

## **PERFORMANCE OF INTERNATIONAL CONSTRUCTION JOINT VENTURES: AN EMPIRICAL ANALYSIS**

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### **ABSTRACT**

The increasing magnitudes, complexities and risks associated with major construction projects have brought together organisations with diverse strengths and weaknesses to form joint ventures to collectively bid for, and execute projects. Published works have focussed primarily on risk and/or success factors without relating these factors directly to the performance of international joint ventures. Moreover, those factors were grouped and ranked without examining their inter-dependence. One implication of this practice is that the role played by such factors is usually examined in isolation giving rise to inaccurate assessment or conclusion. This paper attempts to fill the noted gap by building upon the literature, empirically examining the relationships between reported risk and success factors, and relating these relationships to the performance of joint ventures.

### **KEYWORDS**

Joint Ventures, Risk, Performance, Host Government, Partner Selection

### **1. INTRODUCTION**

Joint Ventures (JVs) occur when two or more legally separate bodies form a jointly owned entity in which they invest and engage in various decision-making activities (Geringer 1991). The increasing magnitudes, complexities and risks associated with major construction projects have brought together organizations with diverse strengths and weaknesses – to form JVs to collectively bid for, and execute projects (Kumaraswamy et al 2000). A JV may be termed *International* where at least one of the parties (or parents) is based outside the country where the venture is taking place (Geringer and Hebert 1989).

Construction organizations have extensively used international JVs as a vehicle to enter new construction markets around the world. The number of international construction joint ventures (ICJVs) is growing worldwide at an increasing pace, especially in developing countries (Lim and Liu 2001). The majority of these works have focussed primarily on risk and/or success factors without relating these factors directly to the performance of ICJVs. Moreover, those factors were grouped and ranked without examining their inter-dependence.

This paper attempts to fill the noted gap by building upon the ICJVs literature, empirically examining the relationships between reported risk and success factors, and relating these relationships to the performance of ICJVs. Three key processes, in the life of an ICJV, are considered in the present study: 1) partner selection; 2) ICJV formation; and 3) ICJV operation.

## 2. RESEARCH MODEL

The developed research model proposes that the process of venture formation is dependent upon selecting the *right* partner represented by a set of partner- and task-related selection criteria. The model assumes that the process of venture operation is influenced by the outcome of the formation process (i.e. agreement), and has direct impact on its performance which, in turn, is directly effected by a set of project- and host government-related risk factors. It was also assumed that those factors (represented by two independent constructs) have direct relationships with the formation and operation processes. Figure 1 illustrates the hypothesized relationships among the underlying constructs selected for this study representing partner- and task-related selection criteria, project- and host government-related risk factors, and the ICJV's formation, operation and performance.

