ON THE MEASUREMENT OF CORPORATE DIVERSIFICATION STRATEGY: EVIDENCE FROM LARGE U.S. SERVICE FIRMS

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Actual, not potential, relatedness determines the results of diversification strategies. An external examination of a firm’s businesses, products, markets and technologies permits an assessment of potential relatedness among its various businesses. Potential relatedness is, however, often not realized. Also, relatedness may be externally invisible. Hence, actual relatedness may diverge from externally measured potential relatedness. This paper provides evidence suggesting that measures of corporate diversification strategy based on internal data differ significantly from those based on externally available data.

Firms are considered diversified if they concurrently are active in more than one business. Diversification strategy can be described by the extent of participation in different businesses and the underlying pattern of relationships among various businesses of firms. Contemporary measures of diversification strategy, therefore, attempt to reflect the extent of firm diversity and relatedness among the various businesses of diversified firms (Rumelt, 1974, 1982; Montgomery, 1979, 1982; Nathanson and Cassano, 1982; Pitts and Hopkins, 1982; Palepu, 1985; Varadarajan and Ramanujam, 1987).

Most previous research on diversification strategy used publicly available external data to compute various measures of diversification strategy. Such data readily reveal the number and size of the various businesses in diversified firms’ portfolios. However, an external examination, based on publicly available data, of a diversified firm’s products, markets, manufacturing technologies and marketing and organizational arrangements permits only an assessment of potential relatedness among businesses. Due to difficulties associated with implementing diversification strategies, potential relatedness does not imply actual relatedness. Since the benefits of relatedness can only arise when businesses are actually related, it follows that empirical examinations of the consequences of diversification strategies require that data be collected on actual relationships among businesses in diversified firms.

This paper reports the results of a comparison of the measurement of corporate diversification strategies of a sample of large diversified U.S. service firms based on data collected from external sources with measurements obtained based on data collected from sources within firms. The main difference in the two sources of data is that the former is more likely to reflect potential relatedness while the latter is more likely to reflect actual relatedness among the businesses of diversified firms. We find that there exist, at least in our sample, substantial differences in potential and actual corporate diversification strategies.

The paper is organized as follows. First, we briefly identify two forms of relatedness between businesses and we discuss implementation diffi-
culties associated with diversification strategies to argue that it is necessary to account for such difficulties when studying corporate diversification strategies. Second, the two main approaches adopted in the measurement of corporate diversification strategies are reviewed to suggest that these rely on external observations of diversified firms to develop measures of corporate diversification strategies. Since these measures do not reflect implementation difficulties, in the next section we describe the procedures that we adopted to collect internal data in order to obtain measures of diversification strategy that attempt to reflect actual relatedness. These measures are then compared with those based on external data similar to those used in previous research on diversification strategy. We conclude with some implications for research on corporate diversification.

**BUSINESS RELATEDNESS AND IMPLEMENTATION DIFFICULTIES**

Businesses within diversified firms can be related in at least one of two ways. They could be related either because they share markets, distribution systems, product and process technologies, or manufacturing facilities (Ansoff, 1965; Rumelt, 1974; Teece, 1980), or because they rely on common technologies, managerial capabilities and routines and repertoires (Grant, 1988; Nelson and Winter, 1982; Prahalad and Bettis, 1986; Winter, 1987).

Sharing resources offers potential economies of scope. Economies of scope, a widely accepted motive for related diversification, arise when the joint cost of producing two or more outputs, including all costs incurred from transforming raw materials to delivering the final products to customers, is less than the sum of the production costs of each output by itself (Teece, 1980; Panzar and Willig, 1981). Factors of production must meet three conditions for the existence of economies of scope. These are: (1) increasing returns (or indivisibilities) to scale, (2) transaction costs preventing an efficient market in these factors, (3) limits on obtaining increased factor utilization by expanding the output of any single end product (Rumelt, 1982; Teece, 1980).

