

Local linkages and their effects on headquarters' use of process controls[☆]

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Received 1 November 2005; received in revised form 1 August 2006; accepted 1 September 2006

Abstract

This paper explores the relationship between subsidiaries' local linkages and headquarters' use of process controls. Making use of both agency and network theories, we conceptualize subsidiaries as agents within multinational networks, as well as instruments seeking resources from external networks. In accordance with agency theory, we predict that subsidiaries' use of local linkages will result in a decrease in the use of process controls by headquarters. Empirical results from 407 Taiwanese firms confirm this hypothesis, suggesting that headquarters employing process controls to monitor subsidiaries' linkages with local actors (i.e., local firms) is too costly. Headquarters' use of process controls decreases when a subsidiary is a joint venture, and as the firm accumulates experience in a host market.

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Keywords: Process controls; Agency theory; Network linkages

1. Introduction

For multinational corporations, figuring out the best way to control subsidiaries is a strategic decision of critical importance, as subsidiaries function not simply as a means of accessing local resources and gaining local legitimacy, but, fundamentally, exist as agents requiring some level of control. Two separate streams of study investigate alternative designs of headquarter–subsidiary control. One is the network perspective, which examines the ways in which subsidiaries are established to tap into local resources (Bartlett and Ghoshal, 1986; Chen and Chen, 1998). The other is agency literature, which presents the idea that control should be related to agency costs resulting from goal inconsistency and information asymmetry between

principals and agents (Eisenhardt, 1989; O'Donnell, 2000). Only a limited amount of work focuses on examining the relationship between the establishment of subsidiaries' local linkages and the controls used by headquarters.

This article examines the relationship between subsidiaries' local linkages and the level of process control employed by their headquarters. In the following pages, we first point out that, from a network perspective, there is indeed a relationship between subsidiaries' linkages in host countries and the level of control exerted by corporate headquarters (Ghoshal and Bartlett, 1990). This article argues that headquarters' monitoring costs grow as subsidiaries establish local linkages. Building from this proposition, this article examines the hypothesis that headquarters reduce the use of process controls as subsidiaries' local linkages become develop. This study tests the hypothesis on a sample of Taiwanese firms operating in foreign markets.

2. Theoretical background

Ghoshal and Bartlett (1990, p. 603) define a multinational company as “a group of geographically dispersed and goal-disparate organizations that include its headquarters and the different national subsidiaries.” According to this definition, multinationals include the combination of (1) the headquarters,

[☆] The authors thank two anonymous reviewers for their valuable comments. The first author also thanks the National Science Council, R. O. C., for partially funding this research (#93-2416-H-004-056).

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(2) the subsidiaries, and (3) the network linkages between them. Since subsidiaries operate on behalf of their headquarters in host countries, subsidiaries are, in essence, agents that the headquarters employs (Eisenhardt, 1985, 1989; Jensen and Meckling, 1976). According to agency theory, cooperation between principals and agents is generally quite difficult to achieve, owing to principals' and agents' inconsistent goals. The differing interests of headquarters and subsidiaries manifest such inconsistencies. For this reason, considerable thought and sophistication are necessary for designing control mechanism to achieve alignment of subsidiaries' interests with those of their headquarters (Eisenhardt, 1989; Hennart, 1991a).

In addition to their consideration of the linkages within multinational networks, Ghoshal and Bartlett (1990) discuss multinationals' external networks. Generally speaking, the conditions in a host country are very different from those in the home country. These differences in cognitive, normative, and regulatory factors force subsidiaries to seek legitimacy (Kostova and Zaheer, 1999). Seen in this light, local linkages are essential to the enhancement of subsidiaries' legitimacy, acting as shields to reduce the pressures of local isomorphism (Kostova and Zaheer, 1999). Johanson and Mattson (1988) and Chen and Chen (1998) also hold that headquarters establish subsidiaries, in part, to seek out network resources in a host country. Taken as a whole, then, subsidiaries' local linkages act as headquarters' instruments for both establishing legitimacy and seeking resources.

Based on the assumption that multinationals' networks consist of multinational networks (relationships between headquarters and subsidiaries) and external networks (relationships between subsidiaries and stakeholders in host countries) (Ghoshal and Bartlett, 1990), this article develops a conceptual framework to describe the relationships among headquarters, subsidiaries, and the environment in the host countries (see Fig. 1). When the headquarters–subsidiary relationship is seen as a principal–agent relationship (O'Donnell, 2000; Pérez and Pla-Barber, 2005), it is to be expected that a headquarters would strive to create control mechanisms designed, optimally, to enable subsidiaries both to behave appropriately and to help build external networks within the headquarters' multinational network (Ghoshal and Bartlett, 1990). A subsidiary, then, may be said to have dual identities (Almeida and Phene, 2004; Andersson, 2003; Birkinshaw et al., 1998): (1) agent, with respect to headquarters' role as principal, and within a multinational network, (line B), and (2) local link within an external network (line A).

