Model for Predicting Success of Partnering in Vietnam: A Discriminant Analysis Approach

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Abstract

Partnering concept has been mentioned as an innovative arrangement that helps to reduce many of the disadvantages of the traditional arrangement. Partnering in construction has been widely applied in Vietnam from late 1990s. The application of the new arrangement has spread thanks to anecdotal proofs. This concept is quite new to Vietnamese practitioners. It is necessary to conduct study as a lesson-learn of the industry to encourage the partnering implementation. This paper attempts to develop a model, using discriminant analysis, which classifies the partnering in construction projects into success levels. Dedication, teamwork, sufficiency, and balance are the four significant components in discriminant model. The proposed model is helpful to practitioners in developing, adjusting and improving their strategy for partnering implementation.

Keywords : *partnering, model, discriminant, construction, Vietnam.*

1. Introduction

1.1 Background

Researchers in project management have become interested in partnering concept application. Partnering possibly orients participants towards a win-win attitude; therefore, it helps to avoid adversarial confrontation between stakeholders in a project. It is an innovative concept to the construction organizations, which traditionally rely heavily on contracting to bind the parties together (Cheng et al, 2004). Due to multidisciplinary skills and knowledge of parties involved in a construction project, partnering evolves as a cooperative strategy that modifies and supplements the traditional boundaries between independent companies in a competitive market (Crowley and Karim, 1995). The most widely cited definition of partnering is developed by the Construction Industry Institute in Austin, Texas (USA) (referred in Chan et al, 2003) as follows:

…a long-term commitment between two or more organizations for the purposes of achieving specific business objectives by maximizing the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based on trust, dedication to common goals, and an understanding of each other's individual expectations and values.

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Vietnam is currently among developing countries. It is considered to be one of the fastest developing economies. Thus, construction industry in Vietnam has been increasing to meet social needs. However, the adversarial relationships between project stakeholders have caused many difficulties. The construction enterprises have been searching for a new type of arrangement sufficient with their current context. Partnering concept has been considered as applicable; and partnering in construction has been widely applied from late 1990s in Vietnam.

Success factors represent those managerial or enterprise areas that must be given special and continual attention to bring about high performance. Impact and performance of success factors are mostly measured by qualitative scales. Converting qualitative performance of related success factors into quantitative value of chance of success is helpful to practitioners in developing, adjusting and improving strategy to execute their partnering.

1.2 Research objective

A model to predict the level of partnering success through the contribution of success factors to partnering performance is necessary in Vietnamese context. This paper attempts to develop a model that classifies the partnering in construction projects into success levels. The success levels can be classified by using the discriminant analysis based on qualitative perceptions about factors of success. Furthermore, on the basis of the available findings, this paper aims to identify significant factors which possibly improve the partnering performance in Vietnamese construction market.

1.3 Research process

Data set about success factors for partnering in construction in Vietnam and level of partnering success, collected after conducting a questionnaire survey, was used to develop a discriminant model. The consensuses between respondents and between respondent groups were tested. Due to good statistical agreements between respondents, all data could be used as a whole for further analysis. Factor analysis was employed to reduce the number of variables (success factors). The extracted components were used as the independent variables of the model. Component scores represented the components in the discriminant analysis.

2. Variables used in discriminant analysis

2.1 Success factors

Researches about success factors for partnering implementation have been vigorous in recent decades around the world. Crane et al. (1997) identified various success factors to ensure a success in each phase of a five-phase partnering process model. Larson (1997) pointed out that top management support for teamwork across organizations was critical to success. Cheng et al (2000) identified the critical success factors based on a review of the partnering literature. Several aspects of research about success factors were presented in Cheng and Li (2001) and Cheng et al (2002, 2004) to facilitate the partnering implementation through a proposed model. Black et al (2000), using a UK-wide postal questionnaire survey, suggested that all project participants must re-think their attitudes and work to make projects more efficient, successful and free of conflict. Paying attention to UK construction industry as well, Beach et al (2005) presented three new aspects of successful partnering: best value, service and dependency, which when reviewed in the context of the four categories of key elements, namely commitment, processes, tools and outcomes, appeared to fit into the outcome category. In the Taiwanese context, Chen and Chen (2007) and Chen et al (2008) identified and assessed critical factors as certain requirements that must be met for partnering to be successful. Chan et al (2006) based on the case study of six selected projects; a best practice partnering framework was developed for Hong Kong context. Focusing on the mainland of China, Tang et al (2006) presented a finding of a study that was conducted to develop and test a partnering model that revealed the

relationships between critical success factors of partnering and demonstrated their importance to construction.