In contrast to sharing resources, diversified firms also benefit from leveraging their core competences across multiple businesses (Prahalad and Hamel, 1990). For example, technology is often not shared among businesses. Common technologies are, however, used in multiple businesses. Similarly, managerial capabilities that Ginsberg (1990), Grant (1988), Prahalad and Bettis (1986) and Prahalad and Hamel (1990) identify as distinctive competences of some diversified firms are seldom shared. Also, routines and repertoires used to manage the firm cannot be considered as shared among businesses (Nelson and Winter, 1982; Winter, 1987). Instead, their use in multiple businesses results in benefits for diversified firms (Ginsberg, 1990; Grant, 1988; Prahalad and Bettis, 1986; Prahalad and Hamel, 1990). Notice that the use of such core competences in multiple businesses within diversified firms is also not generally represented in external sources of data.

The potential for benefits from relatedness does not imply, however, that those benefits will actually be realized (Reed and Luffman, 1986). For example, obtaining economies of scope may require establishing operating relationships among businesses in diversified firms. Such relationships are problematic and costly (Carman and Langeard, 1980; Hoskisson and Hitt, 1988; Kanter, 1989; Porter, 1985) and Lubatkin (1983) cautioned that administrative problems could cancel out the benefits of mergers. In fact, Reed and Luffman (1986) and Kanter (1989) suggested that firms often forego the potential benefits of related diversification when they are likely to incur substantial costs in implementing such strategies. Note, however, that foregoing such benefits does not imply that firms do not participate in potentially related businesses.

Although potential benefits may drive diversification efforts, problems associated with asset redeployment to share resources determine the relative ease of realizing benefits (Salter and Weinhold, 1978; Shrivastava, 1986). Hence, the decision to diversify requires that firms consider how potential benefits will be realized (Ansoff, 1965; Biggadike, 1976; Chandler, 1962; Normann, 1984; Salter and Weinhold, 1979) and at what cost (Buono and Bowditch, 1989).

Firms attempt to realize relatedness benefits by integrating new businesses with existing ones. They might accomplish this by forging new organizational relationships, changing existing ones and creating mechanisms to ensure cooper-
ation among related businesses. These activities result in costs that reduce the benefits from relatedness. A vast literature that suggests a wide variety of implementation difficulties and their causes, costs and consequences has developed in recent years. The following paragraphs provide a brief review of the main conclusions presented in this literature. For more details, interested readers are referred to the original works cited here.

Increasing evidence that diversification efforts and acquisitions do not consistently yield desired financial returns (Jensen and Ruback, 1983; Lubatkin, 1983; Porter, 1987) has motivated investigations into reasons for this deviation from reasonable expectations. Salter and Weinhold (1979) suggest that bidding firms often overestimate the value of target firms by underestimating the costs of exploiting relatedness with targets. Barney (1988) echoes these views and suggests that firms must become skilled at understanding the nature of the strategic relatedness between businesses.

Organization design and human resource management issues involved in integrating businesses have been examined in order to gain some insights into this phenomenon (Bastien, 1987; Buono and Bowditch, 1989; Jemison and Sitkin, 1986; Leighton and Tod, 1969; Mirvis, 1985; Mirvis, Marks, and Sales, 1983; Napier, 1989; Pitts, 1976). These studies argued that processes which precede acquisition and negotiations that follow acquisition play a major role in overcoming impediments to the successful integration of merged firms. In general, these studies concluded that firms expend resources to ensure that potential benefits of relatedness are actually realized.

Organizational arrangements that promote sharing, such as incentive and control systems, may be so much at odds with those currently in place that firms may never attempt to install them. Organizational learning difficulties inhibit development and adoption of new routines and repertoires necessary to successfully realize the potential benefits of relatedness (Ghoshal, 1987; Kazanjian and Drazin, 1987). Organizational inertia due to inflexibility in the firm's format and administrative behavior is also a powerful obstacle to integration attempts (Bastien, 1987; Buono and Bowditch, 1989; Hannan and Freeman, 1984; Mirvis, 1985; Napier, 1989). This absence of organizational fit impedes the successful realization of benefits offered by strategic fit (Jemison and Sitkin, 1986).

