A RESEARCH ANALYSIS ON EFFECTIVE LEARNING IN INTERNATIONAL CONSTRUCTION JOINT VENTURES

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Abstract

This paper presents the results of a statistical analysis and its research findings focusing on the learning aspect in the process of international joint ventures (IJVs). The contents of this paper is derived from a sample of 96 field cases based on a proposed conceptual model of effective learning for international construction joint ventures (ICJVs). The paper presents a brief review on the conceptual model with hypotheses and summarized the key results of statistical analysis including factor and multiple regression analysis for the testing of the validity of the proposed conceptual model and its associated research hypotheses. Among other research findings, the research confirms that ICJVs provides an excellent platform of in-action learning for construction organization and suggests that good outcomes in learning could be reaped by a company who has a clear learning intent from the beginning and subsequently take corresponding learning actions during the full process of the joint venture.

Keywords: International Construction Joint Venture, Learning, Learning Organization

1. Introduction

International joint venture (IJV) offers organizations a feasible option with an excellent platform of learning for many business endeavors. However, in the sector of international construction joint ventures (ICJVs) and in term of learning that can be derived from the process of joint venture (JV), the effectiveness is generally regarded as less than encouraging. Though the importance of learning in the process of JV is reckoned by some construction companies, it has been generally noted that this has not been systematically planned and organized to reap the full benefits of effective learning in practice. In general, these phenomena can be significantly attributed to the lacking of systematic guides available due to shortage of research made in this area of study.

This research has made extensive literature review in the aspects of joint ventures as well as learning effects to identify the determinants for effective learning at various stages of ICJVs. In the process, it is found that the characteristics of environment and partners, general characteristics of JV, and the learning actions form the three learning determinant constructs and would have significant impact and influences on the effective learning results in ICJVs. The research also adopts the definition of learning organization as described by Ellinger et al [1] and Senge [2] as the effective learning outcomes to be measured in the completion & evaluation stage of JV. In view of this, the characteristics of a learning organization are used to measure the effective learning outcomes in this study.

The review conducted proposes that all variables and the measurement of effective learning can be identified respectively in the four main stages of IJV process comprising pre-inception stage, formation & organizing stage, implementation & adjustment stage, and completion & evaluation stage. Putting the three determinant constructs and the outcomes of learning alongside with the four major stages of ICJV, a proposed research model is developed for the effective learning in ICJV as shown in Figure 1.

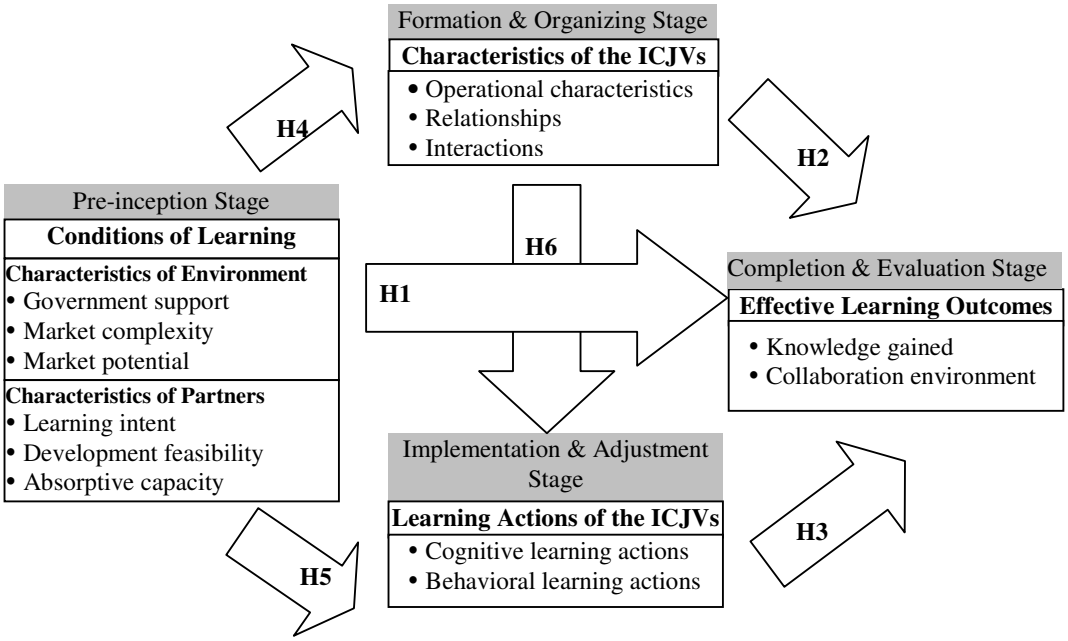

Figure 1: Proposed Process-based Conceptual Model of Effective Learning in ICJVs

As depicted in Figure 1, six main relationships are hypothesized as follows:

H1: Effective learning outcomes are directly supported by the characteristics of environment and partners.
H2: Effective learning outcomes are directly supported by the joint venture's general characteristics.
H3: Effective learning outcomes are directly supported by the observed learning actions in ICJVs.
H4: The joint venture's general characteristics are directly supported by the characteristics of environment and partners.
H5: The observed learning actions in ICJVs are directly supported by the characteristics of environment and partners.
H6: The observed learning actions in ICJVs are directly supported by the joint venture's general characteristics.