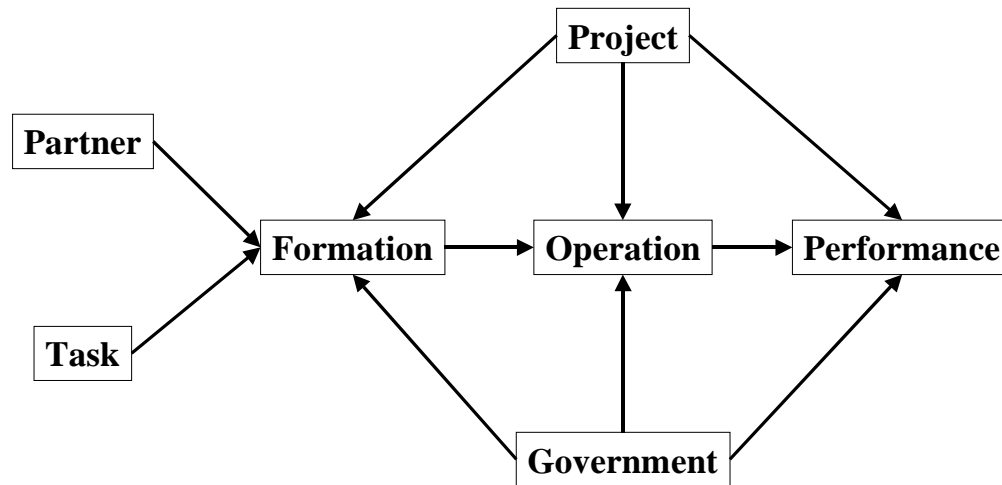


Figure 1. Research Model

### 2.1 Partner Selection and Task Constructs

The partner selection process, adopted by the organization, often provides clues to the potential direction the ICJV will take after formation (Sridharan 1997). Anecdotal evidence suggests that selecting the *suitable* partner is vital for the success or failure of a JV in reaching its objectives (Devlin and Bleakley 1988). Killing (1983) states that it is impossible to identify an exhaustive list of criteria which an organization should meet when attempting to assess a potential *complementary* partner. Nonetheless, selecting a partner that is credit-worthy and financially strong, and that has a strong connection with the host government are considered to be an effective measure to mitigate risks in operating an ICJV in Asian countries (Bing and Tiong 1999).

This paper adopts the simple twofold typology of partner selection criteria, developed by Geringer (1991), to provide a better understanding of the partner selection process and how organizations proceed in selecting partners. Geringer (1991) distinguished between partner-related and task-related dimensions of selection criteria. Partner-related factors are concerned with variables which are specific to the character, culture and history of the involved partners. Task-related factors, on the other hand, apply to the operational skills and resources needed by a JV to achieve project success.

### 2.2 Formation Construct

The groups involved in the process of ICJV formation often have divergent objectives (Sridharan 1997). These objectives need to be addressed during the formation of the conditions of the ICJV agreement. During the formation stage, potential partners spend considerable time to identify their common compatible interests in the task-related areas. A number of critical factors have the potential to enhance or impede this process and thus increase or decrease the likelihood of achieving a formal joint venture agreement. The *Formation* construct was developed using Kwok et al's (2000) study which identified a number of these critical factors including: negotiation, profit and loss distribution, clarity of contribution among partners, control and decision making policy, clarity of sharing of risks and liabilities, composition of decision-making body and dispute resolution procedures.

## 2.3 Government Construct

All international businesses are exposed to host government-related risks to a certain extent. Ostler (1998) identifies major host government-related risks encountered by construction organizations operating in the international arena. According to recent surveys conducted in the UK and Australia, political and economic stability of the host country is a very important condition for working in overseas construction projects (Crosthwaite 1998; El-Higzi 2000). The *Government* construct refers to the degree of threat to the JV posed by host government-related risks. These include political, economic, structural, policy, environmental, market and production factors.

## 2.4 Operation Construct

The partner selection and venture formation processes set the basis of the relationship between the partners during the operation of the ICJV (Gjerde 1995). The smooth operation of the ICJV, after the initial honeymoon period, is mainly dependent upon the interaction between the partners in making strategic and operational decisions (Sridharan 1997). Several studies have shown that successful collaborative win-win relationships rely heavily on relational forms of exchange characterised by high level of trust and commitment. Should any of these essential ingredients be lacking, the JV is likely to weaken and eventually fail.

## 2.5 Project Construct

ICJVs are essentially formed to execute project-based activities in a different business environment which could influence the ICJV's performance. Therefore, this construct covers project-related risk factors which are frequently reported in the literature as significant (Bing et al 1999). These include partner's cash flow problems, poor project participants' relationships, incompetent subcontractors and/or suppliers, disagreement on contract conditions, inability to understand the local business environment, culture and tradition, and employing local staff with no or little international experience.

## 3. RESEARCH SURVEY

A questionnaire survey targeting Australian and British contracting organizations that have had prior ICJV experience was conducted. Each selected organization was mailed an introductory letter, a survey questionnaire, and a postage-paid reply envelope. The introductory letter explained the purpose of the research, assured the anonymity of their replies. Of 180 surveys sent, 48 were filled out and returned. Of those, 44 were sufficiently complete to be included in the analysis, producing a usable response rate of about 25%. Of those used in the analysis, there were 28 responses from Australia. The survey questionnaire comprised two basic sections: 1) general information about the organization and its ICJV experience, and 2) items selected mainly from the literature, reviewed above, to measure each of the research model's constructs; i.e. *Partner; Task; Project; Government; Formation, Operation and Performance*, as shown in Table 1.

Questions were *ex post* measures of respondents' perceptions of the relative values of items at the time the local partner was being selected and during the formation and operation of the ICJV. To operationalize the research model, responses scored on a five-point Likert scale ranging from 1 (not important) to 5 (very important). Each item was used as a separate indicator to avoid relying on a single indicator for any particular construct. For each construct, the obtained Chronbach's alpha ( $\alpha$ ), as a measure of internal scale consistency, was greater than the minimum desired value of 0.70 recommended by Litwin (1995).