Attaining some of the benefits of relatedness requires cooperation among businesses. Cooperation among businesses, in turn, results in intrafirm exchanges. Such exchanges are frequent when businesses are related. Intrafirm exchanges cause internal transaction costs (Jones and Hill, 1988; Williamson, 1985). Internal transaction costs result from at least three sources: governance, incentive degradation and bureaucratic distortions (Riordan and Williamson, 1985).

Governance costs, also called coordination costs (Jones and Hill, 1988; Thompson, 1967) or integration costs (Galbraith, 1973; Galbraith and Kazanjian, 1986) arise because complex contingent claims contracts are always incomplete. Therefore, unanticipated contingencies are likely to occur for which appropriate responses have not previously been determined. Although those who have to share resources will benefit from cooperation, competition for the disposition of gains is likely (Porter, 1985). Goal incongruence between the parties to the exchange may also result in competitive, rather than cooperative, behavior (Williamson, 1975). This creates intense, self-interested bargaining, adding to the costs associated with writing, monitoring and executing incomplete contingent claims contracts. Such conflicts usually are resolved by intervention from a higher level of management (Galbraith, 1973; Gupta and Govindarajan, 1986). Conceivably, whole layers of management could be devoted to full-time conflict resolution to ensure cooperation in the quest for benefits from relatedness. Such organizational solutions to resolve conflicts (e.g. new structural arrangements, systems or processes) result in governance costs.

Markets provide powerful incentives for appropriate behavior in exchange transactions. Firms, therefore, endeavor to institute market-like incentives for their employees to obtain appropriate behavior patterns (Williamson, 1985). Incentive degradation occurs when employees undermine these efforts and act in their own self-interest, not in the best interests of the firm despite incentive systems designed to reward such behavior (Gupta and Govindarajan, 1986; Hoskisson and Hitt, 1988; Riordan and Williamson, 1985; Williamson, 1985). Self-preservation takes
precedence over the larger interests of the firm. This often results in short-term oriented risk preferences among managers (Hoskisson and Hitt, 1988). Further, identifying and measuring successful cooperation is exceedingly difficult, if not impossible (Hoskisson and Hitt, 1988). Coupled with the difficulties inherent in equitably dividing gains from cooperation (Porter, 1985), most incentive systems seldom provide appropriate incentives for joint effort (Hoskisson and Hitt, 1988).

Bureaucratic distortions refer to nonrational (in the economic sense) behavior on the part of managers. Such behaviors include the propensity to manage, to forgive error, and to engage in log-rolling. Consequently, management excesses and nonoptimal resource allocations preserve the status quo that is threatened by diversification efforts (Riordan and Williamson, 1985; Williamson, 1985). Major changes in the corporate portfolio, generally viewed as threatening, are especially likely to generate nonrational behavior. Rational managers begin to act nonrationally from the perspective of the firm although they may be acting rationally from their own perspectives (Buono and Bowditch, 1989; Mirvis, 1985). Protecting turf takes precedence over expanding the corporate pie (Gupta and Govindarajan, 1986). Threats, real or imagined, of corporate restructuring in the face of diversification, for example, may also cause managers to present unrealistic budget proposals to support individual businesses. Such actions do not maximize sharing among businesses. Kanter (1989) notes that sometimes even when relatedness is acknowledged as being beneficial, there are few instances of actual cooperation in the heat of daily managerial decision making.

The lack of communication about intentions to exploit relatedness also hinders the realization of potential benefits from relatedness. While corporate strategy, whether explicitly or implicitly, might recognize the potential for benefits from relatedness, that strategy may never be clearly communicated to appropriate levels in the concerned businesses. Further, even if the strategy has been communicated, the lack of a detailed action plan may inhibit managers from going forward in trying to implement it (Kanter, 1989).

The perceived, or real, loss of independence and autonomy that sharing may bring about also prevents cooperation among businesses (Bastien, 1987; Buono and Bowditch, 1989; Gupta and Govindarajan, 1986; Mirvis, 1985; Napier, 1989; Porter, 1985). Further, sharing may be perceived by each business as leading to unacceptable compromises rather than more desirable optimization for each business although compromises would result in a global optimum that benefits the whole corporation.