In the design of survey questionnaire, the four constructs of the proposed model are measured by 48 items of variables organized into 7 groups, of which 6 groups is classified as belonged to determinants and 1 group is used to measure the learning outcomes.

2. Research methods and field data

The research model with the hypotheses focuses on the relationships among the learning outcomes and the three constructs of determinants. Questionnaire survey is used as the main research instrument with data gathering adopting a Likert 5-point interval scale.

The targeted population for data gathering is limited to companies which have registered in Singapore or China and have in the past engaged in international construction joint ventures. The criteria of selection for sample were based on the reputation of the companies and/or their ranking in the Engineering News Record's "Top 225 International Contractors" listing. In total, 293 survey questionnaires were sent and 96 valid replies were gathered giving a response rate of 32%. Among them, 51 companies or 53% of the sample size are listed in the "Top 225 International Contractors". It turns out accordingly that the respondent profile is made up of experienced construction executives with at least an ICJV project experience as shown in the details of Table 1.

Table 1: Profiles of Respondents of the Survey

Position of the respondents in the company	No.
Engineers	29
Project Managers	14
Department Managers	25
(Vice) General Manager/President/Chairman	28
Total No. of cases	96

3. Validity and reliability

Factors analysis first introduced by Thurstone [3] is considered to be an indispensable method for determining the convergent validity of a research instrument. The main applications of factor analytic techniques are: (1) to reduce the number of variables and (2) to detect structure in the relationships between variables, that is to classify variables.

This study used a principal component analysis with varimax factor rotation on every observable construct. The most commonly used "eigen values greater than one" rule was adopted as the criterion of factor selection in this study. In general, the study considered that factors extracted from factor analysis with loadings more than 0.45 are adequate for establishing the convergent validity as suggested by Kim and Muellar [4]. In the process, item with factor loading less than 0.45 was subsequently removed. On the other hand, factors computed by the average of selected component items would be regarded as more meaningful and easier to interpret than the factor scores. Hence, average of component items with factor loading>0.45 instead of factor scores as generated by factor analysis was used as the value of the factors extracted in this study.

In total, ten factors including two factors on learning outcomes were extracted and presented in Table 2. Research practice uses computed value of Cronbach's coefficient α as a measure of internal consistency reliability of a research instrument, and a coefficient of 0.7 and above is generally taken as acceptable. As shown in the content of Table 2, all values of Cronbach's coefficients are larger than 0.7, which thus indicates the consistency reliability of the research instrument adopted for the research model is well justified.

Table 2: Results of Factor Analysis:

Factors	Designation	Description of Items	Cronbach's Coefficient α
F1: EMAC	Environment and Market's Attractive Characteristics	1.Government support 2.Market complexity 3.Market potential	0.865
F2: PCDF	Partner Company's Development Feasibility	1.Product development strategy 2.Market development strategy 3.Decentralized structure 4.Organic structure	0.742
F3: PCAC	Partner Company's Absorptive Capability	1.Openness to accept knowledge 2.Employees' adaptability 3.Employees' receptivity 4.Employees' experience	0.855
F4: PCLI	Partner Company's Learning Intent	1.Intent to transfer knowledge 2.Intent to apply new knowledge 3.Intent to acquire knowledge 4.Intent to create new knowledge	0.758
F5: JVOC	JV's Operational Characteristics	1.Integrated degree of JV 2. Affinity of JV 3.Independency of JV board 4.Authority power of JV board	0.877
F6: JVIR	JV's Interactions and Relationships	1.Trust 2.Cultural similarity 3.Cultural understanding 4.Business relatedness 5.Management support 6.Training	0.792
F7: JVCLA	JV's Cognitive Learning Actions	1.Self-examination 2.Share personal vision 3.Share experience and lesson 4.Understand the common vision 5.Management's supportive attitude	0.864
F8: JVBLA	JV's Behavioral Learning Actions	1.Engage problem actively 2.Communicate with each other 3.Management's supportive actions 4.Develop & create new knowledge 5.Collect and record knowledge 6.Apply new knowledge	0.820
F9: JVCEI	JV's Collaboration Environment Improvement	1.Collaborative climate 2.Continuous learning climate 3.Consistent vision 4.Coaching and respectable leaders 5.Unhindered communication 6.System thinking	0.878
F10: JVKCI	JV's Knowledge and Capability Improvement	1.Efficient working 2.Individual improvement 3.Effective teamwork 4.Knowledge improvement 5.Skill improvement	0.850

4. Statistical analysis

The factors extracted are subsequently used for the hypotheses testing and discussed in the following sections. In view of the coverage, this paper will only discuss the testing of Hypothesis H1, H2 and H3.

