Host Country Resource Availability and Information System Control Mechanisms in Multinational Corporations: An Empirical Test of Resource Dependence Theory

MADHU T. RAO, CAROL V. BROWN, AND WILLIAM C. PERKINS

ABSTRACT: The management of the information systems (IS) function is a complex task, particularly in the case of multinational corporations (MNCs), where installations dispersed across distance, time, and cultures can lead to diverse and incompatible systems spreading among foreign subsidiaries. The need to globally control and coordinate the IS management function is often met with resistance from local IS managers, who may perceive corporate standards as intrusive. Resource dependence theory (RDT) argues that control is made easier when a subsidiary unit is dependent on corporate headquarters for critical resources. This study examined the IS manage-
ment relationship and the use of various mechanisms of control (formal and informal) between 54 headquarters–subsidiary pairs spread across 19 countries of varying resource-richness. While RDT appears to be valid when subsidiaries are dependent on MNC headquarters for resources, the expected relationship between the mechanisms and host country IS resource availability was not observed. Although there was a significant relationship with the use of informal mechanisms and IS resources, it was in the opposite direction to what would be expected by RDT.

**KEY WORDS AND PHRASES:** canonical correlation, control mechanisms, multinational, resource dependence.

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**THE SCALE IS STAGGERING.** General Electric, a diversified technology and services company, currently has operations in over 100 countries and employs nearly 315,000 employees worldwide. On its corporate Web site, Swiss giant Nestlé S.A. boasts of having factories in nearly every country of the world. Toyota Motor Corporation, Japan’s largest multinational, has manufacturing plants spread across 26 nations supporting the efforts of its 246,700 global employees. These companies are not alone in their astounding breadth of operations. The *World Investment Report 2005,* published by the United Nations Conference on Trade and Development (UNCTAD), estimates that there are currently over 70,000 multinational corporations (MNCs) operating worldwide, controlling and coordinating the activities of nearly 690,000 foreign subsidiaries around the globe [44].

The management and integration of such dispersed and often interdependent operations, necessitated by the search for global efficiencies, can only be achieved through the strategic deployment of information and communication technologies at subsidiary locations around the world. Common standards and global infrastructures within the MNC play a critical role in ensuring that subsidiary behavior and decision making remain consonant with overall corporate objectives. Such attempts at control and coordination, however, are often met with significant resistance from host country functional managers seeking to maintain a stable operating environment within their local branches. Corporate information systems (IS) managers can oftentimes find themselves in a position where they are required to leverage their influence at the headquarters to force subsidiaries to adhere to global standards. Resource dependence theory (RDT) [31] argues that such efforts are made easier if subsidiary operations are reliant on services and technologies from an MNC’s corporate IS operations.

RDT, first presented in Pfeffer and Salancik’s 1978 book, *External Control of Organizations: A Resource Dependence Perspective* [31], has emerged as a powerful approach to explaining organizational behavior and interorganizational relationships. Over the past three decades, Pfeffer and Salancik’s work has been cited over 2,000 times [4] and has been used as the basis to understand and interpret a wide variety of phenomena ranging from ownership issues in franchising [47] to stakeholder influence on corporate strategies [46].
Despite the widespread acceptance of the theory, however, there has been a surprising dearth of empirical studies specifically attempting to test the validity of RDT. Indeed, Pfeffer and Salancik note that “there is a limited amount of empirical work explicitly testing resource dependence and its central tenets” [32, p. xvi]. This study attempts to address this research gap in the context of IS management in multinational organizations. Specifically, this research tests the validity of RDT in the context of headquarters–subsidiary IS operations in MNCs and addresses two questions. The first research question examines the relationship between resource dependence and level of control and coordination exerted by the headquarters IS management over subsidiary operations. Formally stated:

*RQ1*: Is the control and coordination exerted by an MNC headquarters over subsidiary IS operations influenced by the host country IS resource availability, dependence, and subsidiary strategic role?

The second research question examines the influence of the subsidiary-specific factors (strategic role, resource availability, and dependence) which determine the strategic relationship of the subsidiary and MNC headquarters, and the types of mechanisms used to enforce control and coordination.

*RQ2*: Does the strategic relationship influence the types of control and coordination mechanisms utilized to manage subsidiary IS operations?

