of the CSFs that impact on the success outcome of JVs. It can further be indicated that there is paucity of analytical studies, comparing suitable factor models using factor analysis, that are ideal for JV projects.

This paper therefore compares analytically the appropriate performance model that best predicts the successful outcome of JV construction projects. A structured questionnaire survey, which was developed based on the plethora of literature around JV projects was used to achieve this objective. The survey targeted construction professionals registered with the South African Council of the Project and Construction Management Professions (SACPCMP) in South Africa who have been involved in JV projects. The next section provides an overview of the CSFs and the performance outcome.

Literature review

Adnan and Morledge (2003) indicated that the CSFs are those few key areas of activity in which favourable results are unequivocally essential for a particular manager to influence his or her own objectives. However, from the review of the literature it can be indicated that there is consensus of a specific combination of the CSFs that will influence the project success of JVs. Based on this sentiment eight (8) independent CSFs i.e. comprehensive and fair written agreement, mutual understanding, inter-partner trust, co-operation between the members, commitment of the partners, communication between the partners, management control, and partner's experience, that are perceived to directly influence project success outcome of JVs were identified as per Table 1 and hypothesised as follows;

COMPREHENSIVE AND FAIR WRITTEN AGREEMENT

It has been pointed that poorly written agreement is a chance for possible disaster for a JV project. It is imperative for the agreement to be comprehensive and the fair setting out of the obligations, rights, risks and rewards for the partners (CIDB, 2004). This sentiment has been supported in the previous discourse of Hong et al., (2014); Kale et al., (2013); Hyun et al., (2013); Adnan et al., (2003) and Miller, (n.d.). Adnan et al., (2003) suggested that a good JV agreement is essential and can avoid a great deal of trouble and conflict in future JV operations. In a current study Adnan et al., (2018) found that agreement of contract was considered an imperative factor for JV success. The following hypothesis will be tested:

H_{1} - A fair written agreement between the JV partners has a positive relationship with the JV project success.

MUTUAL UNDERSTANDING

Adnan et al., (2018), Manitshana (2012) and Adnan et al., (2003), indicated that mutual understanding may contribute to the success of JV construction projects. Hyun et al., (2013) suggested that careful selection of people who are to work in an alliance will assist the prospects of mutual bonding of partners, therefore providing mutual understanding. Thus, the following hypothesis will be tested:

H_{2} – Mutual understanding positively influences JV success outcome.

INTER-PARTNER TRUST

A high degree of trust between the members of a JV is vital for its' successful operation (Adnan, et al., 2018; CIDB, 2004). Inter-partner trust is often considered to be a very important ingredient of managing relationships (Adnan et al., 2003; Hyun et al., 2013; Hong et al., 2014). Mutual trust is indispensable to overcome the restrictions of the contractual agreement (Hyun et al., 2013; Talman, 2009; Govindan, 1995). However, within organizations, trust contributes to more effective implementation of strategy, greater managerial coordination and more effective work teams (Adnan et al., 2003). The proposed hypothesis to be tested will be:

H_3 – Inter-partner trust between partners, positively influence the success of JV projects.

CO-OPERATION BETWEEN THE MEMBERS

Co-operation reflects the degree to which the parties share responsibility both for dealing with problems and maintaining their relationship (Adnan et al., 2003; Govidan, 1995). The partners must be willing to cooperate and share information and resources to enable essential coordination of activities (Adnan et al., 2003). The proposed hypothesis to be tested will be:

H_4 - Co-operation between the members positively influence the success of JV projects.

COMMITMENT OF THE PARTNERS

Adnan et al., (2018) established that commitment is important factor for the success of JV construction projects. It can further be indicated that commitment reflects the actions of some key decision makers regarding continuation of the relationship, acceptance of the joint goals and the values of the partnership, as well as the willingness to invest resources in the relationship (Hong et al., 2014; Lambe et al., 2011; Adnan et al., 2003). It can be indicated that without commitment the performance of the JV could be jeopardized. The importance of commitment provides a long-term relationship, provides resources and capabilities to the specific needs of the JV for its success (Adnan et al., 2003; Govindan, 1995). Therefore the following hypothesis was postulated for testing:

H_5 - The commitment of the partners, positively influence the success of the JV project.

COMMUNICATION BETWEEN THE PARTNERS

Communication plays a major role in the success of any business. Adnan et al., (2003) and Hong et al., (2014) argued that the ease of communication between the JV partners is a potential problem which should be considered when evaluating a potential partner's suitability. In fact, without adequate communication, problems can occur as a result of differences between national or ethnic cultures, including language, as well as differing corporate cultures (Adnan et al., 2003; Manitshana, 2012). Therefore, the proposed hypothesis is:

H_6 - Communication between partners influence the success of JV projects.

MANAGEMENT CONTROL

The management control aspect of a construction project plays a very significant role in the successful completion of a JV construction project where the role of project participants is vital in this regard (Divakar and Subramanian, 2009). Talman (2009), Aimin and Barbara (2001), and Adnan et al., (2003) believed that, management control is critical to the success of

a JV. The insufficient control of a JV can limit the ability of the parent partner to synchronize their activities, efficiently and effectively implement their strategy. Therefore, the proposed hypothesis is:

H_7 - Management control in JV influence their project success.

PARTNER EXPERIENCE

According to Adnan et al., (2003), firms with multinational experience are considered more likely to have the ability to manage and monitor appropriately the JV project. It can be evinced that vast experience, understanding, competence and confidence in managing inputs of a JV will result in a more detailed and accurate perceptions of risk. In addition, Lambe et al., (2011) argued that, partners experience contributes to the success of the alliance. It can be opined that such partner experience has an indirect impact on the acquisition of complementary resources. The proposed hypothesis is:

H_8 - JV project performance is successful when experienced partners are involved in the project.