4.1 Hypothesis testing

Hypothesis 1 includes six factors of which four independent factors are EMAC (Environment and Market's Attractive Characteristics), PCDF (Partner Company's Development Feasibility), PCAC (Partner Company's Absorptive Capability) and PCLI (Partner Company's Learning Intent). The other two predictors are JVCEI (Joint Venture's Collaboration Environment Improvement) and JVKCI (Joint Venture's Knowledge and Capability Improvement). A regression analysis is used to test the relationship between the independent factors and the predictors, and the results are presented in Table 3.

Table 3: Results of Regression Analysis of H1: the characteristics of environment and partners and effective learning outcomes.

Effective Learning Outcomes	JV's Collaboration Environment Improvement (Model 1a)	JV's Knowledge and Capability Improvement (Model 1b)
Environment and Market's Attractive Characteristics	0.099	0.133*
Partner's Development Feasibility	0.218**	0.271***
Partner's Absorptive Capability	0.198***	0.315***
Partner's Learning Intent	0.370***	0.275***
Adjusted R^2	0.413	0.523
F-Value	17.691***	27.056***

N=96, *P≤0.1; ** P≤0.05; ***P≤0.01

As shown in Table 3, one can notes that the adjusted R^2 in Model 1a and 1b are 0.413 and 0.523 respectively which could be regarded highly acceptable as adopted in general research practice by researchers such as Kale [5] and Park and Luo [6] who had considered regression models with adjusted R^2 of 0.3 as acceptable. The result of regression analysis also shows that the F-statistics are also very significant (P≤0.01). Based on these results, it is deemed that the Hypothesis H1 is supported. Specifically, the results implies that partners' absorptive capability and partners' learning intent can contribute to the effective learning outcomes at a 1% level of statistical significance. Similarly, the partner company's development feasibility can contribute to the effective learning outcomes at a 5% level of statistical significance as well. Lastly, environment and market's attractive characteristics also have slightly impact on the knowledge and capability improvement in ICJV.

Hypothesis 2 is about the relationship of effective learning outcomes and general characteristics of joint venture which includes two independent factors of JVOC (Joint Venture's Operational Characteristics) and JVIR (Joint Venture's Interactions and Relationships). The results of regression analysis on Hypothesis 2 are presented in Table 4.

Table 4: Results of Regression Analysis of H2: the joint venture's general characteristics and effective learning outcomes.

Effective Learning Outcomes	JV's Collaboration Environment Improvement (Model 2a)	JV's Knowledge and Capability Improvement (Model 2b)
Joint Venture's Operational Characteristics	0.320***	0.222***
Joint Venture's Interactions and Relationships	0.440***	0.591***
Adjusted R^2	0.391	0.411
F-Value	31.454***	34.189***

N=96, *P≤0.1; ** P≤0.05; ***P≤0.01

Based on the results as shown in Table 4, the value of adjusted R^2 in Model 2a and 2b are 0.391 and 0.411 respectively with F-statistics significant at 1% level, Hypothesis 2 is thus strongly supported. This result implies that joint venture's general characteristics which include joint venture's operational characteristics, interactions and relationships would contribute to the effective learning outcomes at a 1% level of statistical significance. The results also suggest that the factors of JV's operational characteristics, and JV's interactions and relationships are well selected as the determinants of the effective learning.

Hypothesis 3 is about the relationship of effective learning outcomes and learning actions in joint venture. The two independent factors are JVCLA (Joint Venture's Cognitive Learning Actions) and JVBLA (Joint Venture's Behavioral Learning Actions). The regression results of Hypothesis 3 are shown in Table 5.

Table 5: Results of Regression Analysis of H3: the observed learning actions in ICJVs and effective learning outcomes.

Effective Learning Outcomes	JV's Collaboration Environment Improvement (Model 3a)	JV's Knowledge and Capability Improvement (Model 3b)
Cognitive Learning Actions	0.495***	0.421***
Behavioral Learning Actions	0.234**	0.405***
Adjusted R^2	0.439	0.517
F-Value	38.214***	51.917***

N=96, *P≤0.1; ** P≤0.05; ***P≤0.01

As shown in Table 5, the adjusted R^2 in Model 3a and 3b are 0.439 and 0.517 with F-statistics significant at 1% level which imply that Model 3a and Model 3b can explain 43.9% and 51.7% of the variation in the dependent variables. Hypothesis 3 is thus also strongly supported based on this regression analysis. Specifically, it indicates that cognitive learning actions can contribute to the effective learning outcomes at a 1% level of statistical significance while behavioral learning actions can contribute to the effective learning outcomes at a 5% level of statistical significance.

