Decisions to Outsource Information Systems Functions: Testing a Strategy-Theoretic Discrepancy Model

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ABSTRACT

In recent years, the decision to outsource information systems (IS) functions has become a viable strategic alternative in managing the increasingly complex IS functions. In this study, the IS outsourcing phenomenon is conceptualized as a strategic decision in the organization. Drawing on resource-based theories, resource dependence theories, and other theories of strategic management, a discrepancy model of this decision is developed. Relationships between a number of strategy-theoretic factors and the IS outsourcing decision are hypothesized. These factors include IS resource performance discrepancies manifested in the form of gaps in information quality, IS support quality, IS cost effectiveness and financial performance, as well as the strategic orientation of the firm. Results of the study indicate that, while cost consideration and the firm’s financial performance are not associated with the IS outsourcing decision, difficulties in providing good information outputs and IS support services are associated with the decision. Overall, the findings suggest that the current trend toward outsourcing represents a continuing evolution of the IS function as it attempts to fulfill its traditional mission of providing high quality information resource to the firm. When the performance of the delivered resource begins to slip in the current environment of rising expectation and technological complexity, outsourcing may become a strategic response of necessity. The paper concludes with a discussion of the implications of the results for practicing managers and suggestions for future research.

Subject Areas: Decision Processes, Information Management, and Strategy and Policy.
INTRODUCTION

In recent years, outsourcing of information systems (IS) functions in organizations has markedly increased. Attempting to remain competitive in the rapidly developing world of computer technology is becoming a burden to many organizations, and hiring outsiders to handle part or even all of its information services may help an organization provide better services and acquire and maintain competitive advantage. While recent interest in IS outsourcing has burgeoned, the practice is not new. Electronic data systems (EDS) began to provide limited data processing services for Frito-Lay and Blue Cross & Blue Shield as early as 1963. Over the last few years, however, very extensive and complex outsourcing agreements have been arranged between leading outsourcing vendors, like EDS, Perot Systems, IBM, and such companies as First City, Eastman Kodak, and National Car Rental. After the much publicized outsourcing contract between Kodak and IBM in 1989, the sharp increase in outsourcing decisions became known as the “Kodak Effect” [34].

We broadly define outsourcing of IS functions as the practice of turning over part or all of an organization’s IS functions to external service provider(s). This definition includes the following external services: applications development and maintenance, systems operation, networks/telecommunications management, end-user computing support, systems planning and management, and purchase of application software. We exclude business consulting services, after-sale vendor services, and the lease of telephone lines. An organization can obtain these services through a variety of contracts including facilities management, systems integration, time-sharing, and complete outsourcing which permits the vendor full control over the function with profit and loss responsibilities.

As the scope and complexity of IS outsourcing has expanded, interest in the subject from the practitioner community has grown [58]. However, relatively few studies have provided an in-depth examination of the phenomenon (e.g., [29] [30] [34] [35]). Based on the magnitude, complexity, potential irreversibility, and other attributes of emerging patterns in IS outsourcing, the decision to outsource IS functions is conceptualized in this study as a strategic decision in the organization. Drawing on theories of strategic management, factors with potential relationships with the outsourcing decision will be identified and examined.

The next section discusses the strategic nature of IS outsourcing and develops specific research questions. In order to identify factors that may be associated with IS outsourcing, this is followed by a review of strategic management theories, such as resource-based theories [5] [59] and literature on strategy types [11] [37]. Broad associations are stated in the form of propositions which are subsequently presented as specific hypotheses. The methodology section then describes a field survey intended to explore possible empirical support for the hypothesized relationships. We then report the results of the survey. The final two sections discuss the study’s findings and assess contributions and limitations of the study and the possibilities for future research.

IS OUTSOURCING AND STRATEGY

The origin of IS outsourcing can be traced to the time-sharing and facility management services of the 1960s and 1970s, which were popular among financial institutions.
Today outsourcing has become a valid option in all areas of IS services. Not only smaller firms but larger companies with mature IS departments (e.g., Kodak and American Standard) are also outsourcing their IS functions. In the 1970s, applications packages, contract programming, and specific processing services comprised the major portion of services outsourced. However, in the 1990s, outsourced IS services are more likely to be telecommunication management, systems integration, application development, and systems operation. In the past, outsourcing service providers typically assumed no management responsibility. Today growing ranks of service providers are willing to take on such responsibility. Furthermore, the business relationship between the service receiver and the provider is increasingly that of a partnership rather than merely that of customer and vendor.

### IS Outsourcing as a Strategic Decision

As the scope and complexity of IS outsourcing rapidly expand, the decision to outsource IS functions is bearing less resemblance to the routine decisions of yesteryear, which involved the selection of sub-contractors in a restricted area. The $750-million, 10-year outsourcing contract between EDS and Enron, for example, involved extensive transfer of assets, leases, and staff to a vendor that assumed profit and loss responsibilities. This type of complete outsourcing, which typically lasts for many years, is being practiced by such large companies as Kodak, American Standard, Copperweld, and Dial. The contract between EDS and System One was worth almost $2 billion. As exemplified by these cases, the decision to outsource IS functions is taking on the characteristics of strategic decision making, as manifested by its unprecedented magnitude and potential irreversibility. Not surprisingly, a recent survey of IS senior executives reveals that acquiring outside services is one of the six most important strategic issues confronting their organizations in IS management [9].

Strategic decisions are typically motivated by strategic advantages in the competitive market place. Without convincing possibilities of gaining such advantages, few organizations are willing to commit enormous resources and risk the loss of control over an important management function, as in the case of IS outsourcing. By 1989, when the "Kodak Effect" had begun to accelerate [34], the notion of competitive advantage through strategic IT application [25] [42] was gaining widespread acceptance, and the integration of IT strategic planning with the overall strategic planning of the firm was being advocated [44]. Against this recent "historical" backdrop, it appears that a number of strategic advantages may have motivated IS outsourcing decisions. For example, it has been argued that outsourcing provides immediate access to otherwise unavailable state-of-the-art technology, and moves the obsolescence risk to the service provider [32]. Since service providers often pool projects from different service receivers, they are also in a better position to exploit economies of scale [32]. Furthermore, IS outsourcing might help many companies refocus their business efforts on such higher-level business issues as the strategic use of IT and away from such issues as data center management and hardware acquisition [32].

These potential strategic advantages, as varied as they seem to be, are implicitly based on a common notion of IT management as the management of information.
resources. It is the idea that information technology, information systems, and information itself (as stored in data bases or information warehouses) are various forms of resource inputs to operational and managerial decision processes, and that the efficiency and effectiveness of these processes are the ultimate gauge of performance, not how well a particular resource form is managed [54]. Therefore, the management of these resources can be outsourced to the organization’s advantages. However, it should be noted that the advantages discussed earlier are not really unique to IT outsourcing, they may be realized in outsourcing other forms of resources. For example, a major trucking company has decided to turn over the management of its huge tire warehouse to a large tire manufacturer. In doing so, the company can concentrate more on its main business, namely trucking. In the meantime, due to the economies of scale enjoyed by the tire manufacturer, the cost of tire warehousing is significantly reduced and stock availability improved (the ultimate performance gauge). Thus, the strategic outsourcing decision seems to hinge upon two conditions: (1) the performance of the resource in question falls short of expectations, and (2) an outsourcing vendor may significantly improve the performance.

With a more generalized concept of information resources, IT management in many organizations tends to shift from a focus on technology to a focus on better information utilization and management that leads to performance improvements and competitive breakthrough. Rather than spend time and resources building an internal computing infrastructure, many senior executives believe that efforts should be concentrated on effective use of information and the creation of new analytical data to improve management’s responsiveness to market changes. These executives contend that on its own, an information system can no longer provide enduring business advantage, and that competitive firms should shift their attention from systems to information [30]. This more comprehensive view of information resources—that is, viewing information resources as consisting of both information and information systems—should facilitate the strategic use of these vital resources [27].