Prior Research

The research presented in this paper builds on a significant body of prior literature in the areas of organizational control and coordination, resource dependence, and strategic roles of subsidiaries in MNCs. Each area is briefly reviewed below. We first look more closely at RDT and then present prior research on control and coordination as well as strategic roles of subsidiaries.

Resource Dependence Theory

Operating environments have long been considered critical in determining the administrative processes in a firm [42] and organizations are “inescapably bound up with the conditions of their environment” [31, p. 1]. RDT states that all organizations exchange resources with the environment as a condition for survival, and dependencies between organizations and external units result from the need to obtain such critical resources [36].

Organizations need resources to survive. The process of acquiring these resources typically necessitates that an organization interact with others who control access to those resources. The natural consequence of such a relationship between resource seeker and resource provider is that dominance attaches to the entity that controls the conditions necessary for the functioning of other units [17]. These providers may be either an external entity or another internal unit within the firm. RDT argues that the
control over critical resources engenders a power that the resource provider has over the resource seeker [23, 31]. Resource dependency is considered among the most widely used tools for strategic control [8, 9]. For example, in a study of the influence of U.S.-based headquarters over human resource decisions in a Mexican affiliate, it was empirically determined that the ability to influence was directly related to the dependence of the affiliate on resources from the parent [28]. In the area of IS outsourcing, one study utilized RDTs to explain the decision to outsource the IS function through a discrepancy model [41]. Other than this one study, however, there has been very little IS research that draws significantly on the tenets of RDT. In this paper, we hope to address this relative void by using RDT as the theoretical basis for examining the types of control and coordination mechanisms utilized by U.S. MNCs to manage subsidiary IS operations.

Control and Coordination

The integration of subunits in large organizations is dependent on the manipulation of two processes—control and coordination [7]. While control normally represents a direct intervention in the operations of a subordinate unit [12], coordination is most often viewed as a facilitating process that allows for linkages between multiple business subunits [45]. A number of frameworks exist for both control (e.g., [6, 10, 11, 27, 30]) and coordination (e.g., [14, 42, 45]).

Control and coordination are usually manifested within the organizational context as mechanisms that may take a number of forms. In this study, a mechanism of control and coordination is defined as any administrative device that is used to achieve integration of cross-subsidiary activities.

Galbraith [13] notes that mechanisms for control and coordination increase in both complexity and expense as a firm moves from simple hierarchies to complex integrating departments. Further, each mechanism is envisioned to be in addition to, not a substitution for, a prior mechanism [27, 35]. This is consistent with Nobel and Birkinshaw’s [29] contention that integration modes are both complementary and competing [29]. Martinez and Jarillo [27] offer a classification of such mechanisms that distinguishes between those used for control and those used for coordination (see Table 1). It should be noted that two broad categories of mechanisms may be used by organizations to establish control and ensure coordination. Formal mechanisms of control typically focus on particular individuals in a superior–subordinate relationship while informal mechanisms are geared toward groups [20].

There has been an increasing volume of IS literature over the past few years that focuses on the use of control mechanisms as part of project management. While some have examined the use of IS as means of establishing control over business processes [38] or other organizational activities [43], many have focused on modes and portfolios of control [19, 21]. Only a few have examined the actual mechanisms. Chaudhury and Sabherwal [5], for example, compare the use of formal (outcome and behavior) and informal (clan and self) control in five outsourcing projects. They found that outsourcing projects were managed by portfolios of control dominated by formal rather than informal mechanisms. Similarly, Kirsch [20] found in a study of
two IS projects that the control choices changed over the life of the projects, shifting between combinations of formal and informal mechanisms between project phases. Unlike the study presented here, however, the focus of much of the prior research in IS controls, including the two described above, has been on project management rather than control and coordination of disparate IS operations.