Table 1 Critical success factors for successful JV projects

Critical factors for successful JV projects	Source
Comprehensive and fair written agreement	Adnan et al., (2018); Hong et al., (2014); Kale et al., (2013); Hyun et al., (2013); CIDB (2004); Adnan et al., (2003); Miller, (n.d.)
Mutual understanding	Adnan et al., (2018); Hyun et al., (2013); Manitshana (2012); Adnan et al., (2003)
Inter-partner trust	Adnan et al., (2018); Hyun et al., (2013); Talman (2009); Adnan et al., (2003); Govindan (1995)
Co-operation between the members	Adnan et al., (2003); Govindan (1995)
Commitment of the partners	Adnan et al., (2018); Hong et al., (2014); Lambe et al., (2011); Adnan et al., (2003); Govindan (1995)
Communication between the partners	Hong et al., (2014); Manitshana (2012); Adnan et al., (2003)
Management control	Divakar and Subramanian, (2009); Talman (2009); Aimin et al., (2001); Adnan et al., (2003); Govindan (1995)
Partner experience	Lambe et al. (2011); Adnan et al., (2003)

Source: Literature review

PROJECT SUCCESS OUTCOME OF JV PROJECTS

One of the key challenges in evaluating JV success is the measurement of its performance outcome factors. Diverse performance outcome factors have been suggested. The performance parameters according to Jha and Iyer (2006) and Nisaa, Javed and Akhtar (2015) are: schedule, cost, quality with no-disputes. Hong (2014) indicated that measures on performance informs project stakeholders of their success in order for them to understand competitive nature of the environment in order to improve in their future performance. Alashwal, Fareed and Al-

Obaidi (2017) indicated that project success is defined by three levels of success, the project, the product and the market levels. Ma and Voo, (n.d.) revealed that project success of a JV construction project can be identified through time, cost, safety, quality and client satisfaction. Furthermore, Terjesen (2004), suggested a range of benefits to partner firms, namely; access to new and/or more resources including but not limited to markets, distribution networks, capacity, staff, purchasing, technology in the form of intellectual property, and finance or increase of funds. In a study by Özorhon (2007), performance outcome of international joint ventures (IJV) were measured by four (4) constructs i.e. project performance, partner performance, performance of the IJV management and perceived satisfaction. This discussion suggests that there is no consensus of the measures to determine project success in JV construction projects. Therefore, seven (7) measures are identified in this paper as tabulated in Table 2, i.e. achieve cost of the project, enhancement of advanced technology, improvement of human capacity, improve quality of the projects, minimising accidents, raising of large capital funds, and reduction of delayed construction projects.

Table 2 Project performance outcome measures

Project performance outcome	Source
Achieve cost of the project	Hong & Chan, (2014); Özorhon, (2007); Miller, (2001); Kwok, et al., (2000).
Enhancement of advanced technology	Hong et al., (2014); Azlan-Shah et al., (2010); Cook & Hancher, (1990).
Improve quality of the projects	Nisaa, et al., (2015); Özorhon, (2007); Kwok et al., (2000).
Improvement of human capacity	Hong et al., (2014); Kale et al., (2013); Miller, (2001).
Minimising accidents	Kale et al., (2013); Chan et al., (2002); Kwok et al., (2000)
Raising of large capital funds	Hong et al., (2014); Kale et al., (2013); Miller, (2001).
Reduction of delayed construction projects	Özorhon, (2007); Li et al., (2001).

This study tests the performance outcome of JVs and the critical success factors in the context of local JV construction projects in South Africa to develop a new view of project success. Consequently this will bridge the gap in the literature which shows a small number of studies focused on understanding how to measure project success, and the conditions that contribute to success, based on construction professionals' perspective. Understanding the success factors of local JV construction projects would contribute to the sustainability and competitiveness of the local JVs arrangements. The next section conveys the method of data collection using questionnaire survey, which was developed based on the items identified in this review.

Research methodology

A quantitative research methodology was used. A structured questionnaire survey used to identify the success factors and performance outcome. The questionnaire consisted of seven sections. The cover page which informed the respondent of the nature of research they were getting involved in. The key sections reported in this paper are; the background information of the respondents. The questions included their involvement in JV projects and types of JV. Other questions were designed to profile the participants; position in the company, gender,

race, experience in the construction industry and qualification. The questionnaire also profiled the organisation in terms of; type of business and geographic location. The other important sections constituted the CSFs and the last section was the success of JV performance outcome. Thirty five (35) variables that defined the eight CSFs were identified from extant literature review. The respondents were required to indicate their level of agreement with the use of the measures of the CSFs in their projects. The CSFs measures were rated on a 5-point Likert scale, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. The final section measured seven success performance outcome variables using a 5-point Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. The respondents were required to rate their level of project success.

To achieve content validity the questionnaire was piloted with ten (10) personnel who were knowledgeable, of the CSFs they have been using for the success of their JV projects. The final version of the questionnaire was presented to 400 convenience-sampled professionals registered with the South African Council of Project and Construction Management Professions (SACPCMP) in Gauteng, Limpopo and Western Cape. The sample size was based on the estimated population provided in the SACPCMP website which was 5000. The sample size was determined using Israel`s sampling table (1992). The data was collected using email and drop and collect method of which 115 questionnaires were returned representing 28.75% response rate. All the 115 questionnaires were deemed valid for analysis. It is important to mention that the response rate for mailed questionnaires are usually low, thus, a response rate of 15% to 25% is considered appropriate and acceptable (Wahab, Abdullah, Uli and Rose, 2010). Furthermore, according to Fryrear (2015) a response rate of 10% to 15% is considered appropriate.

