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Welcome message from the Symposium Chair

It is with great pleasure that we extend our warmest welcome to the delegates of Macao International Symposium on Accounting and Finance 2011. It is the first time for us to organize such a symposium. We have received a total of 105 papers: 66 papers were accepted, and 47 made it into the final program. On behalf of the symposium organizing committee and Macao Accounting and Finance Association, I would like to thank you whole-heartedly for supporting this symposium.

I would also like to thank our keynote speakers, Professor Yushi Li, the Vice President and a Senior Research Fellow of Chinese Academy of International Trade and Economic Cooperation (CAITEC), and Professor Xueqin Liu, the Director of Department of China's Foreign Trade Studies and a Research Fellow of CAITEC for gracing the occasion with their presence and insightful keynote addresses (in Chinese). The program chairs, Professors William Cheung of University of Macau, Chengkun Liu of Macao University of Science and Technology, together with the paper reviewers worked extremely hard to ensure that we have a high quality program. The symposium owes its success to their collective efforts and ideas.

Without the generous support of our sponsors, this symposium would not have been possible. We gratefully acknowledge the contributions of Macao Foundation, Macao Polytechnic Institute and Macao Government Tourist Office. Macao Foundation awards the three best papers and covers a fraction of the general operation expenditure. Macao Polytechnic Institute provides the venue for the symposium, and Macao Government Tourist Office sponsors the conference dinner.

Macao Accounting and Finance Association is a small fledgling association, and it has no former experience in organizing an international symposium of this kind. In addition, the very low unemployment rate (less than 3%) in Macao puts extra pressure on us. No full-time staff was involved in running it. Thus, I apologize for any imperfection on our part in organizing this symposium. To help us improve, please send your comments and suggestions to macaofafa@gmail.com.

I invite you to participate actively in the symposium and to explore the sights and leisure activities that only Macao can provide. It is our hope that this symposium will facilitate networking and foster new ideas. Have a great symposium!

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Management control and performance of international alliances

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Management control and performance of international alliances

Abstract

Changes in the complexity of relationships between international alliances and their environments have led to an increase in control problems, and some authors have called for more research effort to be invested in investigating a suitable framework for control in international alliances. This paper takes in the emerging concept of self-organizing systems into research on control systems in international joint ventures (IJVs), and analyzes the relationships among variables within the complexity-control-outcomes framework. Structural equation modeling is used to explore new insights into the roles of management control systems in affecting IJVs' performance of Australian IJVs in Indonesia, from the perspective of alliance complexity constraints.

Keywords: *Management control, performance, international joint venture*

Management control and performance of international alliances

1. Introduction

Interfirm alliances are facts in today's business. Organizations set up alliances, whether they are from different market niches, different types of industry, different ends of supply chains, or different parts of the world with a common purpose of promoting synergies and achieving corporate reorganization. One prominent form of interfirm alliances in the current global environment is international joint ventures (IJVs) (Groot and Merchant, 2000; Park, 1996). Within the management accounting literature, quite a number of studies into control in interfirm alliances have emerged in the last decade or so (e.g. Cooper and Slagmulder, 2004; Dekker, 2003, 2004; Håkansson and Lind, 2004; Langfield-Smith and Smith, 2003; Mouritsen and Thrane, 2006; Mouritsen et al., 2001; Seal et al., 2004; Tomkins, 2001; van der Meer-Kooistra and Vosselman, 2000, 2006). However, relatively less studies have explored control issue in the context of IJVs (e.g. Groot and Merchant, 2000; Chalos and O'Connor, 2004; Mjoen and Tallman, 1997).

A review of study on IJVs in general has revealed that managing an IJV is a particularly difficult process (see e.g. Child and Yan, 2003; Lorange and Ross, 1992). IJVs often perform poorly and are comparatively unstable (see e.g. Child and Yan, 2003; Devlin and Bleackley, 1988; Harrigan, 1988a, 1988b; Inkpen and Beamish, 1997). While management control has been regarded as one of the critical features for successful management and performance of IJVs (see e.g. Child and Faulkner, 1998; Geringer and Hebert, 1989; Glaister, 1995), the complexity of relationships between organizations and their environments have led to a need for more comprehensive views on IJV control research (see Chalos and O'Connor, 2004; Chenhall, 2003; Child and Yan, 1999; Groot and Merchant, 2000; Langfield-Smith, 1997; Makhija and Ganesh, 1997; Mjoen and Tallman, 1997; Otley, 1994, 2003; Otley et al., 1995; Spekle, 2001; Yan, 1998).

Research in management control systems has been dominated by contingency-based approach, and this approach has maintained its popularity in recent years (Chenhall, 2003). Groot and Merchant (2000) expected more contingency-based research in the area of IJV control systems, and Chenhall (2003) suggested that insights from a variety of perspectives should be encompassed into contingency-based studies to better understand control systems within its organizational context.

Lorange and Probst (1987), some time ago, raised an alternate view on IJVs. They took on the concept of self-organizing systems into JV design and implementation, and proposed that in order to cope with evolutionary pressures and be successful a JV must possess self-organizing properties, which include control (self-reference), complexity, autonomy, and redundancy. While it may have seemed an unconventional approach at the time when Lorange and Probst's article was published, it was an interesting idea as interest in the concept of self-organizing systems in organizational studies has grown vastly (see e.g. Lewin, 1999). Taking this on board, this study focuses on the integration of management control perspective and self-organizing properties of IJVs. The main purpose of this study is to investigate the roles of management control systems in affecting IJVs' performance, from the perspective of alliance complexity constraints.

The remainder of this paper is organized as follows. Section 2 provides a review of the relevant literature on IJVs' control systems, complexity, autonomy, redundancy, and performance. Subsequently, the relationships among these variables are synthesized and hypothesized. Section 3 explains the model specification and the research methods. In this section, a model of management control in IJVs is developed and proposed. The research methods describe the basis for the utilization of structural equation modeling approach, and the measurement and validation of the survey instruments. Section 4 contains the analysis of

the data and the discussion of the findings. The paper ends with conclusions and suggestions for future research.