Notwithstanding the motives behind their formation, the ICJV's performance can be reasonably judged by the foreign organization in terms of meeting or exceeding the strategic and financial objectives of forming and operating the ICJV. Therefore, the dependent construct representing performance is measured by three items namely; *Value* (reflecting the overall business benefit derived), 2) *Profit* (reflecting project-based tangible gains) and 3) *Satisfaction* (reflecting the organization's willingness, given the opportunity, to have a continued relationship with the local partner beyond the project under investigation). Respondents indicated to what extent they agreed that each of the above three items was achieved. Responses range from 1 (strongly disagree) to 5 (strongly agree). Similar to the way in which other constructs were handled, those three items served as unique indicators for this construct. Chronbach's alpha ( $\alpha$ ) for the three-item scale was 0.72.

**Table 1: Questionnaire Items**

PARTNER	TASK	FORMATION	GOVERNMENT	OPERATION	PROJECT
Managerial competence	Technical competence	Negotiation process	Changes in policies	Mutual trust	Cash flow problems
Local standing (credibility)	Market contacts and knowledge	Risk and liability sharing	Inconsistency in laws/regulations	Partner's commitment	Contract conditions
Business compatibility	Financial status	Control and decision making policy	Fluctuations in exchange rate and inflation	Cultural diversity	Poor working relationships
Past association	Complementary resources	Profit or loss distribution	Bureaucracy	Conflict resolution procedure	Incompetent suppliers or subcontractors
Prior ICJV experience	Ability to negotiate with local authorities	Clarity of roles and contributions	Corruption and bribery	Management styles	Local business environment
				Communication and information exchange	Local staff with international experience

#### 4. MODEL ASSESSMENT

As the developed constructs may be directly or indirectly influencing the ICJV's performance, a structural equation modeling (SEM) technique was utilized. Modeling with SEM requires a theoretical model, as that shown in Figure 1, as a starting point in the process. The EQS 5.1 program (Bentler 1995) was used in this study. The EQS model is a combination of a factor model (measurement model) and a path model (structural equation model). The former represents the relation between indicators and constructs, and enables us to evaluate whether the constructs are measured with satisfactory accuracy, whereas the latter represents the relation between constructs and is used to test and analyse the hypothesized relationships. A critical issue in relation to any structural equation model is the assessment of the overall model fit. The most widely used index for the assessment of a specified model is the chi-square ( $\chi^2$ ) statistic. Given the relatively small sample size ( $n = 44$ ), and to avoid problems associated with dependence on the sample size, a variety of indices such as the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) have been included in the evaluation of the model. A value of 0.90 for CFI has been proposed as a minimum for model acceptance (Bentler and Bonnet 1980), whereas a value of up to 0.05 for RMSEA would indicate a good model fit with a very small error of approximation (Bollen and Long 1993).

##### 4.1 Factor Model Results

To determine whether it was appropriate to combine data from the two countries, or whether they should be treated separately, a two-group Confirmatory Factor Analysis (CFA) (Bollen 1989) was used. A model where all factor loadings were constrained to be equal was compared to a model where factor loadings were free to vary across the two countries. An insignificant chi-square ( $\chi^2$ ) difference indicated that the measures were interpreted similarly across the two countries justifying combining data from Australia and the UK for further analysis. Following determination of construct equivalence across the two countries, the dimensionality of the constructs in the research model was assessed. The research model was then tested for the overall sample to provide better estimates of factor loadings which, in turn, became reliability estimates of the observed constructs and provided a further indication of factors' internal consistency (Bollen 1989). A factor (measurement) showed a good model fit ( $\chi^2 = 194.16$ ,  $p < 0.01$ , CFI = 0.92, RMSEA = 0.052) and accordingly was used as the baseline model for this study.

Figure 2 highlights the factor loadings of the indicators associated with each of the constructs included in the baseline model. All factor loadings were statistically significant ( $p < 0.01$ ), averaging 0.76, indicating satisfactory reliabilities of the items.