The Statistical Package for Social Science (SPSS) version 23 was used to conduct descriptive statistics of the data computing the frequencies, mean scores and standard deviation. Furthermore, inferential statistics were determined to analyse the factor analysability of the CSFs and project performance outcome. The exploratory factor analysis (EFA) was used to determine the validity and reliability of the CSFs and project performance outcome. Reliability was tested using Cronbach alpha with a cut-off value of 0.60 recommended by Hair et al., (2006). However, according to Pallant, (2013), a Cronbach alpha lower than 0.70 can be accepted if the number of variables in the construct is less than ten (10) and the inter-item correlation mean values range, between 0.20 to 0.40. In this current study, this was achieved indicating that the instrument was reliable. The Maximum Likelihood with Varimax with Kaiser Normalisation rotation techniques were selected as the extraction and rotation methods in the EFA.

Results of analysis

DESCRIPTIVE ANALYSIS AND RELIABILITY

The predominant age group of respondents' was between 31 and 40 years accounting for 35.7%. 25.2% of respondents were between the ages of 41 and 50. 48 participants (41.7%) had graduated with a baccalaureate degree, and 37 participants (32.2%) graduated with a diploma or certificate. 99 respondents were involved in JV project in the past 2 years, 79 respondents (52.3%) accounted for general building projects, 21 participants (13.9%) were involved in transportation/roads JV projects. 61 participants (53%) had been involved in one to two JV projects in the past 2 years; while only 18 participants (15.7%) participated in three to four JV

projects. 39 participants (33.9%) had worked in JV projects for a period of less than 5 years, and 37 participants (32.2%) had worked in JV projects for a period of 5 to 10 years. From 115 participants, 45 participants (39.1%) were involved in a combined JV, 42 participants (36.5%) participated in an integrated JV and finally, 28 participants (24.3%) were involved in a non-integrated JV.

The reliability of the measurement scale, and appropriateness of factor analysis were analyzed using SPSS version 23. The internal reliability of the measurement instrument was evaluated using Cronbach alpha. The Cronbach's alpha of success outcome and CSFs for both the first and second order factor models ranged between 0.60 and 0.95, indicating acceptable to good reliability (Pallant, 2013). The Kaiser-Meyer-Olkin (KMO) results of the success outcome and CSFs were 0.679 and 0.781 respectively, which are above the threshold suggested by Pallant, (2013). This suggests that the correlation pattern between variables is compact. The results of Bartlett test sphericity are 1680.20 and 149.61 with the associated *p–value* equal to 0.000 for both CSFs and success outcome factors respectively. This indicates that the correlation matrixes of the variables are not identity matrixes. Thus the data of the study is suitable for Principal Component Analysis (PCA).

PRINCIPAL COMPONENT ANALYSIS (PCA) RESULTS OF CSFS FIRST ORDER FACTOR ANALYSIS

The PCA result of first order CSFs are shown in Table 3. The result indicates that the total number of components extracted based on the eigenvalues greater than 1 are nine components, contributing 69.66% variance of the total cumulative variance. The first of the components is called "co-operation between the members" and contributed 26.95% of the total variance to the CSFs. The component is defined by five variables namely: "willingness to share resources to enable coordination of activity from partners was undertaken", "efficiency of implementing organization strategies were achieved" but to name a few. The second component is called "communication between the partners" and contributed 7.86% of the total variance to the CSFs. The component is defined by four variables. The third component is called "contract management" and contributed 7.49% of the total variance to the CSFs. The component is defined by three (3) variables. The fourth component is "mutual understanding between partners" and contributed 5.85% of the total variance to the CSFs. The component is defined by three variables. The fifth component was called "management control" and contributed 4.99% of the total variance to the CSFs. The component is defined by five variables. The sixth component was called "inter-partner trust" and was explained by three measures and represented 4.75% of the total variance. The seventh component was called "comprehensive and fair written agreement" and was explained by two measures. The variance percentage explained by this component was 4.36%. The eighth component was defined by four variables and is called "commitment of the partners" which had a contribution of 3.85% of the total variance. The last component was called "implementation of contract agreement" and was defined by two variables and contributed 3.55% of variance of the CSFs.

Table 3 PCA results of first order CSFs

Component	Eigenvalue	Variance %	Variables	Factor loading
1. Co-operation between the members	8.354	26.950	Willingness to share resources	0.812
			Efficiency of implementing organisation strategies	0.654
			Mutual trust overcame the restrictions of the contractual agreement	0.573
			Monitoring and safeguard costs within the joint venture were reduced	0.508
			Willingness to share information to enable essential coordination of activity.	0.470
2. Communication between the partners	2.436	7.857	Proper communication prevented conflicts of cultural difference	0.813
			Effective communication prevented conflicts between different ethnicity.	0.692
			Effective communication prevented misunderstandings and suspicion.	0.487
			Full commitment between partners.	0.399
3. Contract management	2.322	7.489	% participation by each member include risks, rewards, losses and liabilities were recorded.	0.687
			Conducts & decisions of partner in the organisation in line with goals& policies	0.615
			Capability trust implemented to ensure professional experience	0.416
4. Mutual understanding between partners	1.814	5.853	Partners selected on the basis of technical competence	0.654
			Partners selected on an assessment of their ability to form good relationships	0.593
			Consensus between the members was promoted	0.424
5. Management control	1.548	4.992	Ability of the partners to synchronise their project activities	0.644
			Multinational experience ensure acquisition of added resources	0.534
			Differences in interests in JV led to the incorporation of management control	0.529
			The firms' multinational experience ensured proper monitoring	0.486
			Efficiency of utilising the partners' resources was met	0.454

Table 3 continued

6. Inter-partner trust	1.472	4.750	Contractual trust was met to fulfill contractual duties	0.702
			Meaningful input by partners to the policy-making & management activities	0.493
			Goodwill trust executed to ensure partners operate in the concern of the relationship within the JV	0.426
7. Comprehensive and fair written agreement	1.353	4.363	Management body for the joint venture	0.783
			Losses to the JV by the default of a member were limited	0.640
8. Commitment of the partners	1.195	3.853	JV objectives, inputs by the parties, & management systems of the JV	0.677
			Friendly personal contact was regularly maintained between the partners	0.513
			Actions of key decision makers & acceptance of joint goals were achieved	0.447
			Partner selection were observed in order to achieve mutual understanding	0.435
9. Implementation of contract agreement	1.102	3.554	Contributions by each member were set out	0.562
			Effective implementation of strategy, greater managerial coordination & more effective work teams were enhanced	0.556

Extraction method: Principal Component Analysis.