2. Literature review and hypothesis development

2.1. The nature of IJVs

A JV is a form of partnership that is created to pursue some strategic purposes (Harrigan and Newman, 1990), for the mutual benefits of the parents (Darrough and Stoughton, 1989), although not necessarily for the same reasons for each parent (Llaneza and Garcia-Canal, 1998). An IJV is formed when at least one of the parents has its headquarters outside the JV's country of operation, or if the JV has a significant level of activity in more than one country (Geringer and Hebert, 1989). The parent operating in its own home country is referred to as the local parent, whereas the parent operating outside its country of residence is referred to as the foreign parent.

Varieties of strategic objectives have been suggested to explain firms' motives for the formation of IJVs (see e.g. Contractor and Lorange, 1988; Datta, 1988; Harrigan, 1985, 1988a, 1988b; Hennart, 1991; Kogut, 1988; Oliver 1990). Glaister and Thwaites (1994) summarized several of the most common IJVs strategic motives as entry into new geographical markets, circumvention of trade and foreign investment restrictions, satisfy nationalistic demands, access to resources (e.g. supplier networks, raw materials, distribution channels, local knowledge, labor force, or pooling of risk), gain synergies (e.g. manufacturing, distribution, technology, reduce cost of R and D, production, etc.), secure scale economies, utilize idle resources, and achieve product differentiation.

The resource dependence perspective (Pfeffer and Salancik, 1978) underpins the concept of bargaining power in strategic alliances. Ownership or control of key resources by one party may cause other parties to be dependent on the party who has the control of the key

resources (Hamel, 1991). Other parties' dependencies can be a source of bargaining power for the party controlling key resources. Bargaining power can be used as leverage in negotiating a level of JV control, but in the end a JV can only be formed by mutual agreements (Lecraw, 1984).

According to Yan (1998), the literature on IJVs has provided useful insights about conditions leading to the formation of IJVs, but it has not significantly unfolded the development of IJVs after their inception and the relationship process between the parents, and hence more IJV control research is needed.

2.2. Management control in IJVs

Control is widely regarded as a crucial feature for successful management and performance of IJVs (Child and Faulkner, 1998; Geringer and Hebert, 1989; Glaister, 1995; Killing, 1983, Schaan, 1983). While the meaning and interpretation of control have varied (see Flamholtz et al., 1985; Ouchi, 1979), control can be conceptualized as "an evaluation process which is based on the monitoring and evaluation of behavior or of outputs" (Ouchi, 1977, p.95). It creates "conditions that motivate the organization to achieve desirable or predetermined outcomes" (Fisher, 1998, p.51).

Geringer and Hebert (1989) characterized IJVs' control as composed of three dimensions: mechanisms, extent, and focus of control. These dimensions constitute the foundation of effective IJVs' control systems. The mechanisms of control refer to the means by which control is exercised. The extent of control is the degree to which parents exercise control. The focus of control specifies the areas of the IJV's operation in which the parents exercise control. The parent firms must exercise control over an IJV in a way that allows it to implement its strategy without incurring administrative or organizational inefficiencies.

2.2.1. Control mechanisms

The nature of control mechanisms in IJVs in the existing literature varies but it has been predominantly based on its degree of formality. Geringer and Hebert (1989), for example, emphasized the importance of identifying the different types of control mechanisms, the differences in the orientation of control mechanisms, and the operationalization of these various mechanisms. They broke down the control mechanisms into three dimensions: context-oriented (informal and culture-based mechanisms, such as development of teamwork culture), content-oriented (formal mechanisms, such as specification of responsibilities), and process-oriented (planning and decision-making mechanisms, such as participation in planning process).

Child and Faulkner (1998) categorized IJVs' control mechanisms into two forms: formal and informal. Formal control mechanisms deals with such issues as: appointment of key alliance managers, formal contractual agreements, structuring the relationships, or provision of human resource management programs and systems. Informal control mechanisms cover issues such as maintenance of regular personal relations with the JV's senior managers, or personal relations between parents and the JV's functional and technical staff. Thus, in practice, both formal and informal control mechanisms can be applied simultaneously in IJVs. This study adopts these concepts and categorizes the nature of control mechanisms into two forms: (1) formal control mechanisms that are used to prevent the IJVs from implementing certain activities or decisions, and (2) informal control mechanisms that are used to promote certain behaviors.

2.2.2. Control extent

Most studies examining the extent of control exercised over an IJV have a conception of control as being dependent upon the centralization or the locus of the decision-making

process (Geringer and Hebert, 1989). This focal point of decision-making perspective regards control as a continuous variable rather than an absolute variable of either total control or no control. It means that parents can exercise different degrees of control over the JV, tighter or looser control (Merchant, 1985, 1998). The findings shown in the literature have shown that the extent of control exercised by the parents are different and the distribution of each parent's control usually varied across different management areas (see Child et al., 1997; Glaister, 1995; Lecraw, 1984; Yan and Gray, 1994).

According to Child and Faulkner (1998), there are several features of the control extent in IJVs which have practical significance. One is that control applies to a range of activities and decisions. It implies that it is possible for each parent to achieve a comparable level of control over a JV based on different dominance profiles. It also implies that the extent of each parent's control over the JV must be addressed in its own right. Thus, it is not likely that the relationship between parents with respect to control to be either simply zero sum or wholly convergent. In applying tighter or looser control to activities and decisions, it is important to consider the complexity within and surrounding the activities.

2.2.3. Control focus

The conception of *focus* as another dimension of IJVs' control was derived from the notion of "parent firms' parsimonious and contingent usage of resources for controlling IJVs" (Geringer and Hebert, 1989, p.240). Schaan (1983), in his study of ten IJVs, found that some JV parents might choose to focus their control efforts by targeting specific areas of control rather than overall control of the JVs. Other studies that assessed the parent firms' control over a JV have also found that control has a focus dimension (see Child et al., 1997; Geringer, 1988; Glaister, 1995; Yan and Gray, 1994). Child and Faulkner (1998) stated that the focus dimension to control in IJVs implies that parents may consider it effective to

exercise control selectively over those activities and decisions they regard as critical. In this case, the criticality of some activities and decisions is likely to be different between the JVs parents. Thus, control in JVs does not have to be a choice of 'all-or-nothing'. Parents can choose to apply a broader or a narrower focus of control depending on the activities and decisions that they consider critical.