2.1. Process controls, outcome controls, and their costs

This paper only considers process controls. The reason the article does not examine other control mechanisms (e.g., expatriates, interpersonal controls, and others) is that process controls are mechanisms agency theorists (Eisenhardt, 1989; Hennart, 1991a) propose, and, to date, empirical tests are rare [for exceptions, see Gencturk and Aulakh, 1995; O'Donnell, 2000]. Simply put, process controls are a hierarchical method of

organization (i.e., principals act to monitor and influence agents' behavior), while outcome controls may be described as a more market-like organizational approach (i.e., principals' payments to enhance agents' outputs). In a perfect market—that is, one with zero transaction costs—there would be no difference between the use of process and outcome controls. But in accordance with the notions of bounded rationality and goal inconsistency (Eisenhardt, 1989; Jensen and Meckling, 1976), agents may behave opportunistically during the production process and the performance evaluation. Such transaction costs may take the form of costs arising from agents' shrinking during the production process, and that of agents' cheating at the end of production (Hennart, 1991a, 1993).

For principals, detecting the quality of agents' outputs may be costly (Eisenhardt, 1989). Such measurement costs, along with the costs associated with agents' dishonesty, increase the transaction costs associated with output controls. In fact, the combined costs associated with output controls may become so high that it becomes preferable for principals to switch to process controls. In some cases, too, it may be difficult to monitor and supervise agents' behaviors. This is often the case with subsidiaries in foreign countries, as geographic and cultural distance make successful monitoring difficult (Pérez and Pla-Barber, 2005), if not impossible. In such cases, it is particularly hard for headquarters to guide and monitor subsidiaries as they establish local linkages. The monitoring costs make the implementation of process controls less feasible. To reduce costs, then, principals may shift from using process controls to output controls.

By viewing process controls and outcome controls as two different methods of organization, the two may be seen as plausible substitutions for one another, rather than as complements (Hennart, 1991a). When process controls become too costly, headquarters should switch to outcome controls, and vice versa. Since the two methods may be used as substitutions for one another, we chose to use only process controls as our dependent variable, and did not specifically refer to outcome controls in developing our hypotheses. In other words, in the following hypotheses, if explanatory variables relate negatively process controls, then they should be positively related to outcome controls. This suggests that, on some occasions discussed in our hypotheses, headquarters should replace process controls with outcome controls, rather than simply forgoing any system of control.

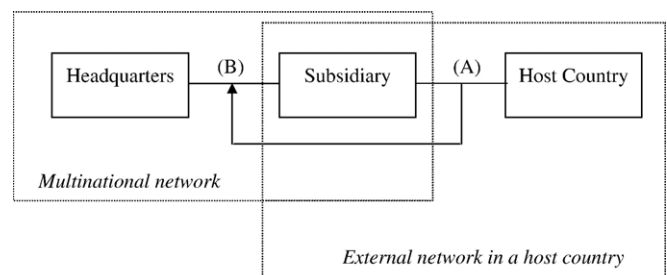


Fig. 1. Conceptual framework.

3. Hypotheses development

3.1. Local linkages and process controls

Firms operating in foreign countries always face numerous disadvantages, including higher operating costs, a greater degree of government intervention, and higher barriers to entry (Chen and Hennart, 2002). One remedy for these difficulties is to form alliances with local firms, especially those indigenous firms that are already locally established. Such linkages help to build foreign firms' legitimacy in a host country. Stated in terms of transaction cost theory, multinationals are motivated to form alliances in host countries because local knowledge does not trade perfectly in the market (Hennart, 1988). By forming alliances in a host country, firms are able to gain a better understanding of the local environment, thereby enhancing their capacity to overcome barriers and more successfully compete in the host country (Anderson et al., 2002). (While the process of subsidiaries' formations of linkages might be explained both by the agency theory and by the perspective of subsidiaries' initiatives (Birkinshaw et al., 1998), it should be noted that the theory of subsidiaries' initiatives differs from our agency theory framework in several assumptions. First, as agency theory suggests, subsidiaries are supposed to be risk-averse (Eisenhardt, 1989) or risk-neutral (Hennart, 1991a). By contrast, the idea of subsidiary initiative may assume that subsidiaries are in fact risk-seeking (Birkinshaw et al., 1998). Additionally, according to the agency perspective, strategic decisions such as the building of local linkages are made by headquarters. Conversely, according to the theory of subsidiaries' initiative, it is subsidiaries that make such decisions. We thank an anonymous reviewer for helping us to clarify this.)

From the point of view of headquarters, however, the use of control mechanisms should be reconsidered as local linkages are formed in host countries. Useful information on the formation and building of linkages, which generally require face-to-face interactions, can only be transmitted to headquarters at significant cost. The complexities of such personal, social, and cognitive factors (Johanson and Vahlne, 1990), as they relate to the external network of a foreign firm in a host country, may not be well understood by a subsidiary's headquarters, while the subsidiary might have a very firm and clear understanding of such features. Problems related to such information asymmetries between a headquarters and its subsidiaries are often exaggerated by the informal, personal nature of such linkages. Given the expense associated with collecting information, the implementation of process controls may prove cost-inefficient (Eisenhardt, 1989). Additionally, such piecemeal information-gathering generally fails to provide a complete picture of a subsidiary's situation. Because the high cost of collecting information leads to an information gap between subsidiaries and headquarters, headquarters may find it inefficient to employ process controls. Accordingly, we hypothesize: (1): A negative relationship exists between a subsidiary's *linkages to local firms* and the use of process controls by the subsidiary's headquarters.