Research Questions and Previous Studies

Today’s IS outsourcing decisions are characterized by their enormity, complexity, and potential irreversibility. Beyond these ostensible indications, a number of perceived strategic advantages may have played a role in motivating the decision to outsource, including immediate access to new technology, avoidance of obsolescence risk, and benefit from vendors’ economy of scale. Finally, and perhaps most importantly, these perceived strategic advantages stem from the generalized information resource concept. Thus, IS outsourcing is not so much an IS decision as a strategic resource outsourcing decision. Similar considerations can lead to other resource outsourcing, for example, tire warehousing. Instead of operating inside the technology black box, many organizations are tempted to outsource the difficult task of managing the black box, and rechannel scarce resources into finding competitive applications for the black box itself that generate ultimate payoff of information resources.

The strategic thrusts underlying the IS outsourcing decision, as summarized above, suggest that the decision may have its root in organizational strategy, and may be explained from a strategy-theoretic perspective. The resource view of IT management, for instance, can be conceptually related to one stream of strategic
management theories, resource-based theories [5] [7] [59], which will be discussed later. Given the strong appeal of the strategy-theoretic perspective, it is surprising that none of the previous studies of IS outsourcing were based on strategy theories. These studies have employed a number of other theoretic perspectives, including innovation [34], and political process, and transaction cost theory [29]. The political process perspective, for instance, underlay the 14-company case study conducted by Lacity and Hirschheim [29] [30] which uncovered evidence that is not consistent with some commonly perceived advantages of outsourcing. In recent research conducted by Loh and Venkatraman [35], the determinants of IS outsourcing were examined in terms of the firms’ financial performance and patterns of IT governance. The two researchers have also examined the sources of influence on the outsourcing decisions from an innovation diffusion perspective [34].

In this study, the IS outsourcing decision will be examined on the basis of strategic management theories, which has not been explored in previous studies. Specifically, the following research questions will be addressed.

1. From a strategy-theoretic perspective, what factors may be associated with the IS outsourcing decision?
2. Is there empirical evidence to support the relationships between these strategy-theoretic factors and the IS outsourcing decision?

To clarify the discussion emanating from the first question, tentative conclusions will be presented in the form of two general research propositions, which are the basis for a set of specific hypotheses. We conducted a preliminary test of these hypotheses through an empirical field survey in order to address the second research question. Viewed from a broad IS research context, this study may be regarded as part of a continuing inquiry into information technology (IT)-strategy interface which has received increasing emphasis from IS scholars in recent years [11] [25] [40] [44]. Research efforts in this direction include a study on the integration of IS planning and competitive strategy [11], an empirical examination of the information systems strategic grid [44], and an attempt to measure the potential impact of IT on organizational strategic variables [40]. We extend this research stream on IT-strategy interface to the IS outsourcing phenomenon.

**IS OUTSOURCING DECISIONS: STRATEGY-THEORETIC PERSPECTIVES**

As a discipline, strategic management is concerned with how firms formulate and implement strategies to accomplish a desired performance goal [47]. Contingency perspectives of business strategy posit that the appropriateness of a given strategy depends on the competitive setting, and that there is no universal set of strategies that is optimal for all businesses, irrespective of their resource positions and environmental context [18]. Thus, effective strategies are those which achieve a fit between environmental conditions and organizational factors [15].

**Strategic Resource Theories**

We review two streams within the field of strategic management that concern the strategic deployment of resources: resource-based theories and resource dependence theories. Resource-based theory views a firm as a collection of such productive
resources as physical capital, human capital, and organizational capital (e.g., formal and informal structures of the firm) [5] [7] [59]. According to resource-based theory, competitive advantage for a firm can only occur in situations of resource heterogeneity (how resources are different across firms) and resource immobility (inability of competing firms to obtain resources from other firms) [5] [57]. In order for a firm's resources to provide sustained competitive advantage, four criteria must be attributable to the resources: (1) value—the resource must be valuable to the firm; (2) rareness—the resource must be unique or rare among a firm's current and potential competitors; (3) imperfect imitability—the resource must be imperfectly imitable, and (4) non-substitutability—the resource cannot be substituted with another resource by competing firms [5]. Thus, the essence of the resource-based theory is that given resource heterogeneity, resource immobility, and satisfaction of the requirement of value, rareness, imperfect imitability, and non-substitutability, a firm's resources can be a source of sustained competitive advantage.

In addition to traditional concepts of resources such as physical capital and human resources, the notion of information resources has taken hold in recent years [27] [51]. Information resources in an organization include not only information in the form of data files and scheduled reports, but also information systems that facilitate information access and acquisition [27]. The management of these resources treats information and information systems as resources having value in decision making and other processes contributing to the products and service that the organization must deliver to its customers [27]. A firm's competitive position depends on its ability to gain and defend advantageous positions concerning resources important to the production and distribution of its products and services [10] [46]. The contribution of information resources to competitive advantage has received increasing attention in recent years [25] [27].

To enhance competitive advantage, however, a firm is not restricted to exploiting only its existing stock of resources and capabilities. Grant [19] argues that the external acquisition of complementary resources (i.e., outsourcing) may be necessary to develop new capabilities in order to fill gaps of resources [50]. Further, according to Quinn, Doorley, and Paquette [43], in times of economic difficulties, firms should strive strategically to refocus on their "core competencies," that is, those resources that define their competitive advantages. For needed resources that are not within this focus, outsourcing should be considered. This strategy not only maintains the firm's stock of resources and capabilities, but also augments it in order to buttress and extend positions of competitive advantage and to broaden the firm's strategic opportunity set [19]. Therefore, according to the resource-based perspective, when the performance of existing resources falls short of expectation, outsourcing can be a strategic response to fill these gaps, as in the example given earlier of the trucking company's decision to outsource its tire warehouse. Applying this perspective to information resources, when information quality, IS support quality, and other performance measures of these resources fall short of expectations, IS outsourcing becomes a viable strategic option for the organization.

While a resource-based approach to strategic management emphasizes internal analysis of a firm in terms of resources and capabilities, resource-dependence theory focuses on the external environment of a firm and argues that all organizations find themselves dependent, in varying degrees, on some elements in their environments [1].
This dependence is usually a result of the external elements’ control of some needed resources—for example, land, labor, capital, information, or a specific product or service [28]. Thus, resource-dependence theories stress the necessity of adapting to environmental uncertainty, coping with problematic interdependence, and actively managing or controlling resource flows. A resource-dependence approach to strategic management argues that organizations adopt strategies to secure access to critical resources, to stabilize relations with the environment, and to enable survival [60].

The essence of the resource dependence theory is that an organization often enters into exchange relationships with other organizations in the environment when it fails to generate necessary resources or capabilities internally. Thus, resource dependence theory helps explain an organization’s strategic propensity toward securing access to critical IS resources from the external environment when gaps in internal capabilities develop. Through outsourcing, an organization can obtain scarce IS human resources (i.e., skilled programming and telecommunication personnel) and technological resources (i.e., network and telecommunication infrastructure) from the external environment to enhance its long-term survivability.

Both resource-based and resource dependence theories seek to explain how the possession and acquisition of valuable resources contribute to a firm’s competitive advantage. Interestingly, both of these theoretical streams would suggest outsourcing as a strategy to fill gaps when performance of internal resources and capabilities falls short of expectation. Therefore, the following research proposition is put forth:

Proposition 1: To the extent that information quality, IS support quality, and other performance measures of information resources fall short of expectation, the organization will be drawn toward the IS outsourcing strategy.