Rotation method: Varimax with Kaiser Normalisation

PCA RESULTS OF CSFS OF SECOND ORDER FACTOR ANALYSIS

The PCA results of the second order factor model are shown in Table 4. The result suggest that the nine components extracted in the first order model can be constituted in two components. The two components had an eigenvalue greater than 1, contributing 56.80% variance of the total cumulative variance. The two components were named as: understanding of contractual agreement accounting for 44.80% of the total variance to the CSFs. The first component is defined by six of the nine components extracted in first order model. They are, "inter-partner trust", "contract management", "management control", "implementation of contract agreement", "effective implementation of the agreement", "co-operation between the members" and the "communication between partners".

The second component accounted for 12.00% of the total cumulative variance and was named enhancement of partner accountabilities. It was defined by three of the components

extracted from the first order model. These components were; "commitment of the partners", "mutual understanding between partners" and "comprehensive and fair written agreement".

Table 4 PCA results of second order CSFs

Component	Eigenvalue	Variance %	Variables	Factor loading
1. Understanding of contractual agreement	4.03	44.80	Inter-partner trust	0.802
			Contract management	0.750
			Implementation of contract agreement	0.541
			Effective implementation of the agreement	0.538
			Co-operation between the members	0.469
			Communication between partners	0.439
2. Enhancement of partner accountabilities	1.08	12.00	Commitment of the partners	-0.944
			Mutual understanding between partners	-0.461
			Comprehensive and fair written agreement	-0.393

Extraction method: Principal Component Analysis.

Rotation method: Varimax with Kaiser Normalisation

PCA RESULTS OF FIRST ORDER FACTOR ANALYSIS OF SUCCESS OUTCOME

Table 5 indicates the PCA results of JV success outcome. The theoretical concept consisted of seven variables defining one component. However, the empirical results established five variables. Two components were further extracted with the eigenvalue greater than 1. The first component is named "achievement of project objectives" and contributed 48.66% of the total variance to the JV performance outcome. The component is defined by "project was within budget", "project was within time" and "occupational accidents were minimised". The second component is called "attainment of company objectives" and contributed 23.04% of the total variance to the JV performance outcome. The component is defined by "improvement of human resource capacity" and "raising of large capital funds from partners".

The second order factor analysis extracted one component from the two components established in the first order factor analysis. However, the study retained the two components established in first order for further analysis. The retention of the two components will ensure robust analysis is achieved.

Table 5 PCA results of success outcome of JV construction projects

Component	Eigenvalue	Variance %	Variable	Factor loading
1. Achievement of project objectives	2.433	48.663	Project was within budget	0.856
			Project was within time	0.744
			Occupational accidents were minimised	0.539
2. Attainment of company objectives	1.152	23.043	Improvement of human resource capacity	0.701
			Raising of large capital funds from partners	0.671

Extraction method: Principal Component Analysis.

Rotation method: Varimax with Kaiser Normalisation

MULTIPLE REGRESSION ANALYSIS (MRA) RESULTS FIRST ORDER MODEL

The MRA was undertaken to determine the nine individual success factors in the first order factor model that influenced the two project success outcomes i.e., achievement of project objectives (PO1) and attainment of company objectives (PO2).

Table 6, reveals that eight of the empirical factors did not influence project objective outcome. Their level of significance were not significant at $p \leq 0.05$. These success factors were: co-operation between the members, communication between the partners, contract management, mutual understanding between partners, inter-partner trust, comprehensive and fair written agreement, commitment of the partners and implementation of contract agreement. However, management control factor was found to influence project objective outcome. The level of significance of $p \leq 0.05$ ($p = 0.001$), and contributing 36.8% (beta =0.368) of the variance in the nine-factor success model.

Table 6 Results of MRA of first CSFs on achievement of project objectives (PO1)

Model	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Zero-order
	B	**Std. Error**	**Beta**			
(Constant)	1.573	0.553		2.846	0.005	
1. Co-operation between the members/partners	0.202	0.108	0.194	1.861	0.066	0.283
2. Communication between the partners	-0.125	0.108	-0.133	-1.157	0.250	0.120
3. Contract management	-0.238	0.124	-0.210	-1.922	0.057	0.106
4. Mutual understanding	0.122	0.128	0.113	0.956	0.341	0.290
5. Management control	0.403	0.112	**0.368**	3.591	**0.001**	0.392
6. Inter-partner trust	0.027	0.120	0.026	0.223	0.824	0.229
7. Comprehensive and fair written agreement	0.056	0.083	0.069	0.678	0.499	0.144

Table 6 continued

8. Commitment of the partners	-0.054	0.129	-0.047	-0.419	0.676	0.143
9. Implementation of contract agreement	0.208	0.113	0.190	1.839	0.069	0.303

Table 7 shows that the nine components i.e. co-operation between the members, communication between the partners, contract management, mutual understanding between partners, inter-partner trust, comprehensive and fair written agreement, commitment of the partners, implementation of contract agreement and management control did not influence the attainment of company objectives. Their level of significance at $p \leq 0.05$ were greater, hence they were not significant.