2.3. Self-organizing factors of IJVs

It has been a widely accepted principle from organization theory that any organizations, including IJVs, must have effective strategies and appropriate management processes in order to be successful. However, based on the dynamic view of cooperative venture's development, Lorange and Probst (1987) claimed that the use of strategies and management processes in a JV would not result in success unless the JV possesses self-organizing properties in order to cope with evolutionary pressures. These self-organizing properties are complexity, management control, autonomy, and redundancy.

2.3.1. Complexity of IJVs

Organizational complexity arises when parents interact to make and implement decisions that affect both parent firms (see Killing, 1988). In an interfirm relationship, such as an IJV, two dominant factors of the relationship have been identified: motives and bargaining power (see e.g. Child and Faulkner, 1998; Thorelli, 1986).

Oliver (1990) mentioned that although any single reason may be enough for the development of a relationship, there was a potential of concurrent or multiple reasons of a relationship. The degree of complexity of an IJV will be higher the more reasons its relationship is built upon. The other aspect of motives that affects the complexity of IJVs is the financial motive, as found by Killing (1988) in his study of several IJVs. He argued that

the degree of complexity of an IJV will be higher when the objectives of at least one parent are more focused upon financial returns or profit.

Bargaining power refers to the ability of a parent to affect outcomes of negotiations (Harrigan and Newman, 1990; Makhija and Ganesh, 1997; Salancik and Pfeffer, 1977) or to gain control of the IJV (Blodgett, 1991; Lecraw, 1984; Yan and Gray, 1994). Thus, it is the ability to influence the decision-making process. Killing (1988) argued that the degree of complexity of an alliance will be higher if the parents have equal influence in the decision-making process. In this sense, the degree of complexity of an IJV will be higher if the perceived bargaining powers of the parents are relatively equal.

2.3.2. Management control as a means of IJVs' adaptation

The viability of an IJV depends significantly on its ability to maintain a degree of internal coherence while it adapts to its environment (Varela et al., 1991, quoted in Boisot and Child, 1999, p.237). An IJV has to utilize a control mechanism to monitor the results of its execution strategies and to change its structure to match the challenge of a changing environment (Lorange and Probst, 1987). There are two crucial issues that need to be identified. Firstly, the ways IJVs' complexities influence the management control systems exercised by parents, and secondly, the ways the actions of parents' management control systems affect IJVs' performance.

The behavior of each parent is dictated by variables of alliance complexity that are related specifically to each parent and by variables of alliance complexity that are shared by parents (Stacey, 1996). The key for successful performance relies on the ability of each parent to achieve flexibility by applying appropriate management control. To allow greater adaptation parents have to apply less control (see Brown and Eisenhardt, 1998). Derived from this perspective, it has been suggested that, with respect to control mechanisms, an

organization can turn to more formal control when the degree of complexity is relatively low (see Molleman, 1998) or when the nature of learning is less complex, and vice versa (Makhija and Ganesh, 1997). Accordingly, the following hypotheses are proposed:

H1. Organizational complexity is negatively related to formal control mechanisms.

H2. Organizational complexity is positively related to informal control mechanisms.

With respect to the extent of control, Child and Faulkner (1998) stated that an effort to exert more control than is necessary by one or more parents in a JV will lead to a danger of over-control. This may result in not only additional direct costs, but also may jeopardize the harmonious relations between parents (Schaan, 1983) and may hinder the flexibility of the JV (Bleeke and Ernst, 1993). The findings of Gordon and Narayanan (1984), which focused on perceived environmental uncertainty as one aspect of complexity, suggested that there was a negative relationship between perceived environmental uncertainty and efforts to apply more coordination and control. It seems that tighter control of activities and decisions are likely to be applied when the degree of complexity is relatively low. These issues are reflected in the following hypothesis:

H3. Organizational complexity is negatively related to control extent.

Regarding the focus of control, parents may consider it effective to exercise control selectively over those activities and decisions they regard as critical (see Child and Faulkner, 1998). The purpose for a parent firm in applying control is to ensure that the IJV is managed so that it conforms to its interest (Schaan, 1983). As noted earlier, flexibility is a critical feature for adaptation, and more flexibility is needed when an organization's environment is more complex. Thus, it can be implied that narrower control is preferable when the degree of complexity is relatively high. These issues are reflected in the following hypothesis:

H4. Organizational complexity is negatively related to control focus.

2.3.3. *Autonomy of IJVs*

JV autonomy refers to “the degree of decision making latitude allowed to the JV management by the [parents]” (Hill and Hellriegel, 1994, p.596). Several previous studies of JV autonomy (e.g. Franko, 1971; Harrigan, 1984; Lyles and Reger, 1987) have treated autonomy as an overall factor. According to Hill and Hellriegel (1994), this approach has overlooked the possibility that parents may choose to control some decision areas more closely than others and that the selection of specific areas of control may have differential performance implications. Harrigan (1986) remarked that it is important for a JV to control its autonomy, to avoid blunders in its development. Keidel et al. (1994) conceptualized an organization as a balance of hierarchical control, individual autonomy, and spontaneous cooperation. Hence, autonomy and control are inseparable aspects of management actions (Feldman, 1989). To allow greater adaptation organizations have to apply less control (Brown and Eisenhardt, 1998). Thus, applying more formal, tighter, or broader control systems, presumably will reduce the degree of autonomy able to be exercised by management of an IJV. These issues are reflected in the following hypotheses:

- H5.** Formal control mechanisms are negatively related to the degree of autonomy of IJVs’ management.
- H6.** Informal control mechanisms are positively related to the degree of autonomy of IJVs’ management.
- H7.** Control extent is negatively related to the degree of autonomy of IJVs’ management.
- H8.** Control focus is negatively related to the degree of autonomy of IJVs’ management.