The research field about success factors seems to be context specific and the implications are limited to the countries where such studies have been conducted. It is due to the diverse nature, professional knowledge, organizational culture and distinctive interests in the project; different stakeholders have different perceptions (Toor and Ogunlana, 2008). A study attempted to fill in the gap of Vietnamese context. Twenty eight success factors for partnering in the construction industry in Vietnam were identified in the study of Le-Hoai (2009) after conducting a questionnaire survey. These identified twenty eight success factors have been employed in this paper to develop the discriminant model.

2.2 Partnering success

To measure the success of partnering in construction, many previous studies have been conducted in the field such as Crane et al (1999), Cheng et al (2000), Cheung et al (2003), and Rowlinson et al (2006). Many criteria have been proposed. Cheng et al (2000) proposed that performance measures can be subjective or objective and these measures should help to set useful monitoring, control, evaluation, and correction of variations and improvements. The frequently used measures relate to cost, schedule, quality, safety, litigation, profit, stakeholders and community. Chan et al (2004) used qualitative scale to request the respondents rating perceptions of partnering success according to a five-point Likert scale (1= strongly disagree and 5 = strongly agree). In this paper, collecting various measures to estimate the level of partnering success seems to meet many difficulties such as reliability of answers of the respondents about the measures due to sensitivity of data, limited time of respondents due to tight working schedule, inertia of practitioners against scientific researches in Vietnam. The surveyed scale must be easy for respondents to respond with an acceptable accuracy for research purpose.

In order to overcome the difficulties and guarantee an acceptable accuracy, ten-point scale was employed to ask the rating of respondents with 1 indicating "completely unsuccessful" and 10 indicating "completely successful". Ten-point scale was similarly employed in Iyer and Jha (2006) to subjectively estimate the schedule performance of construction projects in India. Koksal and Arditi (2004) also used ten-point scale to rate overall condition of construction company in a research about company decline.

3. Data collection

An empirical survey was employed to investigate success factors for partnering application in the construction industry in Vietnam. Respondents were requested to rate the contribution of the factors to the partnering success according to five-point Likert scale from 1 = "Not significant" to 5 = "Very highly significant". With level of partnering success, respondents were asked to rate on ten-point scale from 1 (completely unsuccessful) to 10 (completely successful). The answers were based on projects the respondents participated in. The involved practitioners in the sample were identified through construction companies' web-pages, construction companies' charters, project case analyses, professional forum, and personal relationship.

Table 1. Information about respondents

Category	Percentage
Party	· Client: 20.3% · Contractor: 59.5% · Consultant: 20.3%
Position	· Top manager: 12.7% · Functional manager: 49.4% · Project team member: 32.9% · Partnering facilitator: 5.1%
Experience	· < 5 years: 15.2% · 5-10 years: 36.7% · 10-15 years: 40.5% · > 15 years: 7.6%