Table 1. Framework of Integration Mechanisms

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Formal</strong></td>
<td></td>
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<tr>
<td>Departments</td>
<td>This involves the grouping of activities within organizational units. The goal of such mechanisms is to achieve the “right structure” to deal with a given environment.</td>
</tr>
<tr>
<td>Centralization</td>
<td>A noncybernetic form of control in which the locus of decision making is deliberately centralized or decentralized.</td>
</tr>
<tr>
<td>Formalization and standardization</td>
<td>These mechanisms typically indicate the extent to which policies and rules are written down and standard procedures are established through routines.</td>
</tr>
<tr>
<td>Planning</td>
<td>Planning mechanisms are systems and processes that aim at guiding the activities and actions of subsidiaries. Examples include strategic planning, budgeting, schedules, and goal setting.</td>
</tr>
<tr>
<td>Output and behavioral</td>
<td>Output controls are based on the evaluation of subsidiary outputs by the MNC headquarters. Examples of such outputs include records, files, and reports. Behavioral controls are based on direct personal surveillance and aim at monitoring and enforcing certain behaviors in subsidiary units.</td>
</tr>
<tr>
<td><strong>Informal</strong></td>
<td></td>
</tr>
<tr>
<td>Lateral relations</td>
<td>Such mechanisms cut across formal structures and aim at developing direct contact between personnel in various departments and subsidiaries. Examples include task forces, teams, committees, integrating roles, and integrating departments.</td>
</tr>
<tr>
<td>Informal communication</td>
<td>The goal of these mechanisms is to supplement formal communications through informal and personal contact between managers. Corporate meetings, conferences, management trips, personal visits, and the transfer of managers are typical examples.</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>These mechanisms aim at imparting a sense of the organization’s goals and objectives, how the organization does things, and the style of decision making. This is achieved through the socialization of individuals and training and transferring managers across subsidiaries.</td>
</tr>
</tbody>
</table>

Source: Adapted from [27].
Subsidiary Strategic Role

In addition to the susceptibility to control due to resource dependence, prior research suggests the strategic role of a given subsidiary also plays a role in determining the level and types of control and coordination mechanisms used by a corporate IS headquarters.

For purposes of simplicity and convenience, it is tempting to assume that MNCs are homogeneous structures—that the headquarters–subsidiary relationship is the same for all subsidiaries. Yet the MNC is, in truth, an enormously complex entity. Ghoshal and Nohria note that “the internal structure of MNCs is not homogenous throughout the organization but is systematically differentiated” [15, p. 323]. Environmental volatility and global imperatives have forced MNCs to locate critical resources and assets in subsidiaries around the world [22]. Simply stated, MNCs assign different strategic roles to different subsidiaries worldwide. Table 2 summarizes significant prior research on subsidiary roles.

The Research Model

This paper argues that, based on the findings and conclusions of prior studies, the resource-control-dependence scenario extends to the case of intra-organizational control and coordination in MNCs (concurrency with this viewpoint may be found in [18, 28, 34]). Specifically, it is argued that under conditions where subsidiary IS management has only limited local access to resources needed to provide adequate technological infrastructure, it will depend on the parent company for the required resources. This resource dependency, along with the strategic role of the subsidiary, will significantly determine the nature of the strategic relationship between parent and subsidiary units in a given MNC. This strategic relationship will, in turn, influence the level of control and coordination (both formal and informal) exerted over the IS management of the subsidiary unit. It should be noted that both “strategic relationship” and “level of control and coordination” represent latent variables that are created as part of the analytical method used (canonical correlation analysis).

The Hypotheses

To test the validity of RDT in the context of IS management in MNCs, the relationship between level of control and coordination (FORMAL and INFORMAL), and three key variables (RESOURCE, DEPENDEN, and SROLE) are examined (see Figure 1).

Level of Control and Coordination

As noted earlier, managers in MNCs must continually face the issue of the strategic integration of their operations in a variety of different host country environments [8].
Table 2. Significant Prior Research on Subsidiary Roles

<table>
<thead>
<tr>
<th>Authors</th>
<th>Subsidiary roles defined</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nobel and Birkinshaw [29]</td>
<td>A. Local adaptor</td>
<td>Surveyed 110 R&amp;D units in 15 Swedish MNCs. Classification</td>
</tr>
<tr>
<td></td>
<td>B. International adaptor</td>
<td>based on interactions with international units and existence of worldwide mandates.</td>
</tr>
<tr>
<td></td>
<td>C. International creator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Autarchic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Confederate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Strategic auxiliary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Partner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Vassal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Collaborator</td>
<td></td>
</tr>
<tr>
<td>Birkinshaw and Morrison [3]</td>
<td>A. World mandate</td>
<td>Surveyed 126 subsidiaries from the United States, United Kingdom, France, and Germany. Classification based on scope and nature of subsidiary contributions to the MNC, ranging from purely local to world mandates.</td>
</tr>
<tr>
<td></td>
<td>B. Specialized contributor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Local implementor</td>
<td></td>
</tr>
<tr>
<td>Gupta and Govindarajan [16]</td>
<td>A. Global innovator</td>
<td>Nonempirical. Classification based on inflows and outflows of knowledge to and from the subsidiaries.</td>
</tr>
<tr>
<td></td>
<td>B. Local innovator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Integrated player</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Implementor</td>
<td></td>
</tr>
</tbody>
</table>