In addition to linkages with local firms, foreign firm can acquire local knowledge from other members of the same ethnic groups; this acquisition is particularly true among Asians. That is, ethnic groups in a host country can transmit local knowledge to other members of their ethnic group (Chen and Chen, 1998) and facilitate cooperation with firms from the same home country (Chen et al., 2004). Although there are benefits to be gained from linkages with those firms from the same home country, headquarters still need to think twice as they employ process controls.

For the following reasons, the expectation is that a negative relationship exists between a headquarters' use of process controls and a subsidiary's linkages to firms operated by people from the same ethnic group. First, a subsidiary's linkages with firms that people from the same ethnic group operate can act as effective communication vehicles, thereby aiding in the provision of in-depth local knowledge. Process controls, however, because of their hierarchical nature (Anderson and Oliver, 1987), may act to narrow the depth and breadth of communication between subsidiaries and other ethnically-like firms, thereby rendering linkages less beneficial. More importantly, as a subsidiary interacts with more firms operated by people from the same home country, headquarters' use of process controls will become increasingly inefficient, as it is impossible to monitor a subsidiary's every networking activity. This proposition is true not only because it would be incredibly costly for a subsidiary to report all the details of its interactions with firms from the same ethnic group, but also because a headquarters' acquiring and judging a subsidiary's linkage development process would be exorbitant (Gencturk and Aulakh, 1995; Hennart, 1991a). In such a situation, a headquarters would find it costly to monitor a subsidiary's activities with firms of the same ethnic group; moreover, a subsidiary would lose the opportunity to engage in cooperative projects—and reap the ensuing benefits—if they were subject to a high degree of process control. Indeed, if the benefits of such linkages are to be fully realized, a headquarters would be well advised to decrease their levels of process control, leaving subsidiaries to independently construct linkages. Thus: (2) a negative relationship exists between a subsidiary's linkages to firms operated by the same ethnic group in a host country and the process controls used by a headquarters.

The intrusion of local governments may be a problem for multinationals' subsidiaries. Although it is true that multinationals will be supported by local governments because multinationals' proprietary assets and know-how are good for the host country, local governments may still impose some regulations on multinationals since some indigenous rivals and interest groups could be potentially influenced by the coming multinationals. These concerns of local firms and interest groups encourage local governments to set up restrictions on multinationals. To reduce governments' probable negative reactions, multinationals will make subsidiaries develop relationships with governments to work around government-imposed restrictions (Park and Luo, 2001), and to provide supplementary institutional protections (Xin and Pearce, 1996). Likewise, while not every government is hostile toward multinationals (for instance,

multinationals may receive subsidies from governments), the value of ostensibly positive support from local governments might ultimately be diminished, as multinationals are often expected to pay some additional price (such as lobbying) in exchange for being granted such subsidies. Moreover, legal regulations often vary in different localities, and different government officials, making very different sets of decisions, may act to further erode the benefits of receiving local support (Henisz, 2000). To reduce the impact of such turbulence, some multinationals have striven to build strong connections with local governments (Pfeffer and Salanick, 1978).

Building a subsidiary's linkages with local governments, however, requires that a headquarters decrease its level of process control. First, during the time that a subsidiary is building its relationship with a local government, it is very difficult for headquarters to judge the subsidiary's progress (Anderson and Oliver, 1987). Because of the costs associated with communication, a headquarters may have a hard time determining whether such linkages are motivated by personal gains, business interests, or an entirely different set of factors. Judgments regarding such linkages tend to be quite subjective, as networking relationships involve reciprocity and a long-term perspective (Park and Luo, 2001). Headquarters, then, are incapable of accessing comprehensive information by means of daily process controls. Additionally, if a subsidiary passes information to its headquarters piece by piece, it will likely be extremely difficult for the headquarters to determine the quality of the linkages, as judging the quality of such information is complex, time-consuming, and costly (Eisenhardt, 1989). While an emphasis on process control may appear attractive in the short-term, such an emphasis ultimately acts to the detriment of long-term corporate strategy. Accordingly, (3) a negative relationship exists between a subsidiary's linkages to local governments and the process controls used by a headquarters.

Ownership arrangements also have implications for a headquarters' choice of control methods. Readers may assume that control of joint venture subsidiaries is established in accordance with the distribution of equity among the partners. In fact, this is frequently not the case: the formation of a joint venture is merely the beginning of a long series of negotiations. Indeed, the interaction between partners in a joint venture is not a one-shot deal, but an ongoing process (Ring and Van De Ven, 1994). This suggests that ownership interests may be viewed as entirely separate from control methods (for similar arguments, see Brown et al., 2003). Furthermore, ownership does not always lead to control. As Mjoen and Tallman (1997) found in their empirical study, the relationship between ownership and control was not significant, suggesting that a party with a large degree of ownership does not always exert a high level of control.