Table 2. Summary of all responses about success factors

No	Success factors	N	Rating frequency					Mean	Std. Dev.
			1	2	3	4	5		
X1	Mutual trust between parties	79	0	2	7	38	32	4.266	0.729
X2	Effective communication	79	0	2	16	31	30	4.127	0.822
X3	Adequate resources	79	2	3	10	24	40	4.228	0.986
X4	Long-term commitment	79	0	4	18	41	16	3.873	0.79
X5	Commitment from top management	79	0	2	10	28	39	4.316	0.793
X6	Clear understanding about scope and objectives	79	0	3	16	33	27	4.063	0.837
X7	Early implementation of the partnering process	79	4	12	26	27	10	3.342	1.049
X8	Commitment to continuous improvement	79	0	12	24	30	13	3.557	0.944
X9	Acting consistent with objectives	79	0	6	18	45	10	3.747	0.776
X10	Dedicated team	79	0	10	12	38	19	3.835	0.94
X11	Flexibility to change	79	2	3	21	43	10	3.709	0.834
X12	Commitment to quality	79	0	7	22	25	15	3.861	0.971
X13	Total cost perspective	79	0	23	19	23	14	3.354	1.086
X14	Good cultural fit	79	4	14	21	31	9	3.013	0.913
X15	Company wide acceptance about the partnering	79	2	14	29	28	6	3.278	0.933
X16	Technical expertise	79	2	4	14	43	16	3.848	0.893
X17	Financial security	79	0	0	8	24	47	4.494	0.677
X18	Questioning attitude about assumptions	79	0	10	22	35	12	3.62	0.896
X19	Empowerment of stakeholders	79	0	6	21	29	23	3.873	0.925
X20	Creativity of partnering team	79	1	11	31	26	10	3.418	0.928
X21	Equity	79	0	6	17	39	17	3.848	0.849
X22	'Mutual vision, goals/objectives'	79	2	6	21	35	15	3.696	0.952
X23	Effective conflict resolution process	79	0	5	16	41	17	3.886	0.816
X24	Educated and trained personnel for partnering	79	0	6	23	40	10	3.684	0.793
X25	Effective coordination	79	0	4	23	42	10	3.734	0.746
X26	Adequate partnering team building	79	0	12	18	29	20	3.722	1.012
X27	Partnering experience	79	1	7	32	28	11	3.519	0.89
X28	Joint problem solving	79	0	4	16	47	12	3.848	0.735

Delivery methods employed to distribute the questionnaires were hand delivery, postage and e-mailing. A total of 79 valid returned questionnaires accounted for a response rate of about 24% were used for analysis. Statistical software, namely Statistical Package for the Social Sciences (SPSS), was used to process the data. Cronbach's alpha coefficient of internal consistency yielded a value of 0.887, which is considered to be reliable. Out of 79 returned questionnaires, 26 responses (32.9%) were from foreign sector and the remainders (53 responses or 67.1%) were from Vietnamese sector. An overall of respondent information was shown in Table 1. It is noted that the foreign sector means the foreign construction organizations having participated in the Vietnamese construction market.

The responses on the level of partnering success suggested that the outcome of partnering application in Vietnamese context was fine. There was no answer on levels below 5. The median value was 8 and the mean value was 7.66.

4. Test of consensus

The consensus of responses was tested. The tests showed that all data could be used as a whole for further analysis due to good statistical agreements between respondents. The tests of Kendall's coefficients of concordance were all significant at 0.000. It confirmed that the response consensus about success factors ranking within a certain respondent group was achieved. The produced p-values of Spearman rank correlation tests are all less than 0.05. It could be concluded that there was a significant agreement between any certain pair of respondent groups on the ranking of success factors. Analysis of variance (ANOVA) tests between respondent groups about level of partnering success resulted in insignificance at level of 0.05. The consensuses about the success level between groups were achieved.

5. Responses to success factors

Table 2 shows the distributions of votes, the means and standard deviations of the score ratings of success factors of partnering application with respect to all respondents.

The distributions of responses on rating explain for the mean score values. The distributions are right skewed. Most of the peaks are at level 4. 'Financial security' has the highest mean score of 4.494. The other five factors have mean score ratings above 4. These factors are 'Commitment from top management', 'Mutual trust between parties', 'Adequate resources', 'Effective communication', and 'Clear understanding about scope and objectives'. The other factors have mean score ratings above 3.

6. Factor analysis result

Factor analysis was employed to analyze latent relationships between the larger numbers of success factors. The communalities of all twenty eight success factors were higher than 0.5. Table 3 presents the KMO and Bartlett's test results. Bartlett's test of sphericity was significant at 0.000 and Kaiser-Meyer-Olkin measure of sampling adequacy was satisfactory with the value of 0.685. It can be concluded that the factor analysis was applicable.

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.685
Bartlett's Test of Sphericity	Approx. Chi-Square	1258.335
	df	378
	Sig.	0

Principal component analysis was used as method to extract component. Latent root criterion (eigenvalue greater than 1) and varimax orthogonal rotation technique were adapted. Eight components were extracted after rotation. Rotation converged in 13 iterations. Table 4 presents the explained variance of the components. With eight extracted components, 71.5% of variance can be explained. Table 5 shows the structure of extracted components. Factor has loading higher than 0.5 considered as significantly correlated with component (rule of thumb).