2.3.4. *Redundancy of IJVs*

A self-organizing system always possesses more resources than needed (Richter, 1994). Consequently, an IJV as a self-organizing system should be set up in such ways that

enable it to have alternative ways of performing. Resources, management capacities, and processes should be purposely put into the system, more than they are formally needed (Lorange and Probst, 1987). Lorange and Probst (1987) argued that redundancy adds into the system flexibility to adapt and to evolve. This argument about redundancy is based on the perspective of organizational slack in resource-based theory that views slack resources as reflections of management's efforts to buffer an organization from uncertain environmental events (Nicholson, 1997; Pfeffer and Salancik, 1978). The function of management control systems is to maintain optimal redundancy within the organization. IJVs as self-organizing systems have to apply less control to allow greater adaptation (Brown and Eisenhardt, 1998). Therefore, applying more formal, tighter, or broader control systems, presumably will reduce the level of redundancy available to the management of an IJV. These issues are reflected in the following hypotheses:

- H9.** Formal control mechanisms are negatively related to the level of redundancy available to IJVs' management.
- H10.** Informal control mechanisms are positively related to the level of redundancy available to IJVs' management.
- H11.** Control extent is negatively related to the level of redundancy available to IJVs' management.
- H12.** Control focus is negatively related to the level of redundancy available to IJVs' management.

2.4. Self organizing properties and performance of IJVs

Performance of an IJV is conceptualized as the effectiveness of the JV in meeting the goals of the parents (Hill and Hellriegel, 1994). Performance can be evaluated in many ways. Many previous studies have examined the performance of JVs using a variety of financial

measures typically used in business research, such as profitability, growth, or costs (Lecraw, 1983, Luo, 1995; Luo and Chen, 1995; Woodcock et al., 1994). The argument for the use of these objective measures as criteria of performance is based on the notion that JVs are established as separate legal entities, which are expected to survive the same as unitary firms (see Anderson, 1990). Other studies have examined JVs' performance using perceptual measures of the achievement of parents' goals (Beamish, 1984; Geringer and Frayne, 1993; Geringer and Hebert 1989, 1991; Harrigan, 1988a, 1988b; Hill and Hellriegel, 1994; Killing, 1982; Mjoen and Tallman, 1997; Yan and Gray, 1994). The argument for the use of these perceptual measures is based on the notion that JVs are formed for a variety of motives.

There has been some evidence of problems in data access and measurement that have led researchers to use subjective alternatives based on managers' perception of performance, instead of using objective measures (Child and Yan, 2003). It has also been argued that financial and objective measures may fail to adequately reflect the extent to which an IJV has achieved its overall objectives (e.g. Killing, 1983), because IJVs may be formed for pursuing a variety of objectives (Geringer and Hebert, 1991). Therefore, Child and Yan (1999) emphasized that perceptual measures of performance are suitable for IJV research. Moreover, it has been found that objective and perceptual measures of performance are highly correlated (see Beamish and Delios, 1997; Dess and Robinson Jr., 1984).

Research on IJVs' control-performance relationships has produced indeterminate results (Geringer and Hebert, 1989). According to Child and Faulkner (1998), this problem likely stems from the fact that the assessment of alliance performance is far from straightforward and it has not been consistent across different investigations. Every IJV, as a complex system, emerges from a specific history, and exchanges resources with and adapts to its own unique environment (Charan, 1991; Eoyang and Berkas, 1999; Kelly and Allison, 1999; Stacey, 1996). Since the findings from previous research indicated indeterminate

results, and this study also examines a different set of IJVs, one approach would be to propose a null hypothesis of no relationship between control exercised by parents and the performance of IJVs. Therefore, no direct relationship between control and IJVs' performance is proposed, leading to the following hypotheses:

H13. Formal control mechanisms are not related to perceived performance of IJVs.

H14. Informal control mechanisms are not related to perceived performance of IJVs.

H15. Control extent is not related to perceived performance of IJVs.

H16. Control focus is not related to perceived performance of IJVs.

McMaster (1996) stated that the survival of organizations, including IJVs, as complex adaptive systems depends on their own self-organization. An IJV has to match the complexity of its environment, either by achieving an appropriate measure of fit with it, or by securing itself a degree of autonomy (see Varela et al., 1991, quoted in Boisot and Child, 1999, p.237). Lorange and Probst (1987) said that in order for an IJV to be successful, its management should demonstrate an equitable degree of freestanding independence within its environment. These suggestions are supported by a finding of Hill and Hellriegel (1994) that showed a positive relationship between IJVs' autonomy and future performance potential. Thus, the following hypothesis is proposed:

H17. The degree of autonomy of IJVs' management is positively related to the perceived performance of the IJVs.

Lorange and Probst (1987) raised a similar argument with respect to IJVs' redundancy. They said that in order for an IJV to be successful, it should be set up to have alternative ways of carrying out alternative course of actions, especially "if something should go wrong" (p.73). Thus, it is "another necessary precondition for developing successful self-organizing JVs" (p.73). This issue is reflected in the following hypothesis:

H18. The level of redundancy available to IJVs' management is positively related to the perceived performance of the IJVs.

3. Model specification and research methods

3.1. Model

As previously discussed, there are four partly interrelated variables critical to IJVs in order to cope with evolutionary pressures: 1) complexity; 2) management control as a means of self-reference (adaptation); 3) autonomy; and 4) redundancy (Lorange and Probst, 1987). Management control systems serve as a nerve center of the self-organizing properties' networks, thus it is also a main variable. Complexity has been treated as a structural variable that characterizes both organizations and their environments (Anderson, 1999). Therefore, it serves as a constraint factor within the networks. Both autonomy and redundancy serve as intermediate and complementary factors, while performance serves as a target factor.

In this study, complexity is represented by organizational complexity (Cambel, 1993; Killing, 1988), control is represented by four variables: formal mechanisms, informal mechanisms, extent, and focus (Child and Faulkner, 1998; Geringer and Hebert, 1989; Schaan, 1983), and outcomes is represented by three variables: performance, autonomy, and redundancy (Lorange and Probst, 1987). A model of management control in IJVs, as described in Figure 1, is developed and proposed to represent the relationships among the variables.