The cost of monitoring and enforcement in a joint venture is high than in a wholly-owned subsidiary which suggests that process controls may be inefficient. Eisenhardt (1989) posited that inconsistency between the goals of principals and agents not only breeds agency problems, but also makes it difficult to monitor agents' behavior. In such cases, principals should shift to the use of outcome controls, as process controls are no longer efficient. In joint venture scenarios, it is more problematic to achieve goal

consistency between a subsidiary and its headquarters (Luo et al., 2001), because both joint partners, as well as the subsidiary itself, may have diverging objectives. Additionally, the use of process controls depends heavily on the information available about a subsidiary. Information about joint venture subsidiaries, however, is often hard to obtain, as employees in joint ventures occupy positions characterized by conflicting roles (Gong et al., 2001); managers in a joint venture subsidiary may not know when, how, or to what degree they are responsible for supplying information to their respective headquarters. Lacking detailed information, headquarters will likely find it difficult to make use of process controls. Taken altogether, then, an efficiency-seeking headquarters will tend to reduce its use of process controls and increase its reliance upon outcome controls when subsidiaries are joint ventures. Thus, (4) in comparison with wholly-owned subsidiaries, fewer process controls are active in joint venture subsidiaries.

The final hypothesis involves the linkage of process controls and a subsidiary's local experience. An increase in a subsidiary's local presence can be viewed as an increasing commitment to a host country. As noted by Johanson and Vahlne (1977), one characteristic of the internationalization process is a firm's continued presence in a host country. As a result of this process, a firm comes to better understand the local environment (Johanson and Vahlne, 1977), and builds stronger connections to the local production network (Johanson and Mattson, 1988). As a result, the local presence of a subsidiary is closely tied to its local linkages.

Local presence is expected to be negatively correlated with process controls for several reasons. First, while headquarters may have some understanding of the host countries in which their subsidiaries reside, subsidiaries' knowledge of their host country is, not surprisingly, of far greater breadth and depth. This is so for the simple reason that headquarters lack first-hand information. In addition, the very real phenomenon of cultural distance between headquarters and subsidiaries may compound the costs of collecting and interpreting subsidiaries' behaviors. Moreover, and perhaps most importantly, a headquarters' cost of collecting in-depth information with regards to a subsidiary's activities in a host country may in fact increase quite rapidly, because headquarters may have numerous subsidiaries to monitor. Thus, as subsidiaries' local experience increases, headquarters tend to decrease their level of process controls because of the rising expenses associated with the collection of information. Although headquarters might acquire some knowledge of local environments as a result of subsidiaries' frequent transmissions, information asymmetry between a headquarters and its subsidiaries will still exist (Jensen and Meckling, 1976), and may impede the use of process controls. Thus, (5) a negative relationship exists between a subsidiary's local experience and the use of process controls by its headquarters.

4. Method

4.1. The sample

A nationwide survey, conducted by Taiwan's government in 2001, was used to test our hypotheses. We chose Taiwan as the

home country subject of study for two reasons. First, Taiwanese firms have been noted for utilizing network resources as they engage in foreign direct investment activities (Chen and Chen, 1998; Chen et al., 2004). Indeed, linkages with local firms and institutions have quite frequently helped Taiwanese firms overcome various local barriers to entry. Secondly, the networking activities of Chinese people in host countries very often fall along ethnic-group lines. That is, as an ethnic group, the Chinese tend to be extremely helpful to one another in a host country (Redding, 1990). For these reasons, we felt that the use of Taiwanese data was appropriate.

The database covers almost all direct investments made by Taiwanese manufacturing firms between 1962 and 2001. The Minister of Economic Affairs randomly selected 3481 potential respondents, and mailed questionnaires to selected firms. Firms in the database came from a variety of industries, including timber, printing, chemicals, and heavy machinery. In addition to the mailed surveys, some information was collected via telephone interviews. The body of the questionnaire was comprised of three topics: (1) the characteristics of the parent company (i.e. industry, size, number of employees, spending in research and development activities, etc.), (2) information about the subsidiary (i.e. entry mode, timing, location, and industry), and (3) the relationship between a parent company and its subsidiary (i.e. the level of process control with regards to the pricing, financing, and strategic decision-making of the subsidiary). Of the questionnaires returned, 2170 were complete and usable, for a response rate of 62%.

Notably, not all data was used in the analysis. We chose to examine only those entries into the U.S., Canada, Japan, Malaysia, Thailand, Indonesia, and the Philippines. Our decision to exclude certain entries was due primarily to our inability to identify the exact locations of the investments in question (for instance, “Western European countries” or “South American countries”). Moreover, entries into China were also excluded. Due to the shared historical and cultural roots of the Taiwanese and Chinese peoples, we felt that the data related to entries into China was only tangentially associated to research objectives. Ultimately, we had 407 samples with complete information for analysis.

4.2. Variables and measurements

4.2.1. Dependent variable

As earlier delineated, *process controls* may be defined as controls used by a headquarters to influence the processes of subsidiaries’ production (Eisenhardt, 1985; Hennart, 1991a). Since a subsidiary’s operations may consist of several different functions, process controls were measured according to five broad types of decisions which were monitored and potentially influenced by headquarters. These decisions may be characterized as related to: (1) strategy, (2) pricing, (3) sales, (4) staffing, and (5) financial decisions in the host country. We anchored the items as follows: 1=decided by the subsidiary, 2=jointly decided by the parent and subsidiary, and 3=decided by the parent company. We averaged the sum of the five variables to arrive at our dependent variable. Thus, the higher the value,

the greater the degree of process control employed by a headquarters. The five items showed a high degree of internal validity (Cronbach alpha was .91). Factor analysis further confirmed that there was only one dimension (see Table 1).