Factor loadings are used to interpret the role of each variable plays in each component (Hair et al, 2009). The patterns (naming and structure) of extracted components characterized by high loading factors. As such, the eight extracted components were named as dedication, readiness, coordination, teamwork, sufficiency, leading, balance, and clearness. The eight components covered all aspects that required for a success application of partnering concept in the Vietnamese construction industry. The most critical component, based on the percentage of variance explained, was the dedication to the partnering. The readiness to apply partnering concept was the second highly ranked component. The coordination in partnership was the third critical success component of partnering in construction projects. Teamwork, sufficiency, leading, and balance also contributed to the success partnering in the Vietnamese context. Clearness was the component that contributed least percent of variance explained of the total variance

The component score coefficient matrix produced by SPSS was used to calculate component scores. The component scores have been used in the next analysis step. The formula of component 1, shown in equation 1 below, is taken as an example:

$$\begin{aligned} \textit{Dedication (Component 1)} = {} & -0.032 \times X1 - 0.060 \times X2 + \\ & + 0.020 \times X3 + 0.045 \times X4 - 0.005 \times X5 - \\ & - 0.022 \times X6 + 0.119 \times X7 + 0.256 \times X8 + \\ & + 0.276 \times X9 + 0.135 \times X10 + 0.272 \times X11 + \\ & + 0.028 \times X12 + 0.172 \times X13 + 0.124 \times X14 - \\ & - 0.006 \times X15 - 0.089 \times X16 + 0.068 \times X17 - \\ & - 0.086 \times X18 + 0.059 \times X19 + 0.205 \times X20 - \\ & - 0.076 \times X21 - 0.150 \times X22 - 0.040 \times X23 - \\ & - 0.135 \times X24 - 0.054 \times X25 - 0.133 \times X26 + \\ & + 0.044 \times X28 - 0.061 \times X28 \end{aligned}$$

7. Discriminant analysis

Discriminant analysis (DA) is a multivariate data

Table 4. Total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.97	28.45	28.45	7.97	28.45	28.45
2	2.78	9.93	38.38	2.78	9.93	38.38
3	2.16	7.72	46.11	2.16	7.72	46.11
4	1.99	7.12	53.23	53.23	7.12	53.23
5	1.53	5.46	58.68	1.53	5.46	58.68
6	1.35	4.80	63.49	1.35	4.80	63.49
7	1.19	4.24	67.73	1.19	4.24	67.73
8	1.06	3.77	71.50	1.06	3.77	71.50
9	0.99	3.54	75.04			
10	0.96	3.42	78.46			
...	...	...	...			

analysis method which is used to classify cases into the values of a categorical dependent. If discriminant function analysis is effective for a set of data, the classification table of correct and incorrect estimates will yield a good percentage correct.

Table 5. Component structure

Component	Loading
Component 1 - Dedication	
Creativity of partnering team	0.752
Acting consistent with objectives	0.734
Flexibility to change	0.732
Commitment to continuous improvement	0.673
Total cost perspective	0.576
Dedicated team	0.556
Early implementation of the partnering process	0.507
Component 2 - Readiness	
Company's wide acceptance about the partnering	0.847
Technical expertise	0.699
Good cultural fit	0.618
Effective communication	0.544
Mutual trust between parties	0.528
Component 3 - Coordination	
Effective coordination	0.715
Educated and trained personnel for partnering	0.637
Questioning attitude about assumptions	0.637
Component 4 - Teamwork	
Joint problem solving	0.814
Partnering experience	0.735
Mutual trust between parties	0.524
Component 5 - Sufficiency	
Adequate resources	0.753
Effective conflict resolution process	0.75
Component 6 - Leading	
Financial security	0.658
Commitment from top management	0.65
Equity	0.581
Long-term commitment	0.51
Component 7 - Balance	
Adequate partnering team building	0.806
Commitment to quality	0.645
Empowerment of stakeholders	0.574
Component 8 - Clearness	
Clear understanding about scope and objectives	0.844

Validation is a very important step in the application of discriminant technique. Built model should be tested with cases that are independent of the cases used in the development of the model. The data set was randomly divided into two sets: building and testing sets, which corresponding to the ratio of 90/10 (71 responses used for building and 8 used for testing).