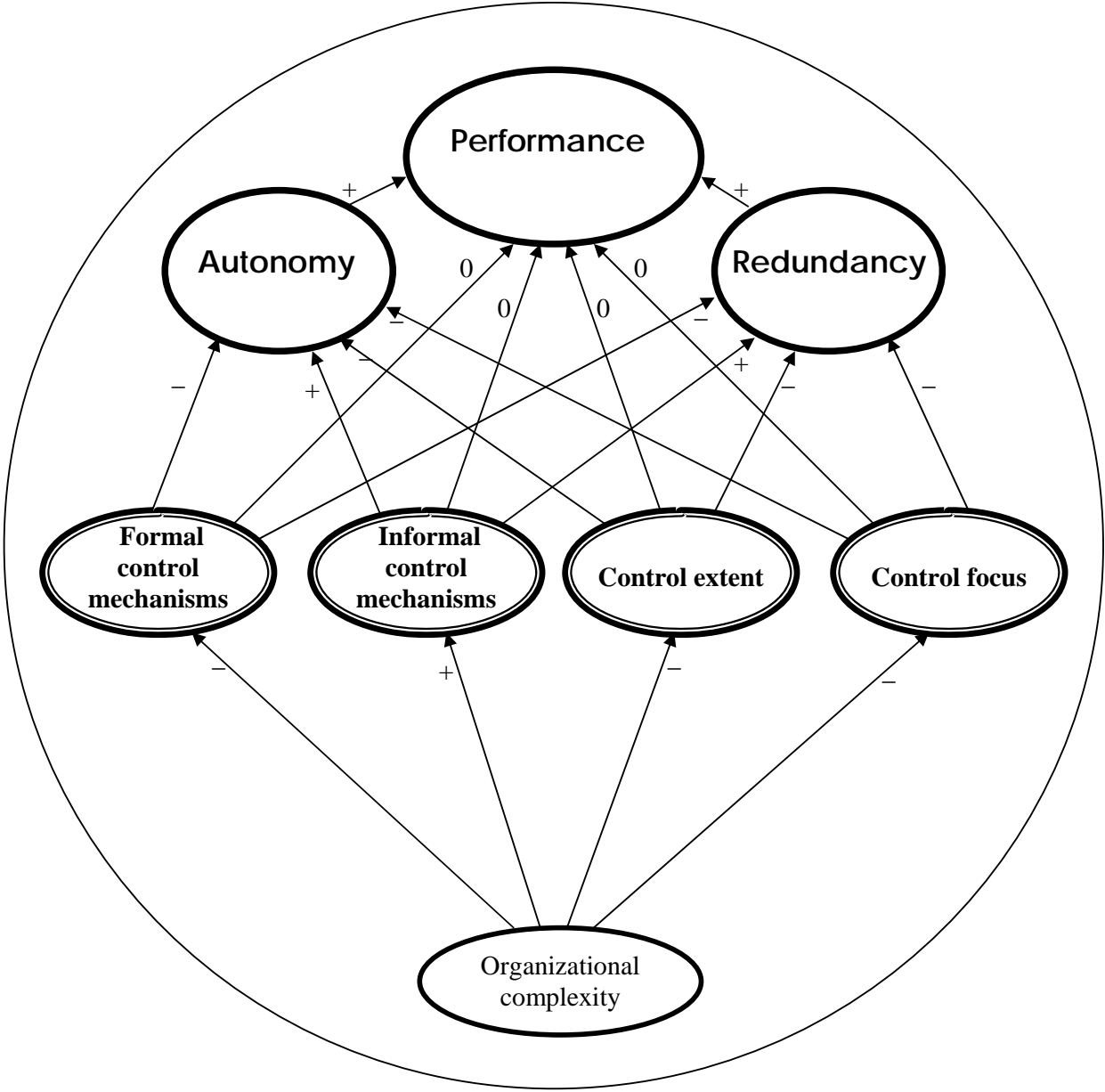


Figure 1. The model of management control in IJVs.

As shown in this model, complexity influences management control, and both complexity and control influence the IJVs' outcomes. The path from the complexity to outcomes represents the view that IJVs as adaptive systems have to match the complexity of their organizational environment, either by improving the fit between management control systems and the organizational complexity, or by securing themselves a degree of autonomy or redundancy.

3.2. Major variables and their indicators

There are two types of variables in the model. First are variables that have measures that are correlated and measure the same underlying phenomenon of each of the variables. These measures are commonly known as reflective indicators. Second are variables which are formed as composites of measures; thus, measures are viewed as the cause that creates the 'value' of the variables. These measures are commonly known as formative indicators. All ten variables in the proposed model are complex concepts exemplifying multiple features of IJVs. Significant numbers of indicators are adopted from various sources and used to measure each variable, and they are summarized in Table 1.

Table.1. A summary of variables and indicators

<i>Variable</i>	<i>Indicator</i>	<i>Type of indicator</i>	<i>Main reference</i>
Performance (PERFO)	<ol style="list-style-type: none"> 1. Satisfaction with the overall performance 2. Conformity with the joint venture's objective(s) 3. Financial profitability 	Reflective	Mjoen and Tallman (1997)
Autonomy (AUTON)	<ol style="list-style-type: none"> 1. Management autonomy in pricing policy 2. Management autonomy in development of new products and/or services 3. Management autonomy in daily operations 4. Management autonomy in the hiring and firing of managers 5. Management autonomy in capital expenditure approval 6. Management autonomy in revenue and cost budgeting 	Reflective	Hill and Hellriegel (1994), and Gordon and Narayanan (1984)
Redundancy (REDUN)	<ol style="list-style-type: none"> 1. Production or service delivery capacity in excess of current market demand 2. Unused debt capacity 3. Management talent in excess of current operations 	Reflective	Nicholson (1997)
Control focus (COFOC)	<ol style="list-style-type: none"> 1. Number of managers in the area of a parent's expertise that are provided by the parent 2. Number of times a parent staffs the departments where the contributions of the parent are used 	Reflective	Mjoen and Tallman (1997)
Control extent (COEXT)	<ol style="list-style-type: none"> 1. Influence in pricing policy 2. Influence in development of new products and/or services 3. Influence in daily operations 4. Influence in the hiring and firing of managers 5. Influence in capital expenditure approval 6. Influence in revenue and cost budgeting 	Reflective	Killing (1998), Beamish (1984), and Glaister (1995)
Informal control mechanisms (INFCM)	<ol style="list-style-type: none"> 1. Teams and task forces 2. Meetings and organized personal contacts 3. Transfer of managers / Lateral movements 4. Rituals, traditions and ceremonies 5. Networking and other socialization processes 	Reflective	Makhija and Ganesh (1997), Child and Faulkner (1998), and Schaan (1983)
Formal control mechanisms (FORCM)	<ol style="list-style-type: none"> 1. Contractual agreements 2. Structural grouping and departmentalization 3. Formal authority relationships 4. Standardized procedures and rules 5. Planning and budgeting 6. Supervision 7. Performance evaluation 	Reflective	Makhija and Ganesh (1997), Child and Faulkner (1998), and Schaan (1983)
Organizational complexity (ORGCO)	<ol style="list-style-type: none"> 1. Numbers of parents' motives for forming the joint venture 2. Emphasis on financial returns or profit 3. Ability to influence the decision-making process 	Formative	Killing (1988), and Child and Faulkner (1998)