Although the measures we adopted are not perhaps designed to produce results of pinpoint accuracy, several scholars have used similar measures. For instance, Gencturk and Aulakh (1995) used “the time which managers spent on monitoring the product, distribution, promotion and pricing activities in the host country” to measure the degree of process controls. Likewise, Bello and Gilliland (1997) used a statement beginning, “Our efforts to influence the way a distributor performs are...” to measure the degree of process control exerted by manufacturers over exporters. The five items used here operate according to similar principles.

4.2.2. Independent variables

The study uses three items to identify the existence of a subsidiary’s linkages to local firms, local Taiwanese firms, and local governments in a host country. Following earlier studies (e.g., Baum and Oliver, 1991), we used a dichotomous variable (LOCALFIRM) to capture the effects of subsidiaries’ building linkages to local firms (hypothesis 1). This variable was measured according to a subsidiary’s “cooperation” with local firms in a host country (1=yes; 0=otherwise). We felt that this variable adequately expressed whether or not a subsidiary was successfully tapping into local resources, since for the Chinese, the word “cooperation” means that a relationship has been formed, and that there exists an emotional attachment and mutual commitment that goes beyond market transactions (Chen, 2001). Linkages with local Taiwanese firms (Hypothesis 2) and with local governments (Hypothesis 3) are measured in the same way (1=yes; 0=otherwise). According to our hypotheses, the coefficients should be negative for all four independent variables discussed above.

Our last independent variable is the level of subsidiary’s local experience (Hypothesis 5). This variable was computed as the difference between the time a subsidiary was set up and the survey year (2001). In other words, if a subsidiary entered its host market in 1991, its local experience would be given as 10 (2001–1991=10). Several studies have measured subsidiaries’ local experience according to the same approach (e.g., Hennart, 1991b). As stated in H5, we believe we will find that headquarters decrease levels of process control as a subsidiary’s local experience increases.

Table 1
Factor loadings of the measures of process controls (rotated by Varimax)

| Variable | Factor |
|--|--------|
| The major strategic decisions of the subsidiary are made by... | 0.819 |
| The pricing decisions of the subsidiary are made by... | 0.914 |
| The sales decisions of the subsidiary are made by... | 0.914 |
| The staffing decisions of the subsidiary are made by... | 0.818 |
| The financial decisions of the subsidiary are made by... | 0.833 |
| Eigenvalue | 3.71 |
| % of variance explained | 74.11% |

4.2.3. Control variables

In examining the degree of process control predicted by subsidiaries' local linkages, several variables were entered as control variables. First, at the headquarters level, we used logged assets (ASSET), the ratio of R&D expense to sales (R&D), and the ratio of foreign sales to total sales, as a proxy for international experience (EXPERIENCE). In particular, we expected that headquarters with more international experience would increase the use of process controls (Anderson and Gatignon, 1986; Eisenhardt, 1989; Pérez and Pla-Barber, 2005). Second, at the subsidiary level, we controlled for the R&D ratio of a subsidiary (R&D_SUB). Finally, we controlled for cultural distance (CD), the logged value of a host country's GDP (GDP), and the political hazards (HAZARD) present in the host countries. We used data from Hofstede (1980) and the formulation used by Kogut and Singh (1988) to calculate the cultural distance between Taiwan and the host countries in question. The GDP index was obtained from the *World Development Report*. Furthermore, we accessed the political hazard indexes from Professor Henisz's website (<http://www-management.wharton.upenn.edu/henisz/>). In our analysis, we also replaced political hazards with other proxies, such as national credit ratings (from *Institutional Investor*) and the risk of political instability (from *The World Competitiveness Yearbook*). No substantial changes were found when we used the proxies. Hence, this study only reports the results relating to political hazard in the following sections.

5. Analysis and results

5.1. Results with full sample

Table 2 summarizes the descriptive statistics and correlation matrix pertaining to all variables involved in the study. Since the independent variables of H1 to H3 are dichotomous variables, it is apparent that there were not many cases in which firms built linkages with local ethnic firms and local governments (their means are .05 and .03, respectively, suggesting that most of our samples did not establish linkages with ethnic firms and local governments). Notable, too, is the fact that the variation of the

two independent variables is small, which will potentially make it difficult to examine the true relationship between the independent and dependent variable in the analysis (Kerlinger, 1986, p.69).

While some imperfections related to our independent variables may exist, we used ordinary least squares (OLS), a general estimation method, to estimate the coefficients for all explanatory variables. We first reported control variables in Model 1; we then introduced the independent variables in Models 2 and 3. As shown in Table 3, all the models were significant (at the .01 level), suggesting that the use of process controls can indeed be explained by the independent variables in the equations. In all of the estimations, the largest VIF value was 3.94—well below the recommended threshold of 10—suggesting that multicollinearity was not a severe threat to our model (Neter et al., 1996).