Accounting conventions also impede cooperation. In particular, the allocation of joint costs is a thorny issue, both theoretically and practically (Dearden, 1978). The allocation of benefits—those elusive rewards of synergy—is even more difficult, if not impossible (Porter, 1985). How to give credit where credit is truly due is a managerial nightmare in the context of related diversified firms. Hence, managers concerned with demonstrating and determining individual performance pull out all the stops to do just that—compete instead of cooperate. Considering the fact that benefits from relatedness could take many years to appear (Biggadike, 1976), the incentives to work together all but disappear.

Difficulties in technology transfer can also prevent firms from sharing or using technologies across multiple businesses (Adler, 1989; Gruber and Marquis, 1969; Tornatzky et al., 1983). Technology is often implicit (Winter, 1987). Those persons that use it are often unable to articulate the technology, let alone develop and install a process to transfer it to a new business.

For these reasons, actual relatedness may deviate from potential relatedness in diversified firms. The economic performance of diversified firms, therefore, depends not only on whether or not there exists potential relatedness among the various businesses of diversified firms but also on the extent to which relatedness is realized in practice. Clearly, firms that anticipate the costs of implementation to exceed the potential benefits will not attempt to seek the benefits of relatedness through exploiting relationships among their businesses. Hence, expected relationships among the businesses of diversified firms may, in fact, not exist in reality.

Conversely, real relationships among businesses, such as those based on a dominant logic (Grant, 1988; Prahalad and Bettis, 1986), sociocognitive similarities (Ginsberg, 1990), managerial capabilities (Prahalad and Hamel, 1990), managerial routines and repertoires
(Nelson and Winter, 1982; Winter, 1987), or information asymmetries (Nayar, 1990) may not be discerned from external data alone and, therefore, might be invisible to external observers.

Hence, measures of diversification strategy must attempt to capture actual business relatedness due to both resource sharing among businesses and the leveraging of core competences across multiple businesses in diversified firms. As discussed later, this requirement raises difficult data collection issues.

MEASUREMENT OF DIVERSIFICATION STRATEGY

Wrigley (1970) developed the first measures of diversification strategy that reflected the extent of relatedness among businesses. Rumelt (1974) modified those measures to assess the extent and nature of relatedness among the businesses of a diversified firm from an examination of characteristics of the product-markets it served and the technologies it employed. Rumelt's measures and his approach to measuring diversification strategy has found wide acceptance among researchers.

Essentially, Rumelt's measures are based on the notion that if a firm's businesses are characterized by similar products, markets or technologies then those businesses must be related. Previous work on diversification strategy classified firms into categories of diversification strategies based on judgments about the nature of relatedness among the various businesses of each firm (Barton, 1988; Bettis and Hall, 1982; Bettis and Mahajan, 1985; Channon, 1973; Chatterjee, 1986; Christensen and Montgomery, 1981; Dubofsky and Varadarajan, 1987; Grant and Jammie, 1988; Grant, Jammie and Thomas, 1988; Hoskisson, 1987; LubatKin and Rogers, 1989; Montgomery, 1979, 1982; Rumelt, 1974, 1982; Wrigley, 1970). This approach was based on the premise that the pattern of relatedness among various businesses of diversified firms could be discerned by an external examination of the product-markets in which the businesses participated and by a knowledge of the key elements of input, throughput and output that comprised each business.

Alternatively, studies using the index approach relied on the Standard Industrial Classification (SIC) system to discern relationships among businesses (Amit and Livnat, 1988a, 1988b, 1989; Palepu, 1985; Varadarajan and RamuNujum, 1987). This method also is based on external perceptions of relatedness among businesses in, say, the same 2-, 3-, or 4-digit SIC code. Several limitations of the SIC-based measures have been noted (Montgomery, 1982; Davis and Duhaime, 1989). Essentially these limitations arise either because distances between SIC codes cannot be interpreted on a ratio or interval scale or because the SIC system does not adequately differentiate between industries. The latter limitation is particularly serious for empirical studies of corporate diversification since the nature and extent of relatedness among businesses with different SIC codes are difficult to assess by referring to the SIC codes alone (Davis and Duhaime, 1989).