Table 7 Results of MRA of first order CSFs on attainment of company objectives (PO2)

Model	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Zero-order
	B	Std. Error	Beta			
(Constant)	2.793	0.724		3.857	0.000	
1. Co-operation between the members/partners	0.145	0.142	0.121	1.025	0.308	0.143
2. Communication between the partners	0.035	0.142	0.032	0.246	0.806	0.077
3. Contract management	0.008	0.162	0.006	0.048	0.962	0.078
4. Mutual Understanding	-0.086	0.168	-0.069	-0.514	0.609	0.061
5. Management control	0.038	0.147	0.030	0.261	0.795	0.056
6. Inter-partner trust	-0.162	0.157	-0.134	-1.028	0.306	0.038
7. Comprehensive and fair written agreement	0.084	0.109	0.089	0.772	0.442	0.119
8. Commitment of the partners	-0.003	0.169	-0.002	-0.016	0.988	0.084
9. Implementation of contract agreement	0.214	0.148	0.169	1.444	0.152	0.157

MRA RESULTS SECOND ORDER MODEL

Further analysis was undertaken to determine the combined components in the second order model that influenced the two project performance outcomes i.e. achievement of project objectives (PO1) and attainment of company objectives (PO2). **Figure 1** shows the empirical conceptualised model.

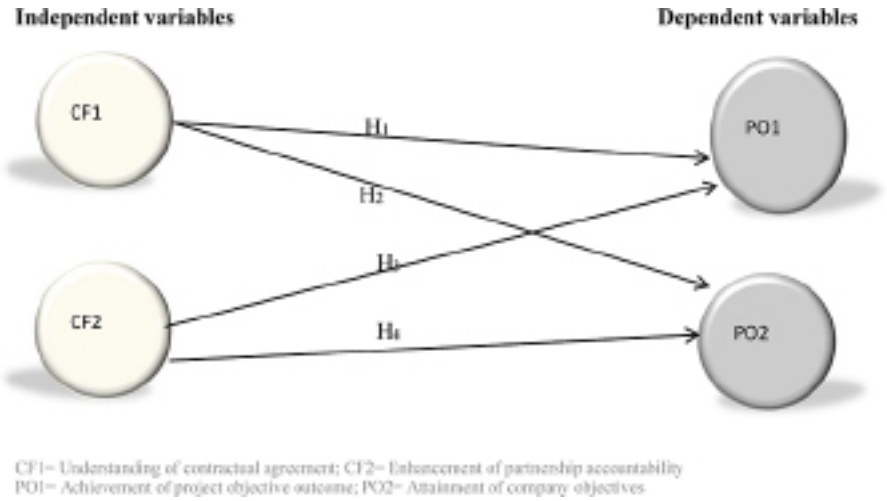

Figure 1 Empirical model for second order factor of JV performance

Table 8 evinces the results of the second order model which suggests that contractual agreement influenced the achievement of project objective. Understanding of contractual agreement, was statistically significant at the 0.05 level (p = 0.001) while enhancement of partner accountabilities was not significant at the 0.05 level (p = 0.609). Of the two variables, understanding of contractual agreement made a larger significant unique contribution of 38.9% (beta = 0.389) whilst enhancement of partner accountabilities made less contribution to the prediction of the achievement of project objectives with a lower beta value of 6% (beta = -0.060).

Table 8 Results of MRA of second order of CSFs in achieving project objectives

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Zero-order
	B	**Std. Error**	**Beta**			
(Constant)	2.092	.566			**0.000**	
Contractual agreement	0.564	0.171	**0.389**	3.695	**0.001**	0.349
Partner accountability	-0.085	0.166	**-0.060**	3.294	**0.609**	0.190

Table 9 reveals the results of the second order model of CSFs impact on the attainment of company objectives. The results deduced that the understanding of contractual agreement and enhancement of partner accountabilities, were not statistically significant at 0.05 level. Understanding of contractual agreement p=0.418, and enhancement of partner accountabilities p=0.665. However, of the two components, understanding of contractual agreement made a larger significant unique contribution of 9.5% (beta = 0.095) whilst enhancement of partner accountabilities made smaller unique contribution to the prediction of the attainment of company objectives with a beta value of 5.1% (beta = 0.051).

Table 9 Results of MRA of second order of CSFs in attainment of company objectives

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Zero-order
	B	**Std. Error**	**Beta**			
(Constant)	2.934	0.666		4.403	**0.000**	
Contractual agreement	0.162	0.199	**0.095**	0.812	**0.418**	0.349
Partner accountability	0.076	0.174	**0.051**	0.435	**0.665**	0.190

Discussion of the results

CSFS OF JV IN SOUTH AFRICA

The findings established that nine components and two components were valid and reliable as empirically extracted in the first and second order models respectively. This finding suggests that the eight factor model conceptualised from the literature is in the form of a nine factor model or two factor model.

In the first order model co-operation between the members contributed significantly to the total variance of CSFs at 26.95%. This result expounds on the previous studies of Adnan et al., (2003) and Govindan (1995). To achieve the success of JV projects co-operation between the members should be evident from conception to the completion of the JV project. The second significant factor is communication between the partners. It can be argued that lack of communication will put constrain in the JV performance. Hence, it is vital to ensure that communication is effective at all levels of the JV projects. This will stifle misunderstandings and suspicion within the JV partners. This CSF was supported by the studies of; Adnan et al., (2003); Manitshana, (2012), and Dikmen, et al., (2008). Furthermore, the second order factor analysis indicates that communication and co-operation between partners are factors that will ensure that contractual agreement is achieved between the different stakeholders in a JV.

Contractual agreement empirically achieved in the second order factor analysis established the significance of contract management for to achieve JV success. If contract management is haphazardly handled chances of project failure is high. Contract management, entails a process of thoroughly and efficiently managing contract creation, execution and analysis to capitalize on operational and financial performance and reduce risk (Elsey, 2007). It is important that the percentage participation by each member is agreed, ensuring that risks, rewards, losses and liabilities are shared. It is also imperative, that the conduct and decisions of the partners in the organization is aligned with the JV goals and policies to ensure that the contract management activities are achieved. This will further entail trusting the capability of each professional in order to benefit from each other's professional experience.