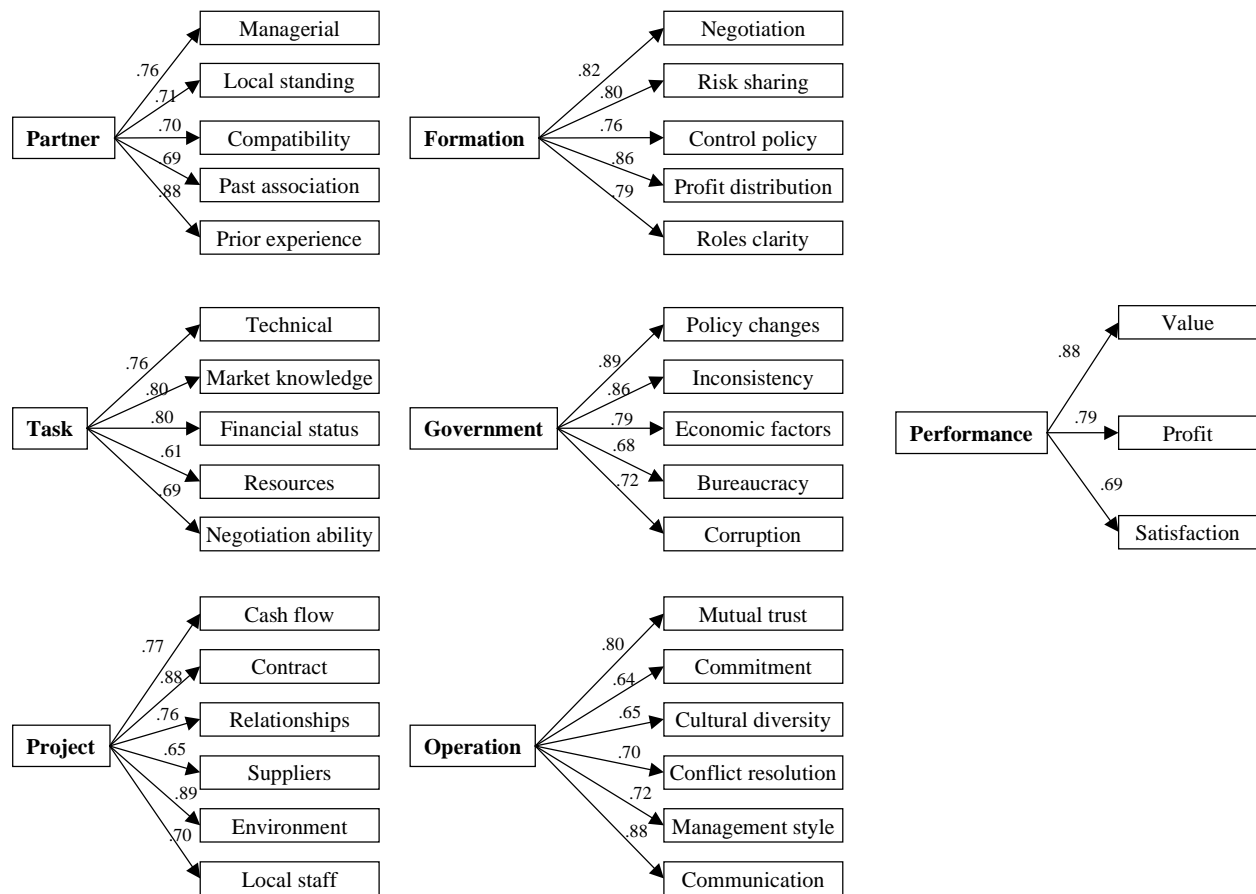
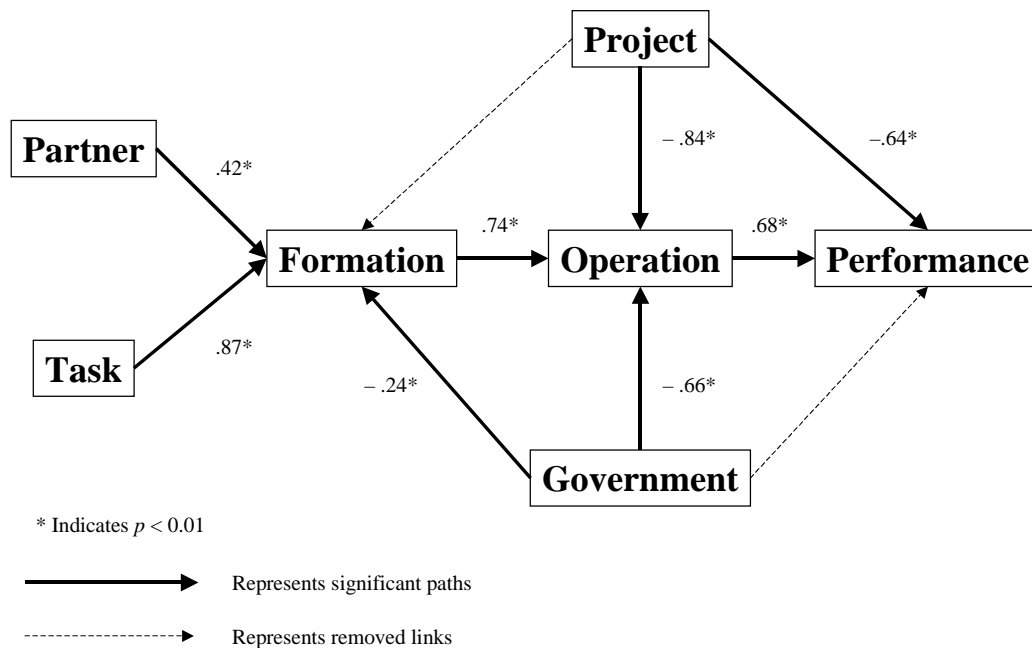