This integration is typically achieved through the careful manipulation of two types of mechanisms—formal and informal (see Table 1). Formal controls are those mechanisms that enforce a standard means of operating and reporting. Informal mechanisms of control and coordination are those that focus on fostering vertical and lateral communications within the organizational network and developing a consistent worldwide company culture. In this study, formal mechanisms (FORMAL) are operationalized as the level of usage of planning and standardization mechanisms imposed by the corporate headquarters. Informal mechanisms (INFORMAL) are operationalized as the level of use of coordination mechanisms such as personal contact, manager transfers, committees, task forces, conferences, and centralized training.

IS Resource Availability

The growing trend toward global integration of value-added activities has emphasized the need for organizations to seek out greater information on the foreign environments
in which they intend to operate. Makhija et al. write: “firms seek environments . . . where the appropriate skills, infrastructure [and] resources exist” [26, p. 685]. In situations where such resources do not exist at the level and quality necessary for purposes of integration, the necessary skills and infrastructure must be sought from corporate headquarters. In this study, IS resource availability (RESOURCE) is measured in terms of the availability and quality of essential hardware, software, vendor support, and skilled IS personnel, in a given host country.

Dependence

According to RDT, the adequacy of a country’s IS and IS resources will play a role in determining the dependence of an MNC subsidiary on the headquarters for meeting necessary infrastructure requirements. In this paper, dependence (DEPENDEN) is measured as the perceived dependence of the subsidiary on corporate headquarters for essential hardware, software, vendor support, and skilled IS personnel.

Strategic Role

As noted earlier, MNCs are internally differentiated with different subsidiaries playing a variety of strategic roles within the company’s global network. The strategic role of the subsidiary unit is expected to significantly influence the strategic relationship between the corporate headquarters and the country unit, and hence, the types of control and coordination mechanisms used. This study utilizes the framework pro-
posed by Gupta and Govindarajan [16] and operationalizes subsidiary strategic role (SROLE) as the level of knowledge flows to and from the subsidiary to other units in the MNC network.

It is hypothesized that there is a significant relationship between the set of predictors of strategic relationship (RESOURCE, DEPENDEN, and SROLE) and the control and coordination set of variables (FORMAL and INFORMAL). That is,

Hypothesis 1: The strategic relationship between a headquarters and subsidiary IS management operations is significantly associated with the use of formal and informal mechanisms of control and coordination.

Further, with regard to dependence:

Hypothesis 2a: Subsidiaries exhibiting higher levels of dependence on IS resources from an MNC headquarters are associated with higher levels of usage of formal mechanisms of control and coordination.

Hypothesis 2b: Subsidiaries exhibiting higher levels of dependence on IS resources from an MNC headquarters are associated with higher levels of usage of informal mechanisms of control and coordination.

Also, with regard to the availability of IS resources:

Hypothesis 3a: Subsidiaries operating in countries with high availability of IS resources are associated with lower levels of usage of formal mechanisms of control and coordination.

Hypothesis 3b: Subsidiaries operating in countries with high availability of IS resources are associated with lower levels of usage of informal mechanisms of control and coordination.

Finally, with regard to the strategic role of a subsidiary, it is hypothesized that

Hypothesis 4a: Subsidiaries characterized by high knowledge flows with other subsidiaries are associated with higher levels of usage of formal mechanisms of control and coordination.

Hypothesis 4b: Subsidiaries characterized by high knowledge flows with other subsidiaries are associated with higher levels of usage of informal mechanisms of control and coordination.

Methodology

To statistically test the hypotheses suggested by the research model presented in the previous section, the study utilizes a linked-pair design in which a valid data point is defined as matched data collected from the headquarters of an MNC and from one of its subsidiary units. The data analyzed here was collected as part of a larger survey on the IS management function in MNCs.
Data Collection

Two questionnaires were administered as part of the survey—a headquarters instrument to be completed by a senior IS manager at the corporate headquarters and a subsidiary instrument targeted at the senior IS manager at the subsidiary unit of the MNC.