The mutual understanding between partners ensures that the selection of partners based on their technical competence is embraced. Furthermore, it is advocated that JV partners should form good relationship to achieve their project success. This finding corroborates the findings of Adnan et al., (2003), Manitshana (2012) and, Hong et al., (2014). To buttress this discussion the second order factor analysis, established that mutual understanding defines

the JV partnership accountability. This suggests that, for JV partnership accountability to be achieved JV partners should have mutual understanding between themselves.

Management control was also identified as a critical component to enable the success of JV projects. It can be argued that management control ensures that the partners synchronise their project activities. Furthermore, with proper management control multinational experience of the partners could lead to the acquisition of complementary resources, and ensure the resources are efficiently utilised as was suggested by Adnan et al., (2003), Govindan (1995), as well as Talman (2009). It is interesting to note that management control was a component defining contractual agreement in the second order factor analysis. This suggests that for contractual agreement to manifest in the JV projects, management control should be practiced.

Contractual agreement component in the second order factor analysis is described by inter-partner trust. Inter-partner trust ensures that the parties to the JV are not skeptical of each other. The contractual trust should fulfill contractual duties of the parties. The partners should participate in policy-making and management activities of the JV. This will make certain, that the trust between the partners to the JV is achieved. Further, the goodwill trust of the stakeholders safeguards the partners to operate in the confines of the JV relationship. Govindan, (1995), Adnan et al., (2003); Hyun et al., (2013); Hong et al., (2014) studies corroborate with this discussion.

Comprehensive and fair written agreement explains the second order component of partner accountability. In order for partner accountability to be realized, comprehensive and fair written agreement should entail ways to limit conflicts between the JV partners. The CIDB, (2004) and Adnan et al., (2003), argued that the possible recipe for disaster in a JV is when the partnership is not founded by means of a comprehensive and fair written agreement between the members. This should address the obligations, rights, risks and rewards of each partner.

Commitment of the partners to the JV is critical in achieving the success of the JV project. The commitment is advocated, because of the varying nature of JV objectives, inputs given by the parties, and management systems of the JV. The commitment of the partners will establish a friendly and personal contact between the leaders of the cooperating organisations, the actions of key decision makers including acceptance of joint goals will be easily embraced, and finally, the partner selection criteria is adhered to. It can also be indicated that for partner accountability to be achieved the commitment of the partners becomes very critical as evinced in the second order factor analysis.

Joint venture partners should be aware of the implementation of contract agreement. The contribution by each member needs to be set out as well as the strategy of JV implementation. This will ensure no contradictions are experienced. It is pivotal that good managerial coordination and more effective team members are present in the JV project. This is consistent with what Durr et al., (2007) emphasized: that a good plan helps optimise the use of the project resources and limits the time spent on resolving complications during implementation. In line with the findings of the second order factor analysis contractual agreement component was also deciphered with implementation of contract agreement.

SUCCESS OUTCOME OF JV

The project performance outcome of joint ventures is measured using two criteria namely: achievement of project objectives and attainment of company objectives. The achievement of project objectives is a significant measure of JV project performance outcome as it indicates the highest component variance in project performance compared with attainment of

company objectives. The JV partners should ensure that the project attains its project budget, project time and minimise occupational accidents. Therefore, the identification of these project objectives directly reports to the project design. Among these measures, the project budget seems to be the most important followed by time and then accidents. The component explored in this study amplifies the definition of project management success as provided by Al-Tmeemy et al., (2011).

The second component of JV success outcome was attainment of company objectives. In the current study it indicates the possibility of the partners raising large capital funds and ensure the improvement of human resource capacity. This result is supported by Terjesen (2004), who established that JVs offer a range of benefits to partner firms through access to new and/or countless resources including but not limited to market entry, distribution networks, capacity, staff, purchasing, technology in the sense of intellectual property, and finance or increase of funds. The new component investigated in this study provides advantages to the JV partners in terms of reputation and competitiveness.

SIGNIFICANT CSFS FOR JV OUTCOMES

The empirical models tested were the first and second order factor models. The nine factors of the first order model were regressed to establish if they influenced the achievement of project objectives and attainment of company objectives. The findings established that, of the nine components, management control significantly influenced achievement of project objectives in JV projects. This finding enhances the findings of Adnan et al., (2003), Govindan (1995), as well as Talman (2009). It is important to note that for management control to influence achievement of project objective outcome, a number of activities should be undertaken. These activities are: the partners should synchronise their project activities, involvement in multinational projects ensures soliciting of complementary resources. Importantly the JV partners should fortify the efficiency of utilising the partners' resources. Finally, the partners should ensure that proper monitoring of the JV is achieved and consider the partners difference in the interest of the JV. Management control will ensure that the JV partners have competitive and reputational advantage in undertaking or bidding for the JV projects.

The two components of the second order model were regressed to establish if they influenced the achievement of project objectives and attainment of company objectives. The findings found that of the two components, contractual agreement significantly influenced the achievement of project objectives in JV projects. This finding is in line with the findings of Adnan et al., (2003), Govindan (1995), as well as Talman (2009). It is interesting to note that in comparison with the first order factor model only one component influenced the achievement of project objectives. The second order suggests that a combination of six factors defining contractual agreement contributed significantly to the achievement of project outcome. This included management control that was established in the first order factor model. These factors were: inter-partner trust; contract management; management control; implementation of contract agreement; effective implementation of the agreement; co-operation between the members and communication between partners.