3.3. Data analysis method

From the proposed model described in Figure 1, it can be seen that there are multiple relationships between the endogenous and exogenous variables. A technique that has been widely used in examining a series of dependence relationships simultaneously is called the technique of structural equation modeling (SEM) (Hair et al., 1998; Kline, 1998). SEM has not been used widely in management accounting studies and some researchers have urged

more usage of this technique (e.g. Shields, 1997; Shields and Shields, 1998). The model in this study integrates both reflective and formative variables. Hence, a SEM technique that is suitable to accommodate the statistical analysis needed in this study is the partial least squares (PLS) approach (see Chin, 1998). The PLS approach provides a means for estimating directly the variable component scores, and therefore, avoids the needs for parameter identification, which cannot be obtained for the formative variables (Bollen, 1989). This approach can be used to suggest whether relationships might or might not exist, as well as for theory confirmation.

3.4. Survey and instrument

There are many research methods that can be used for research in complex systems. However, the choice of an appropriate research method should depend on the original research questions (Frederickson, 1983). In this study, a survey design is chosen in order to provide descriptions of the research questions. Within this design, real-time data collection is conducted for a certain period. This research design involves data collection from representatives of the parents and functional managers of a limited number of selected IJVs, using questionnaires.

The target population was IJVs that were established in Indonesia between Australian and Indonesian businesses. A sample of the target population was identified from the list of Australian businesses in Indonesia taken from the Directory of Australian Businesses in Indonesia (Austrade, 2000) after cross-checked it with the database of Multinational Companies in Indonesia (Business Monitor International, 2010). 125 Australian IJVs in Indonesia were found from these directories.

With respect to sample size under the PLS analysis, Chin (1998) says that the sample size requirement can be sensed by finding the largest of two possibilities: (1) the block with

the largest number of formative indicators, or (2) the dependent variable with the largest number of independent variables influencing it. In this study, the only variable with formative indicators is organizational complexity, and it has three indicators. The dependent variable with the largest number of independent variables influencing it is performance, with six paths going into it. To get an acceptable statistical stability of the results, the subject/parameter ratio should be more than 5:1, with 10:1 is usually considered as reliable (see Chin, 1998; Kline, 1998). Accordingly, the reliable sample size requirement in this study should be at least 60 valid responses. Data collection process was administrated in four stages: (a) informal notification about the study – made through telephone calls and emails; (b) mailed questionnaires with reminder letters; (c) follow-up questionnaires with reminder letters; and (d) second follow-up including requests for participation, replacements of “missing” questionnaires, and collection of responses on sites. From this rigorous process, 62 valid questionnaires were collected from 10 trading, 20 manufacturing, and 32 service companies, an overall response rate of 49.6%.

4. Results and analysis

4.1. Measurement (Outer) model

The evaluation of the outer relations of the research model is separated into two sections – outer model for variables with reflective indicators and outer model for variables with formative indicators.

The analysis of the internal consistency of each variable with reflective indicators were conducted using Cronbach’s alpha, composite reliability (ρ_c), and *average variance extracted* (AVE) measures. As shown in Table 2, all of these reflective variables had both Cronbach’s alpha and composite reliability (ρ_c) above the acceptable value of 0.7 (see Chin,

1998), and had *average variance extracted* (AVE) above the acceptable value of 0.5 (see Fornell and Cha, 1995).

Table 2. Measurement (Outer) model analyses

<i>Variable</i>	<i>Variable reliability</i>		
	<i>Cronbach's alpha</i>	<i>Composite reliability (ρ_c)</i>	<i>Average variance extracted (AVE)</i>
FORCM	0.960	0.967	0.807
INFCM	0.952	0.963	0.840
COEXT	0.969	0.974	0.864
COFOC	0.830	0.922	0.856
AUTON	0.953	0.962	0.809
REDUN	0.813	0.889	0.727
PERFO	0.954	0.970	0.916

The evaluation for the variable with formative indicators, organizational complexity, was conducted by analyzing the path weights of the indicators and comparing the observed t-values, which obtained from a bootstrap resampling procedure, with the critical value at the confidence level of 99%. The results suggested two significant formative indicators of the organizational complexity variable: *the numbers of parents' motives for forming the joint venture* (ORGCO1 -- an indicator based on the motive perspective) with quite a substantial path coefficient of 0.416, and *the ability to influence the decision-making process* (ORGCO3 -- an indicator based on the perceived bargaining power perspective) with quite a substantial path coefficient of 0.515.

4.2. Structural (Inner) model

The structural model was evaluated employing the R-square for the endogenous variables, t-statistics (estimated using the bootstrap resampling procedure) and the significance level of the structural path coefficients. The results of the PLS analysis are summarized and presented in Table 3, which describes the proposed hypotheses, the

estimated inner path coefficients, the indirect effects, the total effects, the observed t-values from the bootstrap resampling procedure, and the significance level of the path coefficients.