**Strategic Orientation Theories**

A major concept of organizational strategy is the notion of strategic orientation which generally refers to a set of underlying values and propensities that consistently guide an organization’s strategic actions and responses [55]. The empirical work of Venkatraman [55] showed that this concept involves such dimensions as analysis, futurity, aggressiveness, defensiveness, proactiveness, and riskiness. As can be seen, these dimensions capture the distinctive posture an organization adopts toward its environment. As aptly characterized by Hofer and Schendel [22], a strategy is “the match an organization makes between its internal resources and skills and the environmental opportunities and risks it faces and the purposes it wishes to accomplish” [22, p. 11]. Strategy formulation, therefore, should be based on the distinctive competence possessed by the firm [22] and will normally involve varying degrees of dependence upon external entities [60].

A number of researchers have discussed the relationship between a firm’s strategic orientation and its outsourcing decisions. Galbraith [17], for instance, proposed the “environmental management” concept as the basis for differentiating between three types of strategies: (1) relying on one’s own resources (independent strategies), (2) cooperating with elements of the environment (cooperative strategies), and (3) seeking to change the task environment (strategic maneuvering). The cooperative strategies have direct relevance to outsourcing, as such strategies involve
cooperative arrangement with other organizations [16] in the external environment to reduce risks and costs while increasing power for each organization [60].

Another well-known theory of strategic orientation was formulated by Miles and Snow [37] who classify corporate strategies into four types: defender, prospector, analyzer, and reactor. In a recent study, Das, Zahra, and Warkentin [11] suggest that Miles and Snow's [37] various strategy types can be associated with different dimensions of strategic MIS planning and approaches to obtaining IS resources. They suggest, for example, that defenders may favor IT developed internally, while prospectors may show preference for external IS resources. Theories of strategic orientation, therefore, provide the basis for the following research proposition:

Proposition 2: The strategic orientation of a firm is related to its propensity to outsource IS functions.

RESEARCH MODEL AND HYPOTHESES

Based on the two research propositions presented above, a research model is proposed to identify factors that may be associated with the IS outsourcing decisions in a strategy-theoretic sense. As shown in Figure 1, the dependent variable in the model is the IS outsourcing decision. The independent variables include a number of factors emanating from the two research propositions. Independent variables for Proposition 1 are related to the performance of resources such as information quality and IS support quality. For Proposition 2, a number of strategic orientation variables are identified, including Miles and Snow's four strategy types [37] and the three strategic roles of IT in the firm [25]. We will first discuss the resource performance variables and the related hypotheses before turning to variables and hypotheses concerning strategic orientation.

Resource Performance Variables

Proposition 1 states that to the extent that information quality, IS support quality, and other performance measures of information resources fall short of expectation, the organization will be drawn toward the IS outsourcing strategy. The independent variables corresponding to this proposition are the discrepancies, that is, the differences between the desired and actual level of performance of the various forms of IS resources (see Figure 1). Discrepancy models have been used successfully in the study of participative decision making [2]. Doll and Torkzadeh [14] applied the concept to IS research in the context of end-user involvement where a discrepancy between desired and actual involvement can occur. Following previous research, they defined three different conditions for such a discrepancy: high deprivation (desired level far exceeds actual level); equilibrium or moderate deprivation (desired level slightly less than or equal to actual level); and saturated (actual level far exceeds desired level). Doll and Torkzadeh [14] have demonstrated that these three conditions represent different frames of reference for user involvement, leading to varying patterns in user satisfaction. We adopt Doll and Torkzadeh's [14] scheme for defining these discrepancy conditions between desired and actual level of resource performance and test the following hypothesis:
Figure 1: Research model.

Hypothesis: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of IS resource, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

Four performance measures for IS resources are examined in the current study: information quality, IS support quality, IS staff quality, and IS cost effectiveness. The above hypothesis, therefore, represents a general statement of the following four hypotheses:

Hypothesis 1: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of IS resource in terms of information quality, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

Hypothesis 2: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of IS resource in terms of IS support quality, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

Hypothesis 3: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of IS resource in terms of IS...
staff quality, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

Hypothesis 4: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of IS resource in terms of IS cost effectiveness, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

Going one step beyond IS, the gap in resource performance at the organizational level, as manifested by the performance of the firm’s financial resources, can be expected to reinforce the predilection for IS outsourcing. Recent economic downturn and poor corporate financial performance are forcing many firms to look elsewhere to increase their margin, including IS outsourcing. As observed by Loh and Venkatraman [35, p. 12], “the traditional view of IT operation as an investment center or a service center is rapidly giving way to an emergent notion of a profit center,” and “when the firm does not perform well vis-a-vis its competition, the need to reevaluate the traditional governance modes of all its major spheres of operation, including the IT arena becomes even greater.” Based on these observations, we hypothesize that:

Hypothesis 5: IS outsourcing decisions are positively related to the perceived discrepancy in the performance of resource in terms of the firm’s financial performance, and the high deprivation group will be more likely to outsource than the equilibrium group which, in turn, will be more likely to outsource than the saturated group.

**Strategic Orientation Variables**

Strategic orientations, as stated in Proposition 2, may be related to an organization’s propensity to outsource IS. Two strategic orientation variables are examined in the research model: Miles and Snow’s strategic types [37] and the strategic role of IT [25]. Miles and Snow [37], in proposing one of the best known conceptualizations of strategic orientation, classify corporate strategies into four types: defender, prospector, analyzer, and reactor. According to them, a defender attempts to maintain a secure niche in a stable market and tries to protect its domain by offering higher quality, lower prices, and so forth. A typical defender firm is not at the forefront of developments in the industry. A prospector, on the other hand, typically operates in a dynamic market and often responds rapidly to opportunities with new products. In contrast to prospectors, analyzers are seldom “first-in” with new products. Rather, they carefully monitor competitors’ actions and try to be “second-in” with more cost-efficient products. The last of the four types, reactors, respond to environmental pressures whenever forced to and do not have a consistent strategy.

The Miles and Snow typology has been validated [48] [49] and used in a variety of empirical studies (e.g., [24]). In the IS field, Jenster [24] found that the extent to which executives monitor critical success factors was significantly different across different strategy types. In a recent study, Das, et al. [11] suggest that Miles
and Snow's [37] various strategy types can be associated with different dimensions of strategic MIS planning and approaches to obtaining IS resources:

1. Defenders are expected to favor IT developed internally. Because of their proclivity toward internal sources, defenders may overlook new market developments in IT. However, given the unique nature of IT, they may also form limited alliances with external sources for their technology.

2. Prospectors are expected to preclude the exclusive use of internal sources to meet their IS technology needs due to the diversity of their information needs. Because of their continuing engagement in new businesses, prospectors may emphasize external sources over internal sources in acquiring IT.

3. Analyzers are expected to make choices typical of defenders in their traditional and stable lines of business, while adopting a strategy typical of prospectors in their newer and more dynamic endeavors. This may sometimes result in mixed (internal and external) strategies for acquiring IT.

4. Reactors are organizations with no distinct competitive strategic orientation. A reactor makes decisions in a random fashion and in a reactive rather than a proactive way. As a result, there is no reason to believe that reactors will follow a specific approach in the way they secure IT resources.

Based on these observations, we hypothesize that:

Hypothesis 6: IS outsourcing decisions are related to a firm's particular strategy type: defender, prospector, analyzer, or reactor.