An initial draft of the headquarters questionnaire was developed and discussed with a panel of expert academicians, which resulted in several revisions. The second draft of the headquarters instrument was pretested with the CIOs of seven large MNCs. Subsequent telephone interviews with three of the respondents indicated that no further changes were required to the instrument.

An initial draft of the subsidiary questionnaire was also developed and discussed with a panel of academic experts. After incorporating several revisions, a second draft of the subsidiary instrument was pretested by administering the questionnaire to two subsidiary IS managers—one in the United Kingdom and one in India. No revisions were required. Table 3 shows how each construct was operationalized.

The first attempt for obtaining a response from an MNC headquarters and (subsequently) a subsidiary was through standard postal services. Failing a mail response within two to three weeks, telephone calls were placed. For headquarters, the questionnaire was administered over the telephone. This was possible due to the shortness of the headquarters survey.

Table 4 provides the response rates for the survey. The final sample included responses from 54 headquarter–subsidiary surveys. Responses were received from 19 countries across six continents and a variety of industries. Table 5 presents the sample characteristics.

Analysis and Results

In this study, canonical correlation analysis was conducted using the two coordination variables (FORMAL and INFORMAL) as predictors of the three independent variables (DEPENDEN, RESOURCE, and SROLE). CCA is a member of the multiple general linear hypothesis family of methods and is used to examine the relationship between two sets of variables. It is most appropriate when there are two or more interrelated dependent variables that need to be simultaneously evaluated against a set of independent variables [37]. Like regular correlation, canonical correlation squared ($R^2$) is the percent of variance in the dependent set explained by the independent set along a given dimension. Thus, while traditional multiple regression models are used to examine one-to-many relationships, CCA is used for many-to-many relationships.

As indicated above, CCA is used when there are two or more correlated dependent variables (if there were no relationship between the criterion variables, then it would have been possible to separately regress each on the set of independent variables). In this case, a simple bivariate correlation analysis yields a Pearson coefficient of 0.592, significant at the $p = 0.01$ level, suggesting that CCA would indeed be an appropriate analytical method to use in the study.
Table 3. Operationalization of Constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variable</th>
<th>Operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal mechanisms</td>
<td>FORMAL</td>
<td>Number of formal mechanisms. Based on aggregate value of responses to four items in subsidiary instrument.</td>
</tr>
<tr>
<td>Informal mechanisms</td>
<td>INFORMAL</td>
<td>Number of informal mechanisms. Based on aggregate value of responses to seven scaled items in subsidiary instrument.</td>
</tr>
<tr>
<td>Strategic role</td>
<td>SROLE</td>
<td>Part a subsidiary plays as a provider of goods, services, or information to other peer subsidiaries in the MNC based on Gupta and Govindarajan [16] framework. Operationalized as level of knowledge flows. Aggregate value using responses to four items in subsidiary instrument.</td>
</tr>
<tr>
<td>Host country</td>
<td>RESOURCE</td>
<td>The required hardware, software, vendor support, and IS personnel available to a subsidiary in the host country. Operationalized as single index based on availability and quality of above resources. Aggregate value of responses to eight scaled items in subsidiary instrument.</td>
</tr>
<tr>
<td>IS resources</td>
<td>DEPENDEN</td>
<td>The extent to which a foreign subsidiary relies on the MNC headquarters for necessary IS resources. Operationalized as single index of dependence on MNC headquarters for hardware, software, vendor support, personnel, and training. Aggregate value using responses to five scaled items in subsidiary instrument.</td>
</tr>
</tbody>
</table>

Table 4. Survey Response Rates

**Headquarters response rate**

- Number of headquarters questionnaires mailed: 610
- Number of envelopes returned to sender: 43
- Effective sample frame size: 567
- Number of responses received: 72
- Effective response rate for headquarters questionnaires (percent): 12.7

**Subsidiary response rate**

- Number mailed to subsidiaries (one per headquarters response received): 72
- Number of subsidiary responses received: 59
- Number of nonusable responses: 5
- Number of usable responses: 54
- Effective response rate for subsidiaries (percent): 75
It should be noted that CCA will yield as many canonical functions as there are variables in the smaller of the two variable sets. Hence, for this model, the analysis resulted in two canonical functions (or roots) with squared canonical correlations of 0.217 (Root 1) and 0.012 (Root 2) for each successive function. Collectively, the full model across both functions is statistically significant using the Wilks’s $\lambda = 0.773$ criterion, $F(6, 98.00) = 2.24, p < 0.05$. Thus, H1 is supported. Dimension reduction analysis shows that, while the full model (Functions 1 to 2) is significant, the second function (Function 2 alone) is not ($F(2, 50.00) = 0.303, p = 0.74$). Thus, only the first function is further analyzed in this study. Table 6 presents the results of the analysis and includes the standardized canonical coefficients for the first function, as well the structure coefficients.