Figure 2: Factor Loadings of the Indicators

#### 4.2 Path Model Results

This section presents testing and analysing the hypothesized relationships in the baseline model depicted in Figure 1. In this model, the *Performance* construct is assumed to be directly as well as indirectly influenced by a number of constructs representing partner selection, venture formation and operation, project- and government-related risk factors. The model was tested using covariance structure analysis (CVA) procedures in Bentler's (1995) EQS program. Model paths were evaluated for significance and model fit, was assessed by two fit indices: CFI and RMSEA. The standardized path coefficients estimated may be interpreted as partial correlation coefficients as noted in Duncan (1975). The majority of structural parameter estimates were significant ( $p < 0.01$ ). No significant relationships, however, could be found between the *Project* and *Formation* constructs, and the *Government* and *Performance* constructs, indicating the absence of direct effects.

Because the directional arrows in the model were arbitrarily chosen, and as correlation does not always indicate cause, the path analysis was taken a step further. Several alternative models were tested where links between constructs were added, removed or altered. This exercise was conducted to introduce and/or to drop direct effects between the different constructs. Each model was tested using CVA and its fit was assessed in an attempt to obtain a best-fitting model which can be considered a best representation of the data. Competing models were compared based on the chi-square ( $\chi^2$ ) difference, CFI and RMSEA values. This process continued until no more improvement to the overall fit could be obtained (added or removed paths could not explain more variance in the model). Figure 3 illustrates the selected *best* model ( $\chi^2 = 178.68$ ,  $p < 0.01$ , CFI = 0.95, RMSEA = 0.05) and its standardized path coefficients. All path coefficients were significant and in the predicted directions implying that the path (structural) model adequately accounts for the relationships between constructs. As can be seen in Figure 3, the only change noted from the baseline model, depicted in Figure 1, is the removal of presumed direct influences of *Project* and *Government* constructs on the *Formation* and *Performance* constructs, respectively. Needless to say, this change does not eliminate the possibility of having influences of an indirect nature.



**Figure 3: Factor Loadings**

Path coefficients reveal that the *Formation* construct is influenced moderately and positively by the *Partner* construct (0.42); strongly and positively the *Task* construct (0.87). This result demonstrates that suitable partner attributes have positive impact on the formation process which, in turn, could increase the likelihood of successful venture operation (0.74). The results also suggest, not surprisingly, that successful venture operation is positively related to perceived venture performance (0.68). Unfavorable project operating environment is related strongly and negatively to the success level of operation (-0.84) and performance (-0.64). Finally, the presence of unfavorable government-related risk factors has weak negative impact on the *Formation* construct (-0.24), but has a significant negative effect on the *Operation* construct (-0.66).