Hypothesis 1 addressed the relationship between linkages with local firms and process controls. In Models 2 and 3, the linkages with local firms (Hypothesis 1) carried a negative and significant sign ($\beta = -.12$ and $-.13$, $p < .01$ in Models 2 and 3, respectively), confirming that as a subsidiary forms linkages with local firms, the process controls employed by a headquarters diminish. Therefore, Hypothesis 1 is supported. But the coefficients of linkages with Taiwanese firms in the host country ($\beta = .04$ in Models 2 and 3) and of linkages with local governments ($\beta = -.01$ in Models 2 and 3) were not significant. Hence, the findings do not support hypotheses 2 and 3. Furthermore, the coefficient JOINTVENTURE was negative and significant ($\beta = -.31$, $p < .01$, in Models 2 and 3), indicating that there will be a lesser degree of process control for a joint venture subsidiary than for a wholly-owned subsidiary. Hypothesis 4, then, was confirmed. Lastly, as a subsidiary's local experience increases, process controls decrease, as expected ($\beta = -.08$, $p < .10$, in Model 3). This evidence supports hypothesis 5.

Among the control variables, the R&D ratio is found to be positively related to process controls ($p < .01$, in all models), thus supporting the idea that the knowledge transferred from a headquarters is the key to a subsidiary's performance (Isobe et al., 2000). But the transferred know-how does not simply

Table 2
The descriptive statistics and correlation matrix

| | Mean | S.D. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---------------------------------|-------|-------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.PROCESS CONTROLS | 1.92 | 0.73 | | | | | | | | | | | | |
| 2.ASSET ^a | 5.86 | 0.97 | 0.76 ^c | | | | | | | | | | | |
| 3.RD ^a | 9.89 | 2.19 | 0.19 | 0.69 | | | | | | | | | | |
| 4.EXPERIENCE | 3.47 | 3.13 | 0.03 | -0.16 | -0.20 | | | | | | | | | |
| 5.RD_SUB | 1.43 | 1.49 | -0.09 | -0.09 | -0.12 | 0.27 | | | | | | | | |
| 6.HAZARD | 0.49 | 0.38 | -0.20 | 0.06 | 0.13 | -0.01 | 0.07 | | | | | | | |
| 7.CD | 39.37 | 15.72 | -0.13 | 0.16 | 0.18 | -0.09 | 0.01 | 0.74 | | | | | | |
| 8.GDP ^a | 4.11 | 0.44 | -0.01 | 0.24 | 0.40 | -0.21 | -0.08 | 0.29 | 0.41 | | | | | |
| 9.LOCALFIRM ^b | 0.12 | 0.33 | -0.20 | 0.04 | -0.04 | -0.02 | 0.06 | 0.03 | -0.04 | -0.06 | | | | |
| 10.LOCALTAIWANESE ^b | 0.05 | 0.22 | -0.04 | 0.01 | -0.03 | 0.01 | 0.02 | -0.03 | -0.01 | -0.08 | 0.01 | | | |
| 11.LOCALGOVERNMENT ^b | 0.03 | 0.18 | -0.03 | 0.04 | 0.05 | 0.05 | 0.01 | -0.03 | 0.01 | -0.03 | 0.05 | -0.02 | | |
| 12.JOINTVENTURE ^b | 0.41 | 0.49 | -0.41 | -0.15 | 0.24 | 0.33 | -0.03 | -0.01 | -0.01 | 0.07 | -0.31 | -0.30 | -0.10 | |
| 13.LOCALEXPERIENCE | 1.39 | 0.81 | -0.11 | 0.09 | -0.02 | -0.09 | 0.04 | 0.10 | -0.01 | 0.15 | 0.06 | 0.04 | 0.07 | -0.03 |

^aLogged variable; ^bDummy variable. ^cThe absolute value of coefficient greater than 0.06 is significant at 0.05 level.

Table 3
OLS estimation results on process controls (standard error in parentheses)

| Variables | Model (1) | Model (2) | Model (3) |
|-------------------------|----------------|----------------|----------------|
| <i>Headquarters</i> | | | |
| ASSET | -0.11 (0.05) | -0.09 (0.05) | -0.06 (0.05) |
| RD | 0.15** (0.02) | 0.22** (0.02) | 0.20** (0.02) |
| EXPERIENCE | 0.09† (0.01) | 0.05 (0.01) | 0.06 (0.01) |
| <i>Subsidiary</i> | | | |
| RD_SUB | -0.15** (0.02) | -0.12* (0.02) | -0.11* (0.02) |
| <i>Host country</i> | | | |
| HAZARD | -0.10 (0.18) | -0.14† (0.17) | -0.12 (0.16) |
| CD | -0.11 (0.01) | -0.06 (0.01) | -0.07 (0.01) |
| GDP | -0.05 (0.14) | -0.10 (0.13) | -0.10† (0.13) |
| <i>Local linkages</i> | | | |
| LOCALFIRM | | -0.12* (0.10) | -0.13** (0.10) |
| LOCALTAIWANESE | | 0.04 (0.17) | 0.04 (0.17) |
| LOCALGOVERNMENT | | -0.01 (0.19) | -0.01 (0.19) |
| JOINTVENTURE | | -0.31** (0.07) | -0.31** (0.07) |
| LOCALEXPERIENCE | | | -0.08† (0.01) |
| R ² | 0.10 | 0.23 | 0.23 |
| Adjusted R ² | 0.08 | 0.21 | 0.21 |
| F value | 6.28** | 10.28** | 9.75** |
| Sample size | 407 | 407 | 407 |