7.1 Model development

Box's M test tests the null hypothesis of equal population covariance matrices. The result from SPSS shows that this test is significant at 0.05. The null hypothesis is rejected or the assumption of equality of covariance matrices cannot be obtained. But the group log determinants, also produced by SPSS, are not very dissimilar, and then a significant Box's M is usually ignored (NCSU). Or the effect of inequality of covariance matrices can be ignored.

Table 6. Results of variable selection

Step	Variable	Wilks' Lambda	F value	
			Statistic	Sig
1	Component 1	0.324	27.079	0.000
2	Component 7	0.189	16.674	0.000
3	Component 5	0.153	11.322	0.000
4	Component 4	0.127	8.916	0.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

The stepwise discriminant analysis select variables entered into the discriminant model based on the power to effectively discriminating the categorical groups (Kim

et al, 2008). The Wilks' lambda is employed to do this work. Table 6 presents the results of variable selection after stepwise procedure conducted. There are four components, namely component 1, component 4, component 5, and component 7, emerged as significant variables in the model at 0.05.

Because there are six levels (categories) in this study, the number of discriminant functions is not larger than six. SPSS output shows that there are four discriminant functions can be extracted in the research. Table 7 presents the eigenvalues and the percent of variance explained by these functions. The first function, the most important, can explain 76.9% of variance of research problem. The fourth function accounts for only 0.35% of variance. Wilks' lambda is employed to test the significance of eigenvalues explained by each function. With the large amount of accounted variance, the first three functions' tests are significant at 0.05. The contribution of the fourth function to discriminating is limited so the test of this function is not significant. The canonical correlation is a measure of the association between the groups formed by the dependent and the given discriminant function (NCSU). When canonical correlation is zero, there is no relation between the groups and the function. When the canonical correlation is large, there is a high correlation between the discriminant functions and the groups. Note that canonical correlation is used to tell how much each function is useful in determining group differences. A value of 1.0 indicates that all of the variability in the discriminant scores can be accounted for by that dimension. Table 7 also denotes the canonical correlation coefficients of the functions. From the results, the first function (0.861) possesses the most discriminating power. The next two are the second (0.597) and the third (0.477) functions.

The coefficients of canonical discriminant functions are produced by SPSS. Deploying these coefficients in the form of equation, the four formulas are obtained as in equations from 2 to 5.

Table 7. Summary of canonical discriminant functions

Discriminant Function	Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	2.866	76.905	76.9	0.861
2	0.552	14.82	91.7	0.597
3	0.295	7.919	99.6	0.477
4	0.013	0.356	100.0	0.114

First 4 canonical discriminant functions were used in the analysis.

$$Function\ 1 = -0.040 + 1.746 \times Component\ 1 + 0.087 \times Component\ 4 + 0.471 \times Component\ 5 + 0.500 \times Component\ 7 \quad (2)$$

$$Function\ 2 = 0.023 - 0.255 \times Component\ 1 - 0.166 \times Component\ 4 - 0.107 \times Component\ 5 + 1.140 \times Component\ 7 \quad (3)$$

$$Function\ 3 = -0.006 - 0.292 \times Component\ 1 + 0.838 \times Component\ 4 + 0.760 \times Component\ 5 + 0.002 \times Component\ 7 \quad (4)$$

$$Function\ 4 = -0.008 + 1.170 \times Component\ 1 + 0.566 \times Component\ 4 - 0.760 \times Component\ 5 + 0.107 \times Component\ 7 \quad (5)$$

Table 8. Classification table

Observed level	Predicted level						Percent correct
	5	6	7	8	9	10	
5	7	1	0	0	0	0	87.00
6	2	4	2	0	0	0	50.00
7	0	2	9	5	0	0	56.25
8	0	0	1	9	3	0	69.23
9	0	0	0	3	9	4	56.25
10	0	0	0	0	2	8	80.00
Overall percentage							64.79

The performance (model fit) is assessed using classification table presented in Table 8. The overall correct rate of the model was 64.79%. The lowest prediction rate was at level 6 with the correct percent of 50. And next, levels 7 and 9 stood at the third position with 56.25% correct prediction. The correct percent of level 8 was 69.23%. The highest correct percent belonged to level 5 and the second was level 10. It is possibly explained that it was not really hard for a participant to rate level 5 and 10 because these values represent the

poor and absolutely excellent performance outcomes, respectively. It was more difficult to rate the intermediate values from 6 to 8. Focusing on the distribution of the predicted values against a certain observed value, the predicted level outputs were distributed around the correct level with the deviation of ±1 level. This is possibly resulted from the difficulty in deciding a specific score for a subjective performance level. For a general purpose, it can be concluded that the final model obtains an acceptable fit with data.