While previous studies using these approaches to the measurement of corporate diversification strategy have contributed substantially to our understanding of such strategies, an external examination of diversified firms focuses on potential relatedness among businesses. Actual relatedness could be quite different. Consequently, variables defined on the basis of external observations of corporate diversification strategy fail the tests of content and face validity if one is interested in actual relatedness (Bacharach, 1989; Venkatraman and Grant, 1986). Using measures of corporate diversification strategy based on external data implicitly assumes that implementation costs are either independent of types of relatedness, or constant, or negligible. To avoid making these assumptions, however, attempts to assess the effects of diversification strategies on variables such as performance and organization design require that actual relatedness be measured. Hence, data on actual relatedness among businesses in diversified firms needs to be collected. In the following sections we report the results of one attempt to collect such data and compare the measures it yields with those obtained from using external data.

METHOD

Data collection

This paper reports the results obtained in a larger study of diversification of service firms. Consequently, the population from which the
sample was drawn was restricted to the Service 500 firms identified by Fortune and service firms in the Corporate 1000 published by Monitor Publishing Company, Washington. Firms in these classifications obtain greater than 50 percent of revenues from businesses in service industries. Firms with more than 10 percent of revenues from nonservice businesses were excluded from the sample. Some examples of service firms that may potentially benefit from business relatedness are ARA Services which offers municipal transport maintenance services making use of its vast fleet maintenance facilities, Delta Airlines which services aircraft of other airlines using its maintenance facilities at many airports, and Hyatt Hotels which manages hospitals to leverage its ability to cater to the diverse needs of ‘guests’. To the extent that goods-producing firms were systematically excluded from our sample, the results of this study should be interpreted as applicable to service firms only. Given, however, that nothing in the arguments presented above and in the methods employed in the study is specific to service firms, our results have implications for all types of firms.

We mailed a pretested, self-administered, structured questionnaire to the Chief Executive Officers (CEOs) of 513 large service firms and asked them for data on their firm’s diversification strategy. After follow-up efforts, we received 319 responses representing a response rate of over 62 percent. Of these, 216 firms declined to participate mostly due to concerns over data confidentiality although the cover letter accompanying the questionnaire contained assurances that only aggregate data would be reported. The large number of declines was not unexpected due to the fact that we requested confidential information. Twenty-three questionnaires were discarded either due to missing data (which could not be obtained even after follow-up efforts) or because the CEO had been with the firm (in any position) for less than 2 years. This latter criteria was used to ensure that the CEO was sufficiently well informed about the strategy of the firm. These procedures resulted in 80 usable responses representing an effective response rate of about 16 percent.

Based on the number of usable questionnaires we obtained in relation to the number of firms we contacted, it might appear that our response rate was too low. It can be shown, however, that a sample size of only 35 is adequate to conduct statistical tests at the 5 percent level of significance with a power of 80 percent and noncentrality not exceeding 0.5 standard deviations (Mazen, Hemmasi, and Lewis, 1987). Increasing the level of significance to 1 percent results in a required sample size of 80. Hence, our sample size was more than adequate. The response rate could have been increased by taking pre- and postmailing measures such as contacting firms prior to mailing and seeking their participation in the study and by extensive postmailing contacts. These steps were deemed too costly given the limited purposes of this study and the funds available to us. Further, a test of nonresponse bias did not reveal any differences between respondents and nonresponders in terms of assets, sales, net income and Jensen’s Alpha (a stock-market based performance measure that accounts for industry participation and risk).

The 80 firms included in our sample covered a wide variety of service industries. Their activities spanned the full range of SIC codes assigned to nonmanufacturing industries except utilities, government and noncommercial educational, scientific, and research organizations. They ranged in size from $250 million to over $15 billion in annual sales in 1986, with an average of $1.7 billion. The sample, therefore, comprised large U.S. service firms.