In addition to Miles and Snow's strategy types, another strategic orientation variable, the strategic role of IT, is also included in the research model. As the application of IS resources in organizations progresses over the years from automating clerical procedures to supporting decisions and to providing tools for competition, IT assumes an ever more important role in corporate strategy. Johnston and Carrico [25] suggest that in relation to strategy there are three different roles of IT in an organization: (1) the traditional non-strategy-related role, that is, supporting operation and facilitating decision support and administrative functions; (2) the evolving role—IT actively supporting the organization's strategy but not as an integral part of the strategy formulation process; and (3) the integral role—IS and executive management working together to make IT an integral part of corporate strategy and a tool for changing competitive patterns in the industry. In the integral role, IT is used proactively as a strategic weapon [42] to gain competitive advantage by improving productivity, enabling new ways of managing and organizing, creating new products and services, altering linkages with suppliers and customers, and ultimately establishing new standards of performance in the industry [20] [42]. These different strategic roles for IT in organizations can be expected to significantly influence the patterns of IS resource acquisition and deployment. One may argue that the more strategic the role the more likely it is that the firm will outsource. The traditional role of IT entails less need for outsourcing because what is required is a limited range of services which are well within the capabilities of the IS department. On the other hand, the integral role of IT would predispose the organization to outsource so as to free up scarce IS resources and redeploy them in strategic applications.
Although the above arguments may be valid, one can also reason in the opposite direction with equal conceptual appeal: when a function is too strategic or mission-critical, it should not be outsourced. Thus, the strategic role of IT may actually lead to less outsourcing if many functions are regarded as too mission-critical to be left to outsiders, as revealed in [53]. As the two opposing arguments may both be valid, the following hypothesis is proposed to examine differences between the three roles in relation to outsourcing decisions:

Hypothesis 7: IS outsourcing decisions will differ across the three different strategic roles of IT in the firm: traditional role, evolving role, or integral role.

As reflected by these research hypotheses, the study is exploratory in nature, with emphasis on testing a set of individual relationships suggested by strategy theories, rather than on developing a comprehensive best model for predicting the outsourcing decision.

RESEARCH METHOD AND MEASUREMENT OF VARIABLES

In selecting a research method, one must realize that generalizability, manipulation of research variables, and context realism cannot all be maximized using any one method. The field survey method was adopted in this study to enhance the external validity of research findings [36]. The unit of analysis is the corporation. Whenever possible, measures that have already been used and validated by other researchers are adopted. Constructs that have not been used are evaluated for content validity based on guidelines suggested in the research methodology literature [26].

The IS Outsourcing Decision

The outsourcing of IS functions, as indicated by Loh and Venkatraman [35], can no longer be considered as a single dichotomous decision as many of today’s outsourcing contracts involve complex arrangements and varying degrees of coverage for a firm’s IS activities. A continuous measure, Change in Outsourcing Budget (COB), is used to capture the concept. This is based on the difference between the current outsourcing budget and that of three years ago. By using this differential measure, we can focus on the proliferation of outsourcing that has occurred since Eastman Kodak and General Dynamics signed mega-contracts rather than on the older facilities management which was prevalent even in the 1970s. Indeed, research has demonstrated the “Kodak effect” on the diffusion of outsourcing practices over the last few years [34].

The outsourcing budget in each case is expressed as a percentage of the firm’s total IS budget. A similar approach is used in a study by Loh and Venkatraman [35]. Budgets were assessed for the five IS functions: applications development and maintenance; systems operations; telecommunications and networks management; end user support; and systems planning and management. Both the present and earlier outsourcing budgets are calculated as follows: the percentage of the total IS budget allocated for a function is multiplied by the percentage of that function’s budget allocated for outsourcing. The sum for all five functions becomes the measure of the degree of outsourcing. Subtracting the sum of three years ago from the present sum yields the COB:
\[ COB = \sum B_i X_i - \sum B_j X_j, \]

where

- \( COB \) = Change in outsourcing budget as percent of total IS budget,
- \( B_i \) = IS budget allocated for function \( i \) as percent of total IS budget at the present time,
- \( X_i \) = Outsourcing budget for function \( i \) as percent of total budget for function \( i \) at the present time,
- \( B_j \) = IS budget allocated for function \( j \) as percent of total IS budget three years ago, and
- \( X_j \) = Outsourcing budget for function \( j \) as percent of total budget for function \( j \) three years ago.

**The Discrepancy Measures**

Information resource performance is measured in terms of the information quality, IS support service quality, IS staff quality, IS cost effectiveness, and the firm's financial performance. For each of these constructs, responses to questionnaire items were on a 7-point scale: very poor (1), poor (2), somewhat poor (3), neutral (4), somewhat good (5), good (6), and very good (7). For each item, respondents were instructed to indicate both their actual ("what you actually achieved") and desired ("what you would have liked to achieve") performance level three years ago. The discrepancy was then calculated by subtracting the actual from the desired performance level. This measure of discrepancy is adopted from an approach used by Doll and Torkzadeh [14] for measuring end-user involvement with respect to the actual and desired involvement in system development activities. For the five-item quality of information scale discussed below, respondents were categorized as "saturated" if the sum of their responses to the five actual items was greater than the sum of their responses to the five desired items (i.e., actual quality of information was greater than desired quality of information). Respondents were placed in the "high deprivation" category if the difference exceeded 10 (or twice the total number of items in the scale). If the difference was between 0 and 10, they were placed in the "equilibrium or moderate deprivation" category [14].

**Resource Performance Variables**

Information resource performance is measured in terms of five constructs: quality of information, quality of support service, IS staff quality, IS cost effectiveness, and the firm's financial performance. Each of these constructs is discussed below:

**Quality of Information**

Quality of output information delivered by IS was operationalized by Bailey and Pearson [4] as one dimension of their user information satisfaction (UIS) measure. Baroudi and Orlikowski [6] have subsequently suggested a short form for UIS, and items for information quality included in that measure are adopted for this research. There are five items and they measure the quality of output information in terms of reliability, relevancy, accuracy, precision, and completeness.
Quality of IS Support and Quality of IS Staff

Miller and Doyle [38] designed and tested an instrument for measuring IS effectiveness. Factor analysis of the results reveals several underlying constructs that are simple to interpret. Among the factors they report, quality of IS support and quality of IS staff are adopted for this research. Quality of IS support is evaluated with five items (actual and desired) related to processing of requests for systems changes, lead time for new systems, responsiveness to user needs, support for users in preparing system proposals, and flexibility of data and reports. Specific items for this and other constructs included in the study are listed in the first column of Table 2. Another measure adopted from Miller and Doyle [38], quality of IS staff, includes responsiveness of analysts to user needs, competence of analysts, competence of IS staff, efforts expended in creating new systems, and relationship of IS personnel with users.

IS Cost Effectiveness

Hamilton and Chervany [21] provided an overview of what system effectiveness means and how it should be measured. They suggested two evaluation approaches: summative and formative. While the first approach focuses on outcomes or ends, the second focuses on process or means. The summative approach includes a cost/benefit analysis to measure accomplishment of systems objectives by quantifying the system's effect on organizational performance in terms of direct cost savings and tangible financial benefits. Instead of computing actual costs and benefits, we adopt the measure of perceived value of investment (actual and desired) in each of five IS functions: applications development & maintenance, systems operations, networks/telecommunications management & maintenance, end user support, and systems planning & management.

Firm Financial Performance

Measurement of organizational performance, is “perhaps one of the thorniest issues confronting the academic researchers today” [56, p. 801]. The limitations of both financial and market-share measures of a firm's performance are widely discussed in the strategic management literature (e.g., [8]). Venkatraman [55] uses two dimensions of business performance—growth dimension and profitability dimension—in order to test the predictive validity of his measurement of strategic orientation. We adopt the profitability dimension to measure a firm's financial performance three years ago (actual and desired) in terms of return on corporate investment, net profit, return on investment (ROI), return on sales, and financial liquidity.