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$ (two-tailed).

contribute to a subsidiary's capabilities—it also supplements the use of process controls. The positive relationship not only confirms the necessity of controls, but, further, indicates that: The greater a headquarters' R&D capabilities, the greater its capability to observe its subsidiaries. Furthermore, we found that a headquarters' international experience has a positive and significant effect on the use of process controls ($\beta = .09$, $p < .10$, in Model 1). This result suggests that as a headquarters' international experience increases, the better acquainted headquarters will likely become with its subsidiaries' activities, leading to an increase in the level of process control exercised by the headquarters over its subsidiaries (Anderson and Gatignon, 1986; Pérez and Pla-Barber, 2005).

Additionally, a subsidiary's R&D ratio appears to correlate with a decrease in process control ($\beta = -.15, -.12$, and $-.11$, $p < .05$, in Models 1, 2, and 3, respectively). Because R&D activities are difficult to monitor and detect (Eisenhardt, 1989), a headquarters may rely less on process controls, shifting instead to other control mechanisms. Thus far, the results of our control variables have generally supported the agency theory framework we proposed in this paper.

5.2. Further analysis of the two groups

To explore the hypotheses of interest in greater detail, we split the full samples into two groups, based on the locations of investments, that is, developed countries (DCs) versus less-developed countries (LDCs). Following Makino et al. (2002), we placed countries in North America (U.S. and Canada), Western Europe, and Japan in the DCs group ($n = 293$), while placing Central/South America, Africa and ASEAN countries into the LDCs group ($n = 114$). The OLS estimation results were

shown in Table 4 (Model 4 for the DCs group, and Model 5 for the LDCs group, respectively). In Model 4, the results for the DCs group were similar to those of the full sample—that is, a headquarters significantly reduces the level of process controls exerted on subsidiaries which have established linkages with local firms, as well as on subsidiaries which are joint ventures. Also, neither a subsidiary's linkages with local Taiwanese firms nor its linkages with local governments are significantly related to a headquarters' use of process controls. Finally, the level of a subsidiary's experience in a host country does not decrease a headquarters' use of process controls.

Compared with the results of the DCs group, the coefficients of the LDCs group produced stronger support for our theory, particularly in the case of Hypothesis 3. In Model 5, the coefficients of LOCALFIRM and JOINTVENTURE were negative and significant, as they performed in the DCs group, and the coefficient of LOCALEXPERIENCE was also both negative and significant. Notably, as predicted in Hypothesis 3, the coefficient of LOCALGOVERNMENT was negative (significant at the .05 level), indicating that a headquarters tends to lessen the employment of process controls when subsidiaries establish ties with local governments in less-developed countries. This suggests that when subsidiaries establish linkages with local governments in less-developed countries, in which local governments tend to exercise higher levels of intervention (Xin and Pearce, 1996; Park and Luo, 2001), a headquarters' use of process controls on subsidiaries becomes less efficient. In such cases, headquarters may wish to reduce the use of process controls and shift to other control mechanisms.

Table 4
OLS estimation results on process controls in two subsamples (standard error in parentheses)

| Variables | Model (4) DCs | Model (5) LDCs |
|-------------------------|----------------|----------------|
| <i>Headquarters</i> | | |
| ASSET | -0.07 (0.06) | 0.05 (0.09) |
| RD | 0.08 (0.03)** | 0.17 (0.39) |
| EXPERIENCE | 0.01 (0.01) | 0.04 (0.02) |
| <i>Subsidiary</i> | | |
| RD_SUB | -0.05 (0.03)* | -0.04 (0.03) |
| <i>Host country</i> | | |
| HAZARD | -0.51 (0.23) | 2.24 (0.91)** |
| CD | 0.01 (0.01) | -0.02 (0.01) |
| GDP | -0.96 (1.25) | 0.12 (0.82) |
| <i>Local linkages</i> | | |
| LOCALFIRM | -0.30 (0.12)** | -0.25 (0.15)† |
| LOCALTAIWANESE | 0.11 (0.21) | 0.07 (0.26) |
| LOCALGOVERNMENT | 0.29 (0.25) | -0.59 (0.28)* |
| JOINTVENTURE | -0.54 (0.09)** | -0.21 (0.13)† |
| LOCALEXPERIENCE | -0.01 (0.01) | -0.02 (0.01)† |
| R ² | 0.27 | 0.25 |
| Adjusted R ² | 0.24 | 0.16 |
| F value | 8.75** | 2.88** |
| Sample size | 293 | 114 |

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$ (two-tailed).