Conclusions

The purpose of this paper was to establish a set of reliable and valid CSFs that influence JV performance outcome in South Africa construction industry based on comparative empirical models. In relation to the empirical findings, the Principal Component Analysis (PCA)

extracted nine components for the first order factor model and two for the second order factor model. The results are contrary to the eight factor model conceptualised from the literature. The nine factors in the first order model and the two factors in the second order model were reliable and valid. The first order factor model comprised of: co-operation between the members; communication between the partners; contract management; mutual understanding between partners; management control; inter-partner trust; comprehensive and fair written agreement; commitment of the partners and implementation of contract agreement. Further, the performance outcome was found to be measured by two factors i.e. achievement of project objectives outcome and attainment of company objective outcome. Thus the performance success outcome is measured against traditional and non-traditional criteria. In relation to the nine factors, co-operation between the members contributed significantly to the cumulative variance. However, co-operation between the members did not influence the achievement of project objectives outcome and attainment of company objective outcome. The findings established that management control which contributed 4.99% to the total variance of the CSFs significantly influenced the achievement of project objectives. However, it did not influence the attainment of company objectives which is deemed a non-traditional measure. Therefore, it can be indicated that the traditional measures were influenced by the management control factor.

The second order factor model consisted of two factors, i.e. understanding contractual agreement and enhancing partner accountability. Understanding contractual agreement impacted the achievement of project objectives, which is a traditional measure. In line with the results of the first order factor model, management control was among the six factors that constitute the contractual agreement.

The performance of South African construction JVs and JVs globally has been unsatisfactory, as highlighted in the introduction of this paper. The JV projects are constraint by time and cost variations, skills and competence issues and lack of worker participation. Therefore, this study provides direction to new JV partners and those who are experienced in South Africa construction industry. It is imperative that the JV partners embrace the understanding of contractual agreement which is a soft skill rather than a technical skill. The soft skills comprising contractual agreement include: inter-partner trust; contract management; management control; implementation of contract agreement; effective implementation of the agreement; co-operation between the members and communication between partners. Further, the study suggests that the JV stakeholders should focus on achieving success equally at the two levels of project success outcome. These include project objective (be within time, be within the budget and minimise accidents), and company objectives (improvement of human resource capacity and raising large capital funds from partners).

Finally, the study achieved robust result by comparing the result of the first order factor model and second order factor model in obtaining the significant success factors that influence project objective. The CSFs can be defined using the second order factor model result comprising contractual agreement and partner accountability. Furthermore, the general definition and theory of project success outcomes in JV construction project therefore constitutes two (2) factors of success, i.e. project objective and organisation objective.

Delimitation

The respondents were professional construction managers and construction project managers registered with the SACPCMP in Gauteng, Limpopo and Western Cape provinces in South

Africa. The findings may not be generalised across South Africa and across all professional bodies.

References

Adnan, H. and Morledge, R., 2003. Joint venture projects in malaysian construction industry factors critical to success. *Association of Researchers in Construction Management*, 3(2), pp.765-774.

Adnan, H., Rosman, M.R., Rashid, A.Z.Z., Yusuwan, N.M., and Bakhary, N.A., 2018. Application of Delphi expert panel in joint venture projects. *IOP Conference Series: Earth Environmental Science*. 117 012048 https://doi.org/10.1088/1755-1315/117/1/012048.

Aimin, Y. and Barbara, G., 2001. Negotiating control and achieving performance in international joint ventures: a conceptual model. *Journal of International Management*, 7, pp.295-315 https://doi.org/10.1016/s1075-4253(01)00049-7.

Alashwal, A.M., Fareed, N.F. and Al-Obaidi, K.M., 2017. Determining success criteria and success factors for international construction projects for Malaysian contractors. *Construction Economics and Building*, 17(2), pp.62-80 http://dx.doi.org/10.5130/AJCEB.v17i2.5319

Al-Tmeemy, S.M.H.M., Abdul-Rahman, H. and Harun, Z., 2011. Future criteria for success of building projects in Malaysia. *International Journal of Project Management*, 29(3), pp.337-48 https://doi.org/10.1016/j.ijproman.2010.03.003.

Azlan-Shah, A., Mohd-Don, Z., Anuar, A., Syahrul-Nizam, K., and Pitt, M., 2010. The performance of construction partnering projects in Malaysia. *International Journal of Physical Sciences,* 5(4), pp.327-333.

Chan, A.P.C., Chan, D.W.M., and Ho, K.S.K., 2002. An empirical study of the benefits of construction partnering in Hong Kong. *Journal of Construction Management and Economics,* 21, pp.523-533 https://doi.org/10.1080/0144619032000056162.

CIDB, 2004. Construction: joint venture arrangements. Available from: http://www.cidb.org.za/toolkit06/toolkitpages/module5/20supplementaryinformation/5s14%20pgd2-jv%20edition%201.0.pdf (Accessed 23 July 2018).

Cook, E.L., and Hancher, D.E., 1990. Partnering: contracting for the future. *Journal of Management in Engineering*, 6(4), pp.431-446 https://doi.org/10.1061/(asce)9742-597x(1990)6:4(431).

Dikmen, I., Birgonul, M.T., Ozorhon, B. and Eren, K., 2008. Critical success factors for partnering in the Turkish construction industry. *Conference Proceedings of the 24th Annual ARCOM Conference held in Cardiff*, UK, Conducted by Association of Researchers in Construction Management. Ankara Turkey: Middle East Technical University.

Divakar, K. and Subramanian, K., 2009. Critical success factors in the real-time monitoring of construction projects. *Research Journal of Applied Sciences, Engineering and Technology*, 1(2), pp.35-39.

Durr, B., Johnson, E., Rugh, J., Furany, K., Chen, M., Rubio, M. and Siles, R., 2003. *The Basics of Project Implementation: A Guide for Project Managers.* Available from: http://www.careclimatechange.org/files/toolkit/CARE_Project_Implementation.pdf (Accessed 26 November 2016)

Elsey, D.R., 2007. *Contract Management Guide- Knowledge Insight* https://www.cips.org/documents/knowledge/procurement-topics-and-skills/10-developing-and-managing-contracts/t-and-cs-and-developing-of-contracts/knowledge_insight-contract_management_guide.pdf (accessed 27 July 2018).

Farrell, E.P., 2014. *The 7 Deadly Sins of Joint Ventures.* Available from: http://www.entrepreneur.com/article/236987 (Accessed 27 January 2015).