On the premise that relatedness resulting in significant benefits to a diversified firm is likely to be actively managed since it leverages a firm’s distinctive competence (Selznick, 1957; Hitt and Ireland, 1985), we collected data on the relationships among businesses in diversified firms from the CEOs of such firms serving in the capacity of key informants (Siedler, 1974). We assumed that CEOs would be sufficiently well informed of the extent and nature of relatedness among the businesses in their firm (Zajac and Shortell, 1989) although this may not always be the case (Phillips, 1981). Of course, direct access that permits a first-hand examination of relationships within firms would be ideal. Such access was not available for a sufficiently large number of firms for this study. Hence, we adopted the use of key informants.

It may be argued that the use of a single key informant in data collection should be replaced by the use of multiple respondents from each firm in order to test for reliability of the reported
data. The use of respondents, however, is more appropriate for recording data on perceptions about organizations such as on organizational culture or dimensions of informal organization structure (Campbell, 1955; Siedler, 1974). In contrast, we required data to assess actual, not perceived, diversification strategy. Using a key informant who was likely to be well informed was, therefore, appropriate. One issue that needed to be addressed was the choice of an appropriate key informant. Since corporate diversification is a fundamental strategic choice for firms, it is highly likely that CEOs will be adequately informed of their firm's strategy and, therefore, are the most appropriate informants for such data. The use of CEOs as informants in this study is consistent with previous research that has examined organizational strategies (Hambrick, 1981; Miles and Snow, 1978; Snow and Hrebiniak, 1980; Zajac and Shortell, 1989).

Follow-up contacts, letters that accompanied returned questionnaires, and comments and signatures on questionnaires indicated that CEOs had indeed either completed or approved the contents of the returned questionnaires. Further, these points of contact with the responding firms also indicated that CEOs had often consulted with their staffs and other highly placed, and potentially well informed, members of their top management teams before completing the questionnaires. Several CEOs and other senior executives from the responding firms also discussed the issues connected with this research with the authors after responding to the questionnaire. These actions heightened our confidence in the reliability and validity of the data provided by the firms and in the belief that CEOs had at least approved the contents of the returned questionnaires.

Limited reliability tests were performed by using two key informants in 23 firms that agreed to permit two independently completed questionnaires to be returned. We found nearly complete agreement among the questionnaires returned from each firm. It appears that firms were reluctant to return us questionnaires that had not already been reviewed within the firm, probably in the CEOs office, to ensure the accuracy of the data being provided. This was not completely surprising because, given the nature of information we requested, contact with firms had to be at the CEO level. In most cases, no other officer of the firm could have responded to the questionnaire without first allowing the CEO to review the data being provided. Consequently, the use of multiple key informants would not be productive; there would always be full agreement among the questionnaires returned. Further, we did not request perceptual data from the CEOs. In addition, there is evidence that several CEOs consulted with other senior members of their staff to ensure that correct data was reported on the questionnaire.

The questionnaire was designed to ascertain the division of each firm's total sales among its top 10 businesses (in terms of sales) and the relationships that existed among these businesses. The CEOs were requested to fill a data matrix (Appendix 1) that was comprised of four parts. First, we requested a listing of the firm's 10 most significant businesses. We asked for information on 10 businesses since that is also the maximum number that firms are required to report in their 10-K filings. It is also the number on which data is available for each firm in the COMPSTAT business segment database. Hence, these two sources of secondary data served to check the data reported on the questionnaires. We obtained over 90 percent correspondence between the primary and secondary data with respect to the number and size of businesses of each firm. Discrepancies were resolved by conducting telephone interviews with the CEOs of the concerned firms.

Second, we asked for the proportion of total firm sales that each business contributed. These proportions summed to 100 percent in all cases in our sample. This indicated that collecting data on at most 10 businesses was adequate for our sample of firms.