6. Discussion

6.1. Contributions and implications

This article examines the degree to which a subsidiary is subject to its headquarters' process controls. To date, the literature on control mechanisms largely emphasizes ownership control (Anderson and Gatignon, 1986; Mjoen and Tallman, 1997). We turned instead to the examination of process control. Far away in the home country, a headquarters may fail to understand the contextual factors or urgency of a subsidiary's decisions—perhaps most particularly, the networking activities in the host country. The use of process control turns out to be inefficient, as collecting the details of all of its subsidiary's actions is, simply, too costly (Eisenhardt, 1989; Hennart, 1991a). Moreover, a subsidiary may find it difficult to explain all the details of its networking activities in a host country. The use of a high level of process control, then, may result in tension between a headquarters and its subsidiary. One solution to this problem is to reduce the level of process controls, and turn instead to output controls (Hennart, 1991a). By lessening process controls, headquarters may be able to reduce their monitoring costs while allowing their subsidiaries to organically build local linkages.

This study also made an exploratory step by bridging network theory and agency theory. Based on network theory (Chen and Chen, 1998; Ghoshal and Bartlett, 1990; Johanson and Mattson, 1988) and agency theory (Eisenhardt, 1985, 1989; Jensen and Meckling, 1976), we proposed that when a subsidiary is linked to local firms, ethnic firms (i.e., firms from the same home country), and the host country's government, process controls will prove to be less efficient. Our empirical results generally supported this conclusion. Our evidence showed that process controls will be employed to a lesser degree for those subsidiaries linked to local firms, as well as for those linked to local governments; the same is true for those which are joint ventures. Additionally, a subsidiary's local experience may exacerbate a situation of information asymmetry between a headquarters and its subsidiary, further suggesting that a headquarters should switch to output controls.

The contributions of this research are twofold. First, this study extends agency theory into the realm of the relationship between a headquarters and its subsidiaries. To the best of our knowledge, this article is among the first systematic attempts to examine the relationship between a subsidiary's network linkages and process controls. According to our framework, as noted earlier, subsidiaries are not simply instruments for accessing local resources, but agents whom a headquarters must properly control. Second, this research specifies the actors in multinationals' networks (i.e., local firms, local firms operated by people from the same ethnic group, and local governments). These actors are common to multinationals (Ghoshal and Bartlett, 1990), but have seldom been empirically examined.

The empirical evidence does not fully support the theory. A lack of significant results was apparent with respect to the linkages with local firms operated by the same ethnic group (H2), and was only partially supported with respect to linkages

with local governments (H3). One reason to dispute our hypothesis might be its sheer simplicity. Our agency theory framework is a simple and dyadic model that addresses the relationships between a headquarters and its subsidiaries. The assumptions of information asymmetry and bounded rationality may seem too narrow to be true (Donaldson, 1990). In particular, as global competitive pressures increase (Burgers et al., 1993; Gupta and Govindarajan, 2000; O'Donnell, 2000), the hierarchical relationships between headquarters and subsidiaries are increasingly subject to change. For instance, formal controls may have been replaced by socialization or other informal mechanisms, which our study did not investigate. Moreover, a subsidiary's initiative and the rise of a subsidiary's advantages (Birkinshaw et al., 1998) may increase subsidiaries' bargaining power with headquarters, leading to a reversal of the principal–agent relationship (Mudambi and Navarra, 2004). Subsidiaries, rather than headquarters, may in some cases serve as principals. In the future, such situations should be considered, and the research hypotheses should be refined. Finally, we wondered if some of the unsupported hypotheses were the result of the fact that the variations in the independent variables (linkages with ethnic firms and linkages with local governments) were not large enough. We suggest that future studies may employ samples within a larger research design to overcome this potential constraint.

6.2. Limitations and future research

Several points addressing the limitations of this paper and providing possible starting-points for future research are given here. First, the study only considers process controls as a dependent variable. The study does not measure or test input controls (Ouchi, 1979, 1980) or outcome controls (Eisenhardt, 1985; Gencturk and Aulakh, 1995). Future studies might consider input, process, and outcome controls within one unified framework. Second, subsidiaries' roles, in this research, are regarded as static; we urge scholars, in future studies, to consider the changing roles of subsidiaries (Birkinshaw et al., 1998). Third, the independent variable in this paper (i.e., network linkages) only considers the actors to whom a subsidiary is linked and the occurrence of the linkage. The *strength* of these linkages was not measured or tested. Researchers may wish to design measurements capable of measuring the strength of linkages (see Chen et al., 2004, for an example) to advance our theory. Finally, in practice, multinationals may use other control mechanisms, such as monetary incentives (O'Donnell, 2000; Roth and O'Donnell, 1996), and expatriate staffing (Pérez and Pla-Barber, 2005). Further studies may wish to extend this framework to include other mechanisms.

7. Conclusions

The ways in which local linkages shape headquarters' methods of controlling subsidiaries have received little attention in the literature. This article provides a set of variables specifying subsidiaries' local linkages and examining their effects on process controls. Based on agency theory, we

hypothesized that the establishment of local linkages is difficult to monitor, thereby increasing the cost of process controls. Moreover, the costs of monitoring also increase in cases in which subsidiaries have more local experience, as well as in cases of joint venture subsidiaries. The results generally support the hypothesis that headquarters will reduce their use of process controls when subsidiaries develop local linkages in a host country. Broadly speaking, our findings indicate that headquarters may decrease the level of process controls and shift to methods of outcome control if subsidiaries seek to access resources available in host countries.

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