Using the recommended minimum of a 0.3 cutoff correlation for acceptable loading [24], the standardized canonical coefficients ($R_c$) for the latent predictor variable indicate that all three dimensions (DEPENDEN, RESOURCE, and SROLE) are important contributors to the strategic relationship composite. Similarly, for the level of coordination set of criterion variables, both FORMAL and INFORMAL notably contribute to the composite. The squared structure coefficient ($R_s^2$) indicates that, in the strategic relationship set, DEPENDEN and SROLE explain 30.7 percent and 26.4 percent of the variance, respectively, while RESOURCE only explains 8.9 percent. With regard to level of coordination, both FORMAL and INFORMAL make noteworthy contributions, explaining 66.2 percent and 90.2 percent of the variance.

Each dependent variable was also regressed on the set of the independent variables to parse out individual effects. It should be noted that the strong codependence of RESOURCE and DEPENDEN would normally be cause for multicollinearity concerns. In this case, however, the variance inflation factors (VIFs) were well below the recommended limit of ten [2] and the possibility of errors stemming from such a statistical phenomenon were deemed to be minimal. Tables 7 and 8 present the results of the regression run.

The results of the multiple regression analysis suggest that the level of usage of formal mechanisms of control and coordination are strongly correlated to DEPENDEN (H2a supported) and moderately so with SROLE ($p = 0.061$; H4a supported). The relationship between RESOURCE and FORMAL was not significant (H3a not supported). The relationship between DEPENDEN and INFORMAL was, however,
highly significant (H2b supported) while RESOURCE was also strongly related but not in the direction hypothesized (H3b not supported). The relationship between SROLE and INFORMAL was not significant (H4b not supported).

Discussion

The primary objective of this study was to test the validity of RDT in the context of global IS operations of an MNC. Although the overall model is significant, it is also interesting to note that the results suggest that the use of both formal and informal mechanisms are significantly and positively associated with the level of IS dependence.
a subsidiary has on its parent organization. Thus, as predicted by RDT, the greater the level of dependence, the greater the use of both formal and informal mechanisms of control. The results for resource availability, however, were more surprising. Based on the analysis, while there was no significant relationship between RESOURCE and FORMAL, the association between RESOURCE and INFORMAL was significant but not in the direction expected. The results suggest that the higher the availability of IS resources in the host country, the greater the level of use of informal mechanisms of control and coordination. This clearly runs counter to the expectations of RDT that argues that resource-rich environments would normally be less susceptible to headquarters control.

A possible explanation is that the availability of high-quality IS resources in a country environment may actually encourage a corporate headquarters to implement a variety of control and coordination mechanisms in a subsidiary and that it is in the best interest of the subsidiary to comply. One of the key weaknesses of RDT lies in the fact it does not adequately address issues of power imbalance and mutual dependence [4]. Power imbalance is defined as the ratio of the power of a more powerful entity (such as a headquarters) to that of a less powerful one (such as a subsidiary) [25]. The fundamental tenets of RDT appear to hold when dealing with dyadic relationships characterized by high power imbalance. The influence of this imbalance can, however, be moderated by the mutual dependence of the actors. Mutual dependence refers to the existence of bilateral dependencies in the headquarters–subsidiary relationship [1]. Given the global nature of competition, both the headquarters and subsidiaries may be damaged by failure to coordinate in the dyadic relationship (regardless of the lack of power imbalance stemming from subsidiaries’ operating in a resource-rich environment). Alternatively, it is possible that, given the subsidiary has access to the technologies and personnel required to make complex integrative mechanisms feasible, such high-technology environments actually make the subsidiaries ideal locations for a global center of excellence and thus transform their strategic role into a critical one. In turn, they become more important to control. While bridging or buffering strategies are often utilized to reduce dependence and susceptibility to external control [36], such an approach may be infeasible in organizational environments that seek high levels of IS integration. Subsidiaries operating in environments with limited IS resources may not have the skills or necessary technology available locally to make the use of control and coordination mechanisms possible. It is interesting to note that, while the use of informal mechanisms is significantly associated with IS resource availability, formal mechanisms are not. This may mean that the control and coordination of subsidiary IS operations where the subsidiary has sufficient access to the necessary IS resources (hence, low dependence on the parent) must be achieved through “softer” informal mechanisms, rather than the more heavy-handed formal mechanism of control. This receives some theoretical support when considering power imbalances and mutual dependence [4]. In situations where there is high mutual dependence between the headquarters and subsidiary with little power imbalance (due to subsidiaries’ operating in resource-rich environments), there is significant scope for the two actors to negotiate. Excessive demands from one party (headquarters) in the shape of formal controls are
likely to be less successful than “softer” informal mechanisms. Thus, while RDT may apply for formal mechanisms of control and coordination, it may not appropriately explain the use of informal mechanisms.