The discriminant model needs to be validated using the cases out of cases used to build the model. The purpose is to test the generalization of the discriminant model. The next section is for model testing.

7.2 Model testing

This section presents the testing procedure of discriminant model which employed the testing set. The probability of being at a certain success level are computed and tabulated in Table 9. The calculation procedure is done under the assistance of SPSS software. For example, with testing case 1, the highest probability is at level 8 (0.544) and the second highest is at level 9 (0.282). The difference between two probability values is large. With the testing case 2, the deviation between two highest probability values is small (0.397/level 8 against 0.344/level

Using maximum probability as the cut-off criteria as well, the testing cases are classified into success level groups. Table 10 denotes the classification results. There are three cases are classified correctly whereas five cases are wrongly done. It results in the low hit ratio value of 37.5%. Through testing the models with testing set, a conclusion can be obtained that the classification performance discriminant model considered as reasonable. The misclassification, however, is not serious because the deviation is only 1 level. This possibly results from the difficulty in deciding a specific score for a subjective performance level.

Table 9. Probability of level occurrence

Testing case	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10
1	0.000	0.002	0.091	**0.544**	0.282	0.081
2	0.000	0.001	0.021	**0.397**	0.344	0.237
3	**0.695**	0.305	0.000	0.000	0.000	0.000
4	0.003	0.006	0.055	**0.413**	0.253	0.270
5	0.100	**0.733**	0.147	0.018	0.001	0.000
6	0.000	0.001	0.132	**0.512**	0.259	0.095
7	0.014	0.081	0.245	**0.468**	0.137	0.055
8	0.000	0.001	**0.992**	0.003	0.000	0.004

Table 10. Category classification

Predicted level	Success level		Correct ?
	Observed	Predicted	
1	8	8	Yes
2	9	8	No
3	6	5	No
4	7	8	No
5	7	6	No
6	8	8	Yes
7	7	8	No
8	7	7	Yes
Percent correct			3/8 = 37.5%
Note: highest probability is the cut-off criteria			

8. Summary and conclusion

A questionnaire survey was employed to collect information on partnering in construction in Vietnam. By means of factor analysis, eight components were extracted out of twenty eight variables. The eight extracted component were named as dedication, readiness, coordination, teamwork, sufficiency, leading, balance, and clearness, respectively.

Component scores achieved from the factor analysis were then used in a further analysis. Discriminant analysis successfully grouped levels of partnering success, based on the extracted eight component scores. Dedication, teamwork, sufficiency, and balance are the four significant components in discriminant model. Dedication is vital for construction partnering performance in the Vietnamese context. Dedication in Vietnamese context comprises various essential factors such as creativity, cultural fit, flexibility, commitment. These factors are clearly important for the new and less experienced participants with partnering concept who achieving low success level and hoping for improvement.

Teamwork and sufficiency have significant impacts on the effort to improve the partnership. Problems should be solved using the joint effort. Mutual trust, mutual vision must be obtained between partners. Partnering experience should be dignified when selecting partner. Resources must be adequately supplied. And it is necessary to establish a process, which mostly focus on early conflict identification, to solve effectively any conflict arising. It should be paid more attention to the balance in a partnership to achieve better performance. The balance component relates to the team building and the empowerment in the partnership. It can be sure that, in the current Vietnamese conditions, it is necessary to focus on these two problems of balance in a partnership.

Discriminant analysis also provided a procedure to predict the success level of a certain partnership, if its scores of success factors could be obtained. By means of discriminant analysis, component scores could be integrated to grade the level of partnering success of a certain partnership. Using the model proposed in the study, the practitioners can make decision about which success level their partnership could be obtained. The participants can also evaluate the impact of each factor on the probability of success level; and so they could decide to put more attention to or greater effort on managing significant factors in order to increase the chance of achieving better outcome.

This study is a contribution to assist construction companies or organizations either currently involved in practicing construction in the Vietnamese market or intended for taking part in this market in the future aiming to apply the partnering concept. It also contributes to the general knowledge about the application of the partnering arrangement in the world.

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