Strategic Orientation Variables

We use two measures for strategic orientation: Miles and Snow's [37] strategy types and the strategic role of IT. The Miles and Snow [37] typology of corporate strategy has been used in various empirical studies (e.g., [24] [48] [49]) and captures the business-level strategic tradeoff between external and internal orientation. The respondent was instructed to check one of the following alternative “types of competitive strategies that best describe your entire organization” (defender, prospector, analyzer, and reactor).
1. The organization attempts to locate and maintain a secure niche in a relatively stable product or service area. It tries to protect its domain by offering higher quality, superior service, lower prices, and so forth. Often this organization is not at the forefront of developments in the industry.

2. The organization typically operates within a broad product-market domain that undergoes periodic redefinition. The organization values “first-in” new product and market areas regardless of profitability. The organization responds rapidly to opportunities.

3. The organization attempts to maintain a stable, limited line of products or services. It is seldom “first-in” with new products or services. However, by carefully monitoring the actions of major competitors, the organization can frequently be “second-in” with a more cost-efficient product or service.

4. The organization responds to environmental pressures whenever forced to and does not have a consistent strategy. It is usually not as aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors.

To prevent bias, labels for these types were not attached. These descriptions of the four strategy types are based on the instrument used by Shortell and Zajac [48], who have conducted extensive reliability and validity studies on Miles and Snow’s strategy typologies with excellent results.

As stated in Hypothesis 4, we expect that the outsourcing of IS functions is contingent upon the strategic role of IT in the firm: traditional role, evolving role, or integral role. These different roles are based on the work of Johnston and Carrico [25], and the measurement scheme was adopted from Grover [20]. The respondent checked one of the following that “best describe the role of information technology (IT) in your organization”:

- **Traditional Role**: IT supports operations and helps decision support and administrative functions but it is not strategy related.

- **Evolving Role**: In addition to the traditional role, IT supports organizational strategy. The information systems group actively supports the organization’s strategies but it is not integral to the development of organizational strategy.

- **Integral Role**: In addition to traditional and evolving roles, IT is integral to organizational strategy. Information systems and corporate management work together on system applications that create competitive advantage or change industry structure.

**Administration of the Survey**

A number of steps were followed to maximize the response rate. These include careful design and pilot testing of the instrument; careful wording of the cover letter (which included a precise definition of IT outsourcing); addressing respondents by name; immediate follow up on undelivered questionnaires by calling companies for correct address or name; and follow-up mailing three weeks after the first mailing.

To improve the instrument, it was administered to six high-level systems professionals and seven top IS executives in the local metropolitan area through personal
interview. Feedback was evaluated and changes were made after meeting with each executive. Pretests were concluded when there were no further substantive comments from the interviews.

Sample

Data were collected from top IS executives in randomly selected industries. These executives were assumed to be in the best position to have a holistic view of all IS functions and their outsourcing. Since there is evidence that in the context of research on outsourcing control variables, such as industry type and organizational size, do not affect outsourcing strategy [33], this research does not adopt any of these constraints in selecting samples. The survey questionnaire was mailed to 1,000 corporate-level top IS executives obtained from the spring 1992 edition of the Directory of Top Computer Executives published by Applied Computer Research, Inc. The same questionnaire was mailed again three weeks later to those who had not responded. After the two rounds of solicitation, 193 responses were received representing a response rate of about 19 percent. Of these, 188 could be used for analysis.

Babbie [3, p. 165] suggests that “a demonstrated lack of response bias is far more important than a high response rate.” Based on guidelines suggested in [13], the respondents and non-respondents were compared with regard to two key organization features: total sales and number of employees. This analysis uses data obtained from Compact Disclosure, in which the annual reports of companies are filed with the U.S. Securities and Exchange Commission (SEC). We randomly selected 30 companies from non-respondents and compared their total sales and number of employees with those of all respondents, respondents from the first mailing, and respondents from the second mailing. In addition, we compared respondents from the first mailing with those from the second. Result of the t-test showed no differences from all four comparisons at the significance level of .05. This lack of non-response bias suggests that the findings from the study sample can be generalized to the larger population [3].

Profile of Respondents

The industry representation of respondent companies (Table 1), shows that a large proportion are manufacturers or involved in banking, insurance, healthcare, and utilities. The sample of 188 companies represents a wide range in size with 63 of them having annual sales of $1 billion or above, and 23 below $100 million. Also, 111 of the companies have 2,000 or more employees, and 17 have fewer than 300. Similarly, wide variance in the size of IS departments can be seen. Of the 188 companies, 43 have IS budgets that are equivalent to 3 percent or more of total sales and 113 companies have 50 or more IS employees.

As the study relies on the survey method and is conceptually based on strategic management, guidelines for gathering accurate retrospective reports from strategic level managers provided by Huber and Power [23] were followed. According to them, “it is crucial that researchers collect their data from the most appropriate person in the organization,” and that “if only one informant per organization is to be questioned, attempt to identify the person most knowledgeable about the issue of interests” [23, p. 174]. The issues of interests for this study concern both organizational strategy
Table 1: Profile of the responding companies.

<table>
<thead>
<tr>
<th>Industry Type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>39</td>
<td>20.7</td>
</tr>
<tr>
<td>Banking/Finance</td>
<td>26</td>
<td>13.8</td>
</tr>
<tr>
<td>Insurance</td>
<td>26</td>
<td>13.8</td>
</tr>
<tr>
<td>Healthcare</td>
<td>23</td>
<td>12.2</td>
</tr>
<tr>
<td>Utilities/Energy</td>
<td>20</td>
<td>10.6</td>
</tr>
<tr>
<td>Retail/Wholesale</td>
<td>12</td>
<td>6.4</td>
</tr>
<tr>
<td>Transportation</td>
<td>9</td>
<td>4.8</td>
</tr>
<tr>
<td>Petroleum</td>
<td>5</td>
<td>2.7</td>
</tr>
<tr>
<td>Computers</td>
<td>5</td>
<td>2.7</td>
</tr>
<tr>
<td>Aerospace</td>
<td>4</td>
<td>2.1</td>
</tr>
<tr>
<td>Conglomerate</td>
<td>4</td>
<td>2.1</td>
</tr>
<tr>
<td>Publishing</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Others</td>
<td>9</td>
<td>4.8</td>
</tr>
<tr>
<td>Unanswered</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>188</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

b. Total Sales Revenue

<table>
<thead>
<tr>
<th>Range</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $50 million</td>
<td>12</td>
<td>6.4</td>
</tr>
<tr>
<td>$50 million to below $100 million</td>
<td>11</td>
<td>5.9</td>
</tr>
<tr>
<td>$100 million to below $500 million</td>
<td>55</td>
<td>29.3</td>
</tr>
<tr>
<td>$500 million to below $1 billion</td>
<td>26</td>
<td>13.8</td>
</tr>
<tr>
<td>$1 billion to below $5 billion</td>
<td>33</td>
<td>17.6</td>
</tr>
<tr>
<td>$5 billion to below $10 billion</td>
<td>17</td>
<td>9.0</td>
</tr>
<tr>
<td>$10 billion and more</td>
<td>13</td>
<td>6.9</td>
</tr>
<tr>
<td>Unanswered</td>
<td>21</td>
<td>11.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>188</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

and vital IS decisions. Top general managers such as CEOs or COOs would be knowledgeable about organizational strategies, but not about important details of IS decisions. As top IS executives can be expected to be knowledgeable about both, they were selected as key informants.