4.2 Results of statistical analysis

As a whole, the research findings covered in the scope of this paper can be summarized in following Tables 6:

Table 6: Summary of the Research Finding for Hypothesis 1-3

Effective Learning Outcomes	JV's Collaboration Environment Improvement	JV's Knowledge and Capability Improvement
Characteristics of market environment and partner company (H1)		
Environment's Attractiveness	NS	*
Development Feasibility	**	***
Absorptive Capability	***	***
Learning Intent	***	***
Joint venture's general characteristics (H2)		
Operational Characteristics	***	***
Interactions and Relationships	***	***
Observed learning actions in ICJV (H3)		
Cognitive Learning Action	***	***
Behavioral Learning Action	**	***

N=96, NS-Not Significant (P>0.1), *P≤0.1; ** P≤0.05; ***P≤0.01

The results as shown in Table 6 suggest that with development strategy, good absorptive capability and learning intent, it is expected a JV partner company can generally improve its effectiveness in learning. The results also show that though to a less significant level, the environment attractiveness has some effect on the effective learning results on the aspect of knowledge and capability improvement. It also indicates that if a partner company can improve a joint venture's general characteristics such as in the areas of integration, independency, authority & power, interactions and building relationships in the joint venture board, it should lead to better effective learning outcomes. Furthermore, a partner company which takes more actions in cognitive and behavioral learning would be also better positioned in reaping maximum benefits of effective learning.

5. Discussion and analysis of research findings

This study has identified that the general characteristics of the partner company which include partner's openness to accept new knowledge, adaptability, receptivity and experience have strong and direct impact on the effective learning outcomes. This finding concurs with works of Hamel [7] who pointed out that transparency, receptivity of partner forms the determinants of learning. Concurring with Hamel [7] who stated that an intent is also a determinant of learning and Fishbein and Ajzen's [8] who suggested that a person's behavior is determined by his or her attitude, which in turn is determined by his or her intent of the behavior, this study also found that learning intent of partner including intent to transfer, intent to apply, intent to acquire and intent to create new knowledge would significantly support the results of effective learning. This finding suggests that in order to benefit from an effective learning, a company would have to plan from the pre-inception stage with a very clear learning intent in mind.

On the aspect about the relationship of characteristics of joint venture and learning, the findings are generally supported as evidenced in the literature of various researches. These include Lyles and Salk [9] who found that organizational management competency to solve problems flexibly and independently are significant to participant's knowledge acquiring in IJV, and Wong [10] who reported that the management competency is one of the key determinants of performance in ICJV, as well as Lane et al [11] who found that relatedness and prior knowledge are positively associated with IJVs learning. To achieve effective learning outcomes, the findings suggest that an ICJV organization should be more integrated and working more closely. This study also found that the partner should also give more independency and more authority power to the joint venture board to manage the project. To this end, a partner should build better relationship with each other such as to improve trust, cultural compatibility and business relatedness and provide more management support and training opportunities for everyone involved in the joint venture.

This study has also identified that the learning actions including cognitive learning actions and behavioral learning actions in implementation & adjustment stage are quintessential for achieving the effectiveness in learning. This finding concurs well with the works of Robbins [12] who said, knowledge is only part of the equation to success, a major part is action and action produces results. It is suggested that action is the most direct way to make things happen. To achieve better effectiveness in the learning outcomes, an organization must take more cognitive learning actions such as conducting self-examination, vision sharing, experience and lessons sharing with supportive attitude; it must also take more behavioral learning actions like engaging problem actively, listen and accept other's better opinions, develop and create new knowledge, gather and record knowledge and apply the new knowledge readily.

In summary, the three proposed hypotheses between the determinants and the effective learning outcomes are generally well supported by the results of analysis. This study result suggests that that the major determinants on effective learning would consist of three key components embedded in various stages of JV, namely a partner's absorptive capability and his partner's clear learning intent in JV's pre-inception stage, a JV's general characteristics such as operational characteristics, meaningful interactions and a good relationships among JV in formation & organizing stage, and the learning actions in implementation & adjustment stage.

6. Conclusions

Although the results of statistical analysis have been presented, details of the insight relationships among the determinants have not been covered in this paper. In the planning, details on the remaining areas of this research including testing of Hypotheses H4, H5, H6 and case interviews conducted would be included in the full results of the ensuing study.

With the multiple regression analysis performed on three of the six hypotheses proposed in this research, the content of this paper has provided good evidence on the validity of the research model. The study has also identified the key determinants which have strong and direct relationships for effective learning in ICJVs. It is believed that some of these findings could eventually serve as useful pointers for company to enhance success in the practice of ICJVs.

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