Given the overall research design and cross-sectional nature of the data collected for the study, however, it is not possible to definitively state that the quality and availability of IS resources influence the implementation of control and coordination mechanisms. An alternative explanation is that the actual deployment and use of the mechanisms creates an IS environment in which the required resources and skills have been made available. That is, the use of the integrative mechanisms creates the necessary IS environment. Further research would be required to make a determination.

The seeming lack of significance of strategic role in determining the use of control and coordination mechanisms is also interesting. While there was a moderately significant ($p = 0.061$) relationship between a subsidiary unit’s strategic role and the use of formal mechanisms, there was none in the case of informal mechanisms. This suggests that MNCs still rely more on the use of standardization and similar mechanisms that force a particular subsidiary behavior for those units perceived as critical to global operations rather than facilitating coordination through contacts and communication.

Limitations

In any international field study involving multiple countries and several industries, there are a number of limitations that place bounds on the external validity of the findings. While these limitations do not negate the veracity of the results, it is important to acknowledge them so that the findings may be interpreted in the context in which the research was designed and the data collected.

First, there is a significant volume of empirical IS research that has been published that looks at IS issues in purely domestic organizations. There is a paucity, however, of similar research in the context of technology management in MNCs. This is not surprising, given the difficulty and expense involved in conducting such studies. The unfortunate consequence of this fact is that there is a limited theoretical base in IS literature to use as a foundation for relevant research models. It becomes necessary, therefore, to extrapolate the findings of research conducted in many other disciplines of management to the research model used here. Thus, the research model developed here is based on prior studies conducted at the overall organization level, rather than at the level of the IS function.

Second, the sample size of 54 data points is relatively small. Survey research is a common means of collecting data. Many respondents indicated that they were deluged by requests for participation in studies and had established company policies that prevented them from responding. Although the sample size is cause for some concern, it meets the rule-of-thumb minimum of five data points per independent variable.

Finally, the generalizability of the findings is always a problem for empirical studies drawing on a limited sample. Several companies that did not respond were contacted by telephone to assess the possibility of a nonresponse bias. The IS managers at these organizations indicated that the study was relevant to them but they did not have the
time to complete the questionnaire. It is also acknowledged that, while the sampling of MNC headquarters to be included in the study was random, the selection of subsidiaries was not. Given that the research design called for headquarters respondents to identify subsidiaries to be contacted, it is possible that the subsidiary sample may reflect some bias. For example, headquarters respondents may have selected subsidiaries they communicated with most frequently. The possible implication of such a selection bias would be that the subsidiary units represented in the sample are too similar and offer insufficient variance for appropriate analysis. While the study asked that headquarters managers identify various types of subsidiaries, this was not always done. The results of the study must be interpreted in this context. Every attempt was made, however, to ensure the subsidiary sample was as representative as possible.

Conclusion

Resource dependence theory has long been used to explain the relationship between parent and subsidiary units in large organizations. This paper attempted to test the validity of the theory in the context of IS management in subsidiary units of multinational corporations. While the theory holds up well in the case of dependence, the expected relationship with IS resource availability was not observed. Although there was a significant relationship with the use of informal mechanisms of control and coordination, it was in the opposite direction to what was expected. This suggests that the type of mechanism (formal or informal) used is an important factor when examining the resource-control issue. Further research is needed to examine the influence of the specific types of control mechanisms and when they are most effective.

REFERENCES