To ensure that the questionnaires were answered by the intended informants, that is, top IS executives, the respondents were asked to indicate their job title at the end of the questionnaire. Tabulation and classification based on these titles reveal the following distribution: chief information officer (9.7 percent), vice president of information services (42.7 percent), director of information systems (29.7 percent), information service manager (16.8 percent) and other titles (1.1 percent). Thus, it appears that the respondents are senior IS executives and can be expected to provide adequate answers to questions requiring a high-level understanding of the organization’s strategy as well as its IS decisions.
STUDY RESULTS

Reliability and Validity of Constructs

Content validity of the survey instrument was established through the adoption of standard instruments, suggestions in the literature, and pretesting with experts in the IS field [26]. Further results of reliability and validity analysis of the constructs are shown in Table 2. Internal consistency, as measured by Cronbach’s alpha for the various constructs were .8634 or higher. Convergent validity is evaluated by measuring the correlation of each item representing the construct with the aggregate measure for that construct less the focal item [26]. This approach assumes the total score to be valid; thus the extent to which the item correlates with the total score is indicative of construct validity for the item. The results showed that these correlations are all substantial and significant at the .001 level.

Discriminant validity was examined by means of factor analysis [26]. Twenty-five items are used to measure the various discrepancies in IS and general resource performance. Factor analysis with varimax rotation was performed on this collection of items. The results reveal only four factors, even though we expected five (Table 2). Two of the items measuring discrepancy in IS staff quality loaded onto factor 1. These two items were found to relate to items measuring discrepancy in IS support quality. The rest of items for IS staff quality were dropped since loadings were less than .50. Furthermore, although factor 1 was new, it was appropriate to keep the same variable name, “discrepancy in IS support quality,” because only two of the seven items are new and both are related to IS support. One of the items measuring discrepancy in financial performance was also dropped because of a low loading (<.50). Since one of the independent variables, discrepancy in IS staff quality, no longer exists, Hypothesis 3 which relates to IS staff quality is also dropped.

The COB measure required estimates of the budgetary proportion of each IS function outsourced currently and three years ago. The results indicate that on average, an additional 13.6 percent of the IS budget was spent on IS outsourcing as compared to three years ago (1989). This represents a rather large increase in outsourcing level, as the increase is represented as a percentage of the total IS budget, not the outsourcing budget. To evaluate the validity of these measures, holistic estimates of the percentages by the subjects were also captured. The request was to “estimate the percentage of your organization’s total IS budget allocated for outsourcing” three years ago and for the current year. The correlation between the COB measure and the corresponding measure resulting from the holistic estimates (estimate for current year minus estimate for three years ago) was .90 (p<.01).

The two strategic orientation variables, Miles and Snow’s strategy types and the strategic role of IT, are categorical. The measurement for strategy types has been successfully utilized in a variety of empirical studies (e.g., [24] and [52]). Further, the construct has been validated [48]. The measurement for the strategic role of IT, which was based on Johnston and Carrico’s [25] three-level taxonomy, has been used successfully by Grover [20]. In the current study, pretesting the instrument with experts in the IS field [26] yielded satisfactory responses
Table 2: Reliability and validity analysis for measures.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Convergent Validity*</th>
<th>Factor Loading</th>
<th>Factor Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discrepancy in Information Quality</strong> (alpha = .8863)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>.7944</td>
<td>.7693</td>
<td>3</td>
</tr>
<tr>
<td>Relevancy</td>
<td>.5909</td>
<td>.5038</td>
<td>3</td>
</tr>
<tr>
<td>Accuracy</td>
<td>.7834</td>
<td>.8854</td>
<td>3</td>
</tr>
<tr>
<td>Precision</td>
<td>.7323</td>
<td>.6981</td>
<td>3</td>
</tr>
<tr>
<td>Completeness</td>
<td>.7530</td>
<td>.6598</td>
<td>3</td>
</tr>
<tr>
<td><strong>Discrepancy in IS Support Quality</strong> (alpha = .8883)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing of requests for changes to systems</td>
<td>.7522</td>
<td>.7640</td>
<td>1</td>
</tr>
<tr>
<td>Lead time required for new systems</td>
<td>.7666</td>
<td>.7542</td>
<td>1</td>
</tr>
<tr>
<td>Responsiveness to changing user needs</td>
<td>.8309</td>
<td>.8534</td>
<td>1</td>
</tr>
<tr>
<td>Support for users in preparing systems proposals</td>
<td>.6870</td>
<td>.5860</td>
<td>1</td>
</tr>
<tr>
<td>Flexibility of data &amp; reports from systems</td>
<td>.6181</td>
<td>.5409</td>
<td>1</td>
</tr>
<tr>
<td><strong>Discrepancy in IS Staff Quality</strong> (alpha = .8364)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness of systems analysts to user needs</td>
<td>.7834</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Quality and competence of systems analysts</td>
<td>.7240</td>
<td>.6449</td>
<td>1</td>
</tr>
<tr>
<td>Technical competence of the IS staff</td>
<td>.6965</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Effort extended to create new systems</td>
<td>.6196</td>
<td>.6409</td>
<td>1</td>
</tr>
<tr>
<td>Relationship of IS personnel with users</td>
<td>.6648</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Discrepancy in Cost Effectiveness</strong> (alpha = .8666)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applications development and maintenance</td>
<td>.6763</td>
<td>.6917</td>
<td>2</td>
</tr>
<tr>
<td>Systems operations</td>
<td>.7343</td>
<td>.7134</td>
<td>2</td>
</tr>
<tr>
<td>Telecommunications/network management &amp; maintenance</td>
<td>.7406</td>
<td>.8250</td>
<td>2</td>
</tr>
<tr>
<td>End user support</td>
<td>.6771</td>
<td>.6308</td>
<td>2</td>
</tr>
<tr>
<td>Systems planning and management</td>
<td>.6316</td>
<td>.5310</td>
<td>2</td>
</tr>
<tr>
<td><strong>Discrepancy in Financial Performance</strong> (alpha = .8778)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on corporate investment</td>
<td>.6348</td>
<td>.6124</td>
<td>4</td>
</tr>
<tr>
<td>Net profit position</td>
<td>.8139</td>
<td>.8949</td>
<td>4</td>
</tr>
<tr>
<td>ROI position</td>
<td>.8481</td>
<td>.9382</td>
<td>4</td>
</tr>
<tr>
<td>Return on sales</td>
<td>.7609</td>
<td>.7977</td>
<td>4</td>
</tr>
<tr>
<td>Financial liquidity position</td>
<td>.4994</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*Correlation of item with total score-item.

**Preliminary Results**

Although the study was not aimed at regression-type model fitting, possible dependency relationships between the independent variables should be examined. As shown in Table 3, independence between these variables is relatively assured. In Table 3a,
Table 3: Associations between independent variables.

a. Associations between quantitative and categorical independent variables:
ANOVA analysis level of significance

<table>
<thead>
<tr>
<th>Categorical Variables*</th>
<th>Gap in Information Quality</th>
<th>Gap in IS Support Quality</th>
<th>Gap in IS Cost Effectiveness</th>
<th>Gap in Financial Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Types [37]</td>
<td>.2229</td>
<td>.1953</td>
<td>.1682</td>
<td>.2939</td>
</tr>
<tr>
<td>Strategic Role of IT</td>
<td>.1222</td>
<td>.6180</td>
<td>.6474</td>
<td>.1768</td>
</tr>
</tbody>
</table>

*Chi-square analysis reveals no relationship between the two categorical variables (p=.895).

b. Correlations between quantitative independent variables

<table>
<thead>
<tr>
<th></th>
<th>Gap in Information Quality</th>
<th>Gap in IS Support Quality</th>
<th>Gap in IS Cost Effectiveness</th>
<th>Gap in Financial Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gap in Information Quality</td>
<td>1.00</td>
<td>.63**</td>
<td>.49**</td>
<td>.32**</td>
</tr>
<tr>
<td>Gap in IS Support Quality</td>
<td>1.00</td>
<td>1.00</td>
<td>.67**</td>
<td>.30**</td>
</tr>
<tr>
<td>Gap in IS Cost Effectiveness</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Significance <.05  
**Significance <.01

It can be seen that none of the eight ANOVA results are significant, indicating that the strategic resource performance discrepancies are independent from the strategic orientation variables. In addition, chi-square analysis reveals no relationship between the two strategic orientation variables. In Table 3b, however, the correlation matrix includes two that are above .5—between gap in information quality and gap in IS support quality, and between gap in support quality and gap in cost effectiveness. While these correlations should be noted in interpreting the study results, they do not present significant difficulties, as the various gaps represent distinct factors from the factor analysis. Furthermore, our emphasis is on preliminary testing of individual associations, rather than on regression-based model fitting.