Fitzpatrick, J., Hecker, D. and Hazard, G., 2011. *Divided Loyalty: Ethical Considerations in Representing Joint Ventures. Construction Super Conference*, Session E23 held in San Francisco. California: University of California.

Fryrear, A., 2015. Survey Response Rates. Available from: https://www.surveygizmo.com/survey-blog/survey-response-rates/ (Accessed 13 April 2016).

Govindan, S., 1995. *Determinants of joint venture performance in the construction industry: Cases from the mass rapid transit project in Singapore.* PhD. London: University College London.

Hair, J.F, Black, W.C, Babin, J.B, Anderson, R.E and Tatham, R.L., 2006. *Multivariate data analysis*, 6th Edition. Upper Saddle River, New Jersey: Pearson/Prentice Hall.

Hong, Y. and Chan, D. W.M., 2014. Research trend of joint ventures in construction: a two-decade taxonomic review. *Journal of Facilities Management,* 12(2), pp.118-141 https://doi.org/10.1108/jfm-04-2013-0022.

Hyun, J.H. and Ahn, S.Y., 2013. Host country perspectives on partner selection criteria for the success of international joint ventures: an empirical survey of Korean firms. *Conference Proceedings of the 24th International Business Research Conference held in Las Vegas,* USA Conducted by Planet Hollywood. Korea: Hankuk University of Foreign Studies.

Israel, G. D., 1992. *Sampling the Evidence of Extension Program Impact: Determining Sample Size.* Available from: http://edis.ifas.ufl.edu/pdffiles/pd/pd00600.pdf (Accessed 24 July 2018).

Jha, K.N. and Iyer, K.C., 2006. Critical factors affecting quality performance in construction projects. *Journal of Total Quality Management*, 17(9), pp.1155–1170 https://doi.org/10.1080/14783360600750444.

Kale, V.V., Patil, S.S., Hiravennavar, A.R., and Kamane, S.K., 2013. Joint venture in construction industry. *Journal of Mechanical and Civil Engineering,* 3, pp.60-65.

Kamal, K.K.A., 2010. *Joint Ventures in Construction Firms in Saudi Arabia*. Available from: http://faculty.kfupm.edu.sa/CEM/assaf/Students_Reports/Joint-Ventures-in-Construction-Firms.pdf (Accessed 22 January 2015).

Kavishe, N., and Chileshe, N. 2017. Joint venture housing projects in Dar Es Salaam City: An analysis of challenges and effectiveness *In:* Chan, P W and Neilson, C J (Eds) *Proceeding of the 33rd Annual ARCOM Conference,* 4th-6th September 2017, Cambridge, UK, Association of Researchers in Construction Management, 144-153.

Kwok, H.C.A., Then, D. and Skitmore, M., 2000. Risk management in Singapore construction joint ventures. *Journal of Construction Research*, 1(2), pp.139-149.

Lambe, C. J., Spekman, R. E. and Hunt, S.D., 2011. Alliance competence, resources, and alliance success: conceptualization, measurement, and initial test. *Journal of the Academy of Marketing Science*, 30(2), pp.141-158 https://doi.org/10.1177/03079459994399.

Li, H., Cheng, E., Love, P. and Irani, Z., 2001. Co-operative benchmarking: A tool for partnering excellence in construction. *International Journal of Project Management,* 19(3), pp.171-179 https://doi.org/10.1016/s0263-7863(99)00033-2.

Ma, T. and Voo, M., n.d. A comparative study of construction joint ventures in Australia and Malaysia.

Manitshana, B., 2012. *Assessment of the Critical Success Factors of Joint Ventures in the South African Construction Industry.* Unpublished Magister Technologiea thesis. Johannesburg: University of Johannesburg.

Miller, R.W., n.d. *Joint Ventures in Construction.* Washington: National Association of Surety Bond Producers.

Nisa, Z.U., Javed, U. and Akhtar, H., 2015. Impact of project performance measurement system on project success: a study based on NGO sector of Pakistan. *International Journal of Sciences: Basic and Applied Research*, 22(2), pp.289-315.

Özorhon, B., 2007. *Modelling the Performance of International Construction Joint Ventures:* Unpublished Doctoral Thesis, The Middle East Technical University.

Pallant, J., 2013. Spss survival manual: a step by step guide to data analysis using IBM SPSS. London: Allan and Unwin.

Richards, P., Bowen, P., Root, D. and Akintoye, A., 2005. Client strategic objectives: the impact of choice of construction contract on project delivery. *Construction Law Journal*, 7(21), pp.1-25

Shen, L. Y., Wu, G. W. C., and Catherine, S. K. N., 2001. Risk assessment for construction joint ventures in China. *Journal of Construction Engineering and Management,* 127(1), pp.76-81 https://doi.org/10.1061/(asce)0733-9364(2001)127:1(76).

Talman, J.A., 2009. *Management Control in Joint Ventures: An Analysis Based on Transaction Cost Economics and Game Theory.* Unpublished Doctoral Thesis. Zurich: Erasmus University Rotterdam.

Terjesen, S., 2004. *Joint Ventures: Synergies and Benefits.* Available from: http://isites.harvard.edu/fs/docs/icb.topic1157739.files/joint-ventures-synergies-and-benefits.pdf (Accessed 26 November 2016).

Umunna, P., 2014. *PRS Structure Issues for Bybrid Joint Ventures.* Available from: http://www.wslaw.co.uk/site/uploads/tinymce/PRS/prs_booklet/PRS_structure_issues_for_hybrid_joint_ventures.pdf (Accessed 22 January 2015).

Wahab, S.A., Abdullah, H., Uli, J. and Rose, R.C., 2010. Inter-firm technology transfer and performance in international joint venture firms. *International Journal of Business and Management*, 5(4), pp.93-103 https://doi.org/10.5539/ijbm.v5n3p89.