Table 3. Structural (Inner) model analyses

<i>Endogenous variable</i>	<i>Hypo thesis</i>	<i>Exogenous variable</i>	<i>Propo- sed sign</i>	<i>Path coeff. (Direct effect)</i>	<i>Indirect effect</i>	<i>Total effect</i>	<i>Observed t-value</i>	<i>Sig. Level ~</i>	<i>1 or 2 tail</i>
Formal control mechanisms ($R^2 = 0.333$)	H1	Organizational complexity	-	-0.557	N/A	-0.557	-3.372	****	1
Informal control mechanisms ($R^2 = 0.659$)	H2	Organizational complexity	+	+0.784	N/A	+0.784	+11.831	****	1
Control extent ($R^2 = 0.468$)	H3	Organizational complexity	-	-0.674	N/A	-0.674	-8.642	****	1
Control focus ($R^2 = 0.046$)	H4	Organizational complexity	-	-0.136	N/A	-0.136	-0.942	ns	1
Autonomy ($R^2 = 0.682$)	H5	Formal control mechanisms	-	+0.113	N/A	+0.113	+1.284	(*)	1
	H6	Informal control mechanisms	+	+0.231	N/A	+0.231	+1.566	*	1
	H7	Control extent	-	-0.637	N/A	-0.637	-5.270	****	1
	H8	Control focus	-	+0.130	N/A	+0.130	+1.650	(**)	1
Redundancy ($R^2 = 0.213$)	H9	Formal control mechanisms	-	+0.179	N/A	+0.179	+0.946	ns	1
	H10	Informal control mechanisms	+	+0.419	N/A	+0.419	+2.503	***	1
	H11	Control extent	-	-0.127	N/A	-0.127	-0.619	ns	1
	H12	Control focus	-	-0.269	N/A	-0.269	-1.723	**	1
Performance ($R^2 = 0.497$)	H13	Formal control mechanisms	0	+0.400	+0.049	+0.449	+2.591	***	2
	H14	Informal control mechanisms	0	-0.043	+0.101	+0.058	-0.276	ns	2
	H15	Control extent	0	+0.627	-0.252	+0.375	+2.854	***	2
	H16	Control focus	0	-0.098	+0.044	-0.054	-0.776	ns	2
	H17	Autonomy	+	+0.390	N/A	+0.390	+1.700	*	1
	H18	Redundancy	+	+0.025	N/A	+0.025	+0.203	ns	1

~ Significance at the confidence level of: **** 99.9%; *** 99%; ** 95%; * 90%; ns = not significant
 Critical values (1-tailed) for confidence level of: 99.9% = 3.090; 99% = 2.326; 95% = 1.645; 90% = 1.282
 Critical values (2-tailed) for confidence level of: 99.9% = 3.290; 99% = 2.576; 95% = 1.960; 90% = 1.645
 () indicates that the sign of observed effect is opposite to that proposed in the hypothesis.

For the outcomes variables, which were predicted mainly by the control variables, the R-squares were substantial for the performance and autonomy variables, which were 0.497 and 0.682 respectively, and moderate for the redundancy variable, with an R-squares of 0.213. For the control variables, which were predicted by the complexity variables, the R-squares were substantial for the informal control mechanisms and control extent variables,

which were 0.659 and 0.468 respectively, moderate for the formal control mechanisms variable, with an R-square of 0.333, and weak for the control focus variable, with an R-square of 0.046. Therefore, the results suggested that overall the inner relations of the complexity-control-performance framework in proposed model were reasonably substantial.

4.3. Effects on performance

As Lorange and Probst (1987) suggested, the use of strategies and management processes in a JV will not result in success unless the JV possessed four self-organizing properties in order to cope with evolutionary pressures: complexity, management control, autonomy, and redundancy. In the model, performance is treated as the main endogenous outcome variable with links to autonomy, redundancy, and management control (which is categorized into four types of control) variables as its exogenous variables. As seen in Table 3, the findings show that the autonomy variable has a significant positive direct effect on the IJVs' performance variable, and it is consistent with Lorange and Probst's (1987) suggestion that autonomy is an important self-organizing property of IJVs. This is similar to the findings of Hill and Hellriegel (1994), in their study on JVs pursued by U.S. and European oil companies, which showed a positive relationship between IJVs' autonomy and future performance potential. Significant positive direct effects on the IJVs' performance variable are also found from the formal control mechanisms and control extent variables. These results are consistent with the suggestion that autonomy and control are inseparable aspects of management actions (Feldman, 1989).

This study proposed a null hypothesis of no relationship between controls exercised by parents and the performance of IJVs, since the findings from previous research indicated indeterminate results. As seen in Table 3, while the findings show significant positive relationships between the formal control mechanisms and control extent variables with the

IJVs' performance variable, there are no significant relationships found between the informal control mechanisms and control focus variables with the IJVs' performance variable. These results show similarities with the findings of Mjoen and Tallman (1997) in their study on Norwegian firms involved in IJVs in various industries, which showed a significant positive relationship between a parent's overall control and perceived performance, but no direct relationship between a parent's control over specific functions (control focus) and perceived performance.

Performance of IJVs in this study is conceptualized as the effectiveness of the JVs in meeting the goals of the parents (Hill and Hellriegel, 1994). The arguments from the concept of self-organizing systems suggest that the relationship of management control with performance is dependent on the relationship of management control with complexity (e.g. Stacey, 1996). The results in Table 3 show that there are significant negative relationships between the organizational complexity variable and the formal control mechanisms and control extent variables, and a significant positive relationship between the organizational complexity variable and the informal control mechanisms variable. These are consistent with the perspective that an organization can turn to more formal control when the degree of complexity is relatively low (e.g. Molleman, 1998). The significant positive relationships between the formal control mechanisms and control extent variables with the IJVs' performance variable are also consistent with the perspective that the relationship of management control with performance is dependent on the relationship of management control with complexity.

Finally, although the redundancy variable is included as one property of self-organizing systems, this study finds no significant relationship between this variable and the IJVs' performance variable.