Testing Resource Performance Discrepancy Hypotheses

For the four resource performance measures, most respondents were distributed in either the high deprivation condition or the equilibrium condition. Less than seven cases are classified as saturated for each of the four resource performance levels. This indicated that as per our criteria, very few companies had reached their desired levels of resource performance. Thus, an overall accurate but more clarified picture of the whole sample can be obtained through simple t-tests to compare the high deprivation group and the equilibrium group in their outsourcing decisions. In addition, correlations between the discrepancy measure and the outsourcing decision are also provided for cross checking and validation.
As shown in Table 4, the overall change in IS outsourcing is significantly associated with perceived discrepancy in information quality and IS support quality. (As the study was exploratory in nature, regression and other model-fitting results were not emphasized. For interested readers, a simple regression involving all the research variables can be seen in the Appendix.) In both cases, the high deprivation group outsourced 11 percent or more when compared to three years ago. The comparable percentage for the equilibrium group was only 4.12 percent or less. Thus, Hypotheses 1 and 2 are supported, and we conclude that a perceived discrepancy between desired and actual levels of IS resource performance in terms of information quality and IS support are positively associated with IS outsourcing decisions. We also conclude that the high deprivation group was much more likely to outsource than the equilibrium or moderate deprivation group with respect to information quality and IS support.

For the other two measures of resource performance, IS cost effectiveness and financial performance of the firm, the results are not statistically significant and Hypothesis 4 and 5 are not supported. However, the results are in the expected direction. In the case of financial performance, the difference between the high deprivation group and the equilibrium group was not significant, but there was moderate correlation (r = .15) which is significant at .05 level.

Testing Strategic Orientation Hypotheses

The two hypotheses related to strategic orientation were tested by one-way analysis of variance. The ANOVA results (Table 5) reveal no significant differences among the various Miles and Snow strategy types in terms of IS outsourcing decisions. The ANOVA analysis includes the three distinct, well-defined strategy types: Defenders, Prospectors, and Analyzers but excludes Reactors who do not have a consistent strategy. Thus, Hypothesis 6 was not accepted. However, the results indicate that the various strategic roles of IT were associated with significantly different outsourcing decisions, and Hypothesis 7 was supported. Interestingly, the average change in IS outsourcing over the last three years for the traditional role (15.02 percent) was much higher than that for the evolving role (4.23 percent) or the integral role (2.59 percent).

DISCUSSION

IS Outsourcing and Resource Performance Discrepancy

The results of the test for Hypotheses 1 and 2 support the contention that perceived discrepancies in the performance of IS resources in terms of information quality and IS support are positively associated with the propensity for strategic outsourcing. These findings provide evidence that information quality and IS support quality [12] may be important reasons for IS outsourcing.

These results lend credence to the theoretical perspectives emanating from resource-based and resource dependence theories in that IS outsourcing may bridge gaps between an organization’s information needs and the ability of its internal sources to meet such needs. Further, as environments become more dynamic and volatile, timely and accurate information will become a critical resource in organizations,
Table 4: Testing resource performance discrepancy hypotheses.

<table>
<thead>
<tr>
<th>Resource Discrepancy</th>
<th>Discrepancy Condition (Frequency)*</th>
<th>Percent Outsourcing Decision (COB)</th>
<th>T-statistic</th>
<th>Correlation++</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>EM (N = 158)</td>
<td>4.12</td>
<td>-2.23*</td>
<td>.19*</td>
<td>Hypothesis 1</td>
</tr>
<tr>
<td>Quality</td>
<td>HD (N = 21)</td>
<td>12.78</td>
<td></td>
<td></td>
<td>(supported)</td>
</tr>
<tr>
<td>IS Support</td>
<td>EM (N = 128)</td>
<td>2.91</td>
<td>-3.18**</td>
<td>.31**</td>
<td>Hypothesis 2</td>
</tr>
<tr>
<td>Quality</td>
<td>HD (N = 49)</td>
<td>11.61</td>
<td></td>
<td></td>
<td>(supported)</td>
</tr>
<tr>
<td>IS Cost</td>
<td>EM (N = 151)</td>
<td>3.95</td>
<td>-1.63</td>
<td>.03</td>
<td>Hypothesis 4</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>HD (N = 23)</td>
<td>10.78</td>
<td></td>
<td></td>
<td>(not supported)</td>
</tr>
<tr>
<td>Financial</td>
<td>EM (N = 134)</td>
<td>4.75</td>
<td>-1.21</td>
<td>.15*</td>
<td>Hypothesis 5</td>
</tr>
<tr>
<td>Performance</td>
<td>HD (N = 30)</td>
<td>9.09</td>
<td></td>
<td></td>
<td>(not supported)</td>
</tr>
</tbody>
</table>

Notes:
*EM = Equilibrium or moderate deprivation
HD = High deprivation
**Correlations between discrepancy variables and outsourcing decisions
*Significant at .05 level
**Significant at .01 level

and opportunities to reduce discrepancies in the performance of this critical resource through outsourcing arrangement will be increasingly compelling. The strength of relationship is particularly strong for discrepancy in the perceived IS support quality (r=.31). This construct includes seven items relating to a wide variety of IS service attributes, including both the systems development process (short lead time and efforts in creating new systems) and user service (responsiveness of analysts, responsiveness to user needs, and flexibility of reports). Our results thus indicate that this measure may be used as a comprehensive, broad-based gauge for IS resource performance and the discrepancy between the desired and actual level of IS support, a good predictor of the outsourcing decision.

The results of the t-test comparing the high versus moderate deprivation groups in terms of financial performance did not reveal significant difference in outsourcing decisions. However, the difference between the two groups was not small, and there was a significant correlation. We may thus speculate that to the extent that a firm’s financial performance falls short of expectation, there may be a heightened tendency for IS outsourcing. A recent study by Loh and Venkatraman [35] also examined this relationship empirically and found negative association between firms’ financial performance and IS outsourcing. Their study, however, took the absolute financial performance level as the independent variable, and thus did not account for those situations where low performance levels fall within expectation (or relatively high performance levels still fall short of desired achievement), situations which do not necessarily enhance the appeal of IS outsourcing.

One aspect of the discrepancy model related to cost effectiveness, that is, the perceived value of IS investment (actual and desired) in various IS functions, was not substantiated. Although the result is in the anticipated direction, we had expected a stronger relationship, since one of the most important purported reasons for outsourcing

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Table 5: Testing strategic orientation hypotheses.

<table>
<thead>
<tr>
<th>Strategic Orientation</th>
<th>Classifications (Sample Size)</th>
<th>Percent Outsourcing Decision (COB)</th>
<th>ANOVA F-value</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy Types [37]</td>
<td>Defender (79)</td>
<td>5.05</td>
<td>.38</td>
<td>Hypothesis 6</td>
</tr>
<tr>
<td></td>
<td>Prospector (47)</td>
<td>7.07</td>
<td>(p = .68)</td>
<td>(not supported)</td>
</tr>
<tr>
<td></td>
<td>Analyzer (45)</td>
<td>4.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic Role of IT</td>
<td>Traditional (28)</td>
<td>15.02</td>
<td>9.27</td>
<td>Hypothesis 7</td>
</tr>
<tr>
<td></td>
<td>Evolving (87)</td>
<td>4.23</td>
<td>(p = .00)</td>
<td>(supported)</td>
</tr>
<tr>
<td></td>
<td>Integral (71)</td>
<td>2.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

is cost savings [35]. Our findings indicate that cost considerations, along with financial performance may not be as important in motivating outsourcing as difficulties in providing good information outputs and IS support services.