## 5. DISCUSSION OF RESULTS

The broad hypothesis that partner selection would influence the venture formation process which, in turn, would influence its operation and performance, was supported by the data. In addition to this sequential effect, the results provide evidence that project-related risk factors have impact on both the operation and performance of the venture. Also, venture formation and government-related risk factors seem to have indirect effects on performance through the operation process. To illustrate, an indirect effect could be provided by introducing detrimental changes in government policies being related to a less certain operating environment which, in turn, hinders performance. At least for organizations included in this study, there is no direct relationship between government-related risk factors and venture performance.

Model-testing results confirm the hypothesized relationships between partner attributes and venture formation. Links between partner attributes and formation constructs are positive implying that an organization's choice of a suitable complementary partner would influence the venture formation. Interestingly, task-related selection criteria seem to have a stronger influence. This finding is consistent, to some extent, with the argument made by Glaister and Buckley (1997) on the difference between the two sets of selection criteria. Partner-related selection criteria tend to be more general in nature, implying that the characteristics of a suitable partner will be more universal and will be related much less with the specific activities of the JV than will task-related selection criteria. The empirical results proved that venture formation is strongly and positively related to its operation. This suggests as other studies have revealed, both constructs are inextricably linked together (Sridharan 1997). Therefore, it can be argued that joint development of a strategic agreement between the partners would lead to greater congruency about their roles, responsibilities and liabilities, thus creating and fostering a more productive operating environment.

The level of the essential attributes (trust, commitment, etc.) used in this study to measure the *Operation* construct, is strongly linked to venture performance, as perceived by the respondents. This also suggests that openness and similarity in management styles contribute positively to venture performance. This is in line with the literature which suggests that certain relationships tend to hold among venture operation and performance. For example, in a longitudinal study of IJVs, Hyder and Ghauri (1993) found that inter-partner conflicts or co-operation might affect the performance of ventures. They also found that inter-partner relations (trust, co-operation, etc.) play an important role in the existence/non-existence of inter-partner conflicts and therefore influence perception of performance. According to Mohr and Spekman (1994), the impact of conflict resolution on the relationship between JV partners can be either productive or destructive. Given that the quality of inter-partner relations and harmony can influence performance, foreign organizations and local partners should endeavor to create mechanisms which can resolve conflicts as they emerge.

As mentioned earlier, the *Government* construct refers to the degree of risk/threat to the venture posed by a number of host government-related risk factors (changes in policies, inconsistency in laws, etc.). These factors, alone or in combination, have the potential to intensify and even complicate challenges to the venture. The relationship between the *Government* and *Formation* constructs is found to be considerably weaker than between the *Government* and *Operation* constructs. It thus appears that respondents do not directly associate potential threats caused by this type of risk factors with the formation process, but rather with the operation process. Equally importantly, the *Government* construct seems to have no direct significant relationship with venture performance. While this particular finding may be surprising, the *Government* construct was found to have an indirect effect on venture performance by introducing the element of uncertainty in the operation process.

Finally, as expected, results have also shown that project-related risks have strong and negative dual 'direct and indirect' effects on venture performance. The essential underlying explanation is that the more project-related risks the venture has to deal with, the less certain the operating environment becomes, and the worse it will perform. The lack of direct significant relationship between the *Project* and *Formation* constructs reflects the fact that project-related risk factors might be of secondary importance for organizations during this preliminary stage of the venture's life. Also, it can be argued that certain specifics (e.g. partner's cash flow problems), which might be unknown to the foreign organization during the venture formation stage, usually surface during the operation stage.

## 6. CONCLUSION

A structural model was formulated and tested on data collected from Australian and British contracting organizations that had formed and operated ICJVs. The empirical analysis demonstrates a sequential effect from partner selection through venture formation and operation to performance. As hypothesized, the venture formation process is influenced positively by the partner- and task-related selection criteria. The results show that partner selection would influence the formation process which, in turn, would influence its operation and performance. Consistent with earlier findings (Sridharan 1997), the results also suggest that successful venture operation is positively related to perceived venture performance. The strong impact of project-related risks on the operation and performance constructs reinforces the importance that must be assigned by organizations to the development and adoption of risk management strategies, via which risk sources and factors are identified, evaluated and addressed in a proactive manner (Mohamed 2000). While affecting venture formation directly, host government-related risks affect performance indirectly, through its effect on the operation process. Contrary to what was hypothesized, risks associated with host government appear to have no significant direct relationship with venture performance.

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