4.4. Effects on autonomy

In the model, autonomy is treated as an intervening endogenous outcome variable with links to management control (which is categorized into four types of control) and organizational complexity as its exogenous variables. It is interesting to find that all control variables have significant relationships with the autonomy variable. Two relationships support the initial hypotheses and two others show opposite effects to those proposed in the initial hypotheses. Conceptually, control and autonomy are commonly regarded as two opposing variables (Harrigan, 1986; Keidel et al., 1994). Thus, in the context of IJVs, applying more formal, tighter, or broader control systems presumably will reduce the degree of autonomy able to be exercised by management of the IJVs. This study shows a significant negative relationship between the control extent variable and the autonomy variable, and a significant positive relationship between the informal control mechanisms variable and the autonomy variable. These results are consistent with the common presumption about the relationship between control and autonomy. However, in contrast to this presumption, the formal control mechanisms and control focus variables are found to have significant positive relationships with the autonomy variable.

We also tested the relationship between the organizational complexity variable and the autonomy variable, and found a path coefficient of 0.160 and an observed t-value of 0.963, which indicates no significant relationship between the two variables. However, the indirect effect of the organizational complexity variable on the autonomy variable was substantial (+0.530). This suggests sound links between the relationship of the organizational complexity variable and the control variables with the relationship of the control variables and the autonomy variable. The sign of this indirect effect is positive, thus, it is consistent with the suggestion of the concept of self-organizing systems that IJVs have to match the

complexity of their environment by securing themselves a degree of autonomy (see Varela et al., 1991, quoted in Boisot and Child, 1999, p.237).

4.5. Effects on redundancy

In the model, redundancy is treated as an intervening endogenous outcome variable with links to management control (which is categorized into four types of control) and organizational complexity as its exogenous variables. It was described previously that the redundancy, informal control mechanisms, and control focus variables do not have significant relationships with the performance variable. It is interesting to find that the only two variables that have significant relationships with the redundancy variable are the control focus and the informal control mechanisms variables. This study shows a significant negative relationship between the control focus variable and the redundancy variable, and a significant positive relationship between the informal control mechanisms variable and the redundancy variable. These results are somewhat consistent with the conceptual presumption about the relationship between control and redundancy, but in this study it was found that these relationships did not affect the performance of the IJVs.

4.6. Effects on control

In the model, management control is categorized into four types of control: the formal control mechanisms, informal control mechanisms, control extent, and control focus variables. These control variables as intervening endogenous variables are linked to complexity (which was categorized into three types of complexity) as their exogenous variables. Confirming the previous discussion, significant relationships are found between the organizational complexity variable and three control variables (formal control mechanisms, informal control mechanisms, and control extent), supporting the initial hypotheses.

However, there is no significant relationship found between the organizational complexity variable and the control focus variable. Significant negative relationships are found between the organizational complexity variable with the formal control mechanisms and control extent variables, and a significant positive relationship is found between the organizational complexity variable and the informal control mechanisms variable. Thus, overall, this shows a consistency of the results with the perspective of balance between complexity and control derived from the self-organization concept (see Brown and Eisenhardt, 1998). The findings are also similar to the findings of Gordon and Narayanan (1984), which suggested a negative relationship between perceived environmental uncertainties with the efforts to apply more control.

4.7. Significance of formative indicators of the organizational complexity

The analysis of the significance of formative indicators of the organizational complexity variable finds that two indicators are significant: the number of parents' motives for forming the JV and the ability to influence the decision-making process. The findings in this study confirms the previous suggestion that as the number of reasons or motives that parents have in forming IJVs increase, the organizational complexity of the IJVs increases. The findings in this study also show that bargaining power in the decision-making process is one dominant factor in IJVs' organizational complexity, in line with the findings of Mjoen and Tallman (1997).

5. Conclusion

The proposed model integrates multidimensional relationships among IJVs' properties to explain the roles of management control in affecting the performance of IJVs, and to consider the influence of alliance complexity on the application of management control

systems by the parents of IJVs. It takes a new perspective by extending the recent development of the concept of self-organizing systems into IJVs' control research, adopting a comprehensive framework of IJVs' self-organizing properties (Lorange and Probst, 1987), and utilizing the multidimensional features of both alliance complexity and management control. Overall, the model shows solid measurement (outer) and structural (inner) relations, representing the relationships among the complexity, control and outcomes variables in IJVs. Hence, it contributes to current needs for a more integrated and comprehensive approach on IJV control research.

The intricacy of the model, which combines variables with reflective and formative indicators in a set of multiple relationships, creates a necessity to apply a technique that can examine a series of dependence relationships simultaneously. Therefore, the technique of structural equation modeling (SEM) using the partial least square (PLS) approach was used to accommodate the methodological requirements of this study. As mentioned, SEM has not been used widely in management accounting studies and there has been some urge for more usage of this technique (e.g. Shields, 1997; Shields and Shields, 1998). Hence, this study adds a methodological contribution to the existing literature.

There are several main managerial implications that can be derived from this study. First is in relation to the effect of the management autonomy on the IJVs' performance, which is found to be positive and significant. This supports the previous finding by Hill and Hellriegel (1994). Thus, it shows the importance of providing the management of IJVs with a certain degree of autonomy to enable them to run the IJVs to achieve higher performance. The effects of the formal control mechanisms and the control extent on the performance variable are both positive and significant. Thus, it can be interpreted that the application of these two management controls can help IJVs to achieve higher performance. However, the findings in this study also show significant negative effects of the organizational complexity

variable on the formal control mechanisms and control extent variables. Hence, it suggests that the parents of IJVs must adjust and balance their applications of management control systems in accordance to the change in organizational complexity to enable them maintain the fit between control and performance.

Finally, as always there are limitations that should be considered. The model covers a large number of variables, and thus creates a trade-off between breadth and depth, which in this study is resolved in favor of testing and analyzing a broad overall model of management control in IJVs. Another issue is that the unique nature of IJVs as complex adaptive systems may limit the general implications of this study to the domain of IJVs that have similar characteristics with equity IJVs surveyed in this study. Future work using other data sets or in-depth case-based studies is strongly recommended to explore further relationships among the variables.

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