While financial and cost considerations as factors in the outsourcing decision have received much attention from practitioners as well as researchers [35], this study represents the first attempt at examining more fundamental factors related to the basic mission of the IS function: providing high-quality information and support service. A major finding of our study indicates that, contrary to popular belief, the degree of outsourcing is related more to the severity of the “information problem” than to the “financial problem.” To the extent that the IS department fails to fulfill its mission in providing desired quality in information and support, the company may be more likely to adopt the strategic decision to outsource IS functions.

IS Outsourcing and Strategic Orientation

The relationship between Miles and Snow’s strategy types and outsourcing decisions proposed in Hypothesis 6 was not supported. Thus, IS outsourcing might have been more universally adopted by firms across the strategy spectrum than we anticipated. The results did indicate that Prospector increased outsourcing most (7.07 percent) among the various strategy types, but the differences are not statistically significant. While strategy type might make a difference in earlier years prior to the influential Kodak outsourcing contract [34], it appears that firms with different strategy types are all drawn to the outsourcing decision to some extent in recent years reflecting a more advanced diffusion stage for outsourcing as an innovation. One important characteristic captured by strategic orientation is risk-taking propensity. We would suspect that prospectors would be more aggressive with respect to risk, and defenders would be more conservative. However, it would be erroneous to characterize all outsourcing as risky. Outsourcing of generic applications, like payroll or transaction processing based on brute computing power, would reflect safer outsourcing options. Outsourcing strategic applications, however, is more risky. Further studies incorporating these details could clarify the role of strategic orientation in IS outsourcing decisions.

The results confirming Hypothesis 7 are interesting: the strategic role of IT that was most associated with outsourcing decisions in recent years is the traditional
rather than the integral role. This is consistent with indications from another study in which 38 percent of the responding companies indicated that the most important factor that would prevent a company from outsourcing a function is that the function is too strategic or mission-critical [53]. Since the mean for the traditional group (15.02 percent) far exceeds that of the evolving (4.23 percent) and the integral (2.59 percent) groups, we conclude that IS participation in corporate strategy is not necessarily a prerequisite for IS outsourcing. This finding can be understood in corroboration with the results from the discrepancy model: providing higher quality information and service has indeed been a "traditional" mission for the IS function. Therefore, the overall pattern of the study results suggests that the current trend toward outsourcing represents a continuing evolution of the IS function as it attempts to fulfill its traditional mission of providing high quality information resources to the firm. When the performance of the delivered resource begins to slip in the current environment of rising expectation and technological complexity, outsourcing may become a strategic response of necessity.

CONCLUSION

In this study, we have shown that the notion of a discrepancy in IS resource performance has considerable merit in helping to understand the strategic decision to outsource IS functions. With research hypotheses based on resource-based and resource dependence theories, the responses of 188 companies support the contention that IS outsourcing decisions may be related to the perceived discrepancy between desired and actual level of resource performance in terms of information quality and IS support quality. In particular, the results suggest that when the quality of general IS support falls short of expectations, the organization will exhibit a noticeably stronger tendency to outsource, possibly as a means of compensating for resource deficiencies.

The discrepancy model offers fresh insight into the outsourcing phenomenon with the interplay between "supply" (actual) and "demand" (desired) of IS resources. On the supply side, with the diversification of IT, it is increasingly difficult to get the personnel and equipment in-house on a real-time basis. However, the diverse hardware and software proliferation is giving birth to new specialized "consulting" entities often based on niches acquired through unique products, specialized personnel, and service quality. Simultaneously, on the demand side, the rapid diffusion of IT in organizations and the massive popular and trade journal blitz are raising "derived" levels of expectation regarding information resource performance. With a research model grounded in strategic resource theories and strategic orientation theories, our findings suggest that as the discrepancy between the supply and demand widens, outsourcing may become the strategic choice of many IS departments to fulfill their "traditional" mission of providing high quality information and support service to the users.

The research involves an empirical study based on a large sample and validated instruments, and the results can be relied upon with a high degree of generalizability. In interpreting the findings, however, it should be noted that the collection of perception measures was carried out on an "ex post facto" basis. While this is typically a problem for much of the empirical work in IS, a recent study by Rice and Contractor [45] found merits in collecting retrospective data. In either case, we feel that the relatively short recall period (three years) greatly reduces model feedback.
The study findings have interesting implications for practice. For managers who wish to pursue the outsourcing alternative, calling attention to the gap between desired and actual levels of information quality and IS support may be an effective way to advocate and champion the cause. However, in working with senior management and planners, taking on an "evolving" or "integral" role may not be conducive to the outsourcing cause. Our findings suggest that the outsourcing decision is not necessarily an aggressive and proactive move. On the contrary, the decision may be more consistent with the traditional role of the IS function to provide information and support services. In any case, it is important for IS managers to take notice of the fact that their fellow managers in other companies may be "intrinsically" motivated to outsource on the basis of output and service, rather than reacting to "extrinsic" signs in financial and cost terms. To the extent that these IS managers are doing the "right" thing, one may recommend that a sound and rational step for outsourcing decision making is a systematic internal evaluation of the company's IS function in terms of information quality and support quality, both actual and desired. In fact, this could be a very useful application of the User Information Satisfaction instruments developed and refined over the years by many researchers [4] [6].

In recent years, the decision to outsource IS functions has become a viable strategic alternative in managing the increasingly complex IS function. Correspondingly, the complexity and impact of outsourcing contracts have increased. Both practitioners and researchers need to have a better understanding of IS outsourcing. For further study on this important IS phenomenon, researchers may wish to look beyond the outcome and examine the process of the outsourcing decision itself. The role of the IS steering committee, the influence of top management versus IS executives, and the interaction and (possibly) conflicts between IS and corporate planning are some of the elements of this process. Researchers interested in such process-oriented studies may wish to tap studies in strategic decision-making processes [39] [41] and consider the use of qualitative research methods such as case studies [31]. Future studies may also examine the factors contributing to the success or failure of outsourcing and the management of the ongoing outsourcing relationship with service providers. It is very important to recognize that outsourcing is not necessarily a panacea for all IS management problems or an instant cure for incompetent IS groups. [Received: July 19, 1993. Accepted: December 12, 1994.]

REFERENCES


**APPENDIX**

A simple regression on the COB measure (the outsourcing decision) with all the independent variables in the current model was presented here for interested readers. As the model contains both continuous and categorical variables, analysis of covariance (ANCOVA) is performed to test the overall significance of the model. The results are shown in the following table:
<table>
<thead>
<tr>
<th>F Value</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Equation: R Square = .24</td>
<td>5.31</td>
</tr>
</tbody>
</table>

Resource Performance Variables:
- Gaps in Information Quality: .04 | .8516 |
- Gaps in Support Quality: 17.82 | .0001 |
- Gaps in Cost Effectiveness: 9.78 | .0021 |
- Gaps in Financial Performance: .64 | .4255 |

Strategic Orientation Variables:
- Strategic Types: .93 | .4277 |
- Role of Information Technology: 6.55 | .0019 |

As shown in the table, the overall equation is significant at the .0001 level, with an R square of .24. The significance levels for the various independent variables are in most cases consistent with the hypotheses testing results.

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