Third, we asked for a listing of up to 10 most significant resources of the firm. Significant resources were described on the questionnaire as those that were considered as a strength or asset of the firm (not a strength or asset of any one business). An illustrative list of resources was included in the questionnaire. Data on a limited number of resources was requested to ensure that CEOs would be forced to carefully consider their firm and identify truly significant resources. (In fact, in most cases, CEOs identified less than 10 significant resources.) CEOs were specifically asked to identify firm-level significant resources since these would be the ones most likely to be
leveraged across businesses. Finally, the CEOs were asked to indicate in which businesses each resource was used. The use of common resources across any two businesses served to indicate the presence of relationships between those businesses. We assumed that when such firm-level significant resources were used in multiple businesses, they reflected the distinctive competences of the firms and, as such, were the ones most likely to meet the requirements for providing relatedness benefits to diversified firms. Hence, use in multiple businesses was considered as an indicator of relatedness.

We refrained from directly inquiring about shared resources among businesses for two reasons. First, we wished to avoid any biases that might arise from self-typing and post-hoc rationalizations of diversification moves as driven by any ex ante desires to exploit relatedness among businesses. We believed that firms would be reluctant to admit that actual relatedness diverged from potential relatedness among their businesses because that would imply administrative failures either in assessing potential relatedness prior to diversification or in implementation. This reluctance may manifest itself in informants indicating ex ante expectations of potential relatedness and not actual relatedness. Consequently, only a brief statement in the cover letter accompanying the questionnaires stated that the aim of the survey was to gather information about the relationships that exist among the various businesses of a service firm.

Second, as noted earlier, sharing resources among businesses is not the only way that businesses can be related. The use of common technologies, managerial capabilities, routines and repertoires and other core competences in multiple businesses also indicates relatedness among those businesses. Data on shared resources alone may have missed such relationships.

Balancing the conflicting requirements to collect data on actual relatedness in diversified firms from both shared resources and the use of resources in multiple businesses without overt sharing required a compromise. We chose to accept the possibility of potential Type II errors. As a consequence, our methods may ascribe greater relatedness among businesses than actually exists in firms. If this bias were eliminated, even fewer firms would be classified as related and an even greater number of firms would be classified as unrelated. Since we expect that external data would result in a larger number of firms being classified as related, this bias acts against our expectation that internal data would reveal lower levels of relatedness among businesses in diversified firms due to the presence of implementation difficulties. Nonetheless, as discussed later, it is important to note the existence of this bias in our methods.

It might also be argued that Type I errors might arise due to the method used to assess relatedness among businesses. A Type I error would arise if resources that are truly contributing to benefits for diversified firms are not so identified on the questionnaire. It is unlikely, however, that such resources would not be identified by the CEOs of the firms. A pilot test of the questionnaire in 10 large diversified U.S. service firms (subsequently excluded from the study) was conducted. During this pilot test each of the 10 firms was closely studied and the process adopted by the CEOs as they collected the necessary information to complete the questionnaire was observed. These observations indicated that CEOs interpreted the questions and the instructions as intended. They identified only those resources as significant that were a strength or asset of their respective firms.

Further, to aid CEOs in recalling such resources, an illustrative list of potentially significant resources was included in the questionnaire. Responses were not limited to resources on this list alone. Further, the listed resources were interpreted according to their commonly understood meanings and usage. For instance, functional expertise was understood as the several functional areas in business firms such as marketing, finance, manufacturing, distribution and sales. Similarly, professional expertise was interpreted as referring to members of the professions such as lawyers, architects, physicians and actuaries. A summary of the resources listed on the questionnaires is provided in Table 1. These procedures to ensure that CEOs focussed on significant resources reduce the probability of Type I errors. Significant resources that offer benefits to diversified firms are unlikely to have been omitted in the completed questionnaires.

Data analysis

The classification of firms to Rumelt’s categories of diversification strategy and the computation
Table 1. Resources listed on the questionnaires

<table>
<thead>
<tr>
<th>Resource</th>
<th>Number of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft/landing rights</td>
<td>6</td>
</tr>
<tr>
<td>Architects</td>
<td>3</td>
</tr>
<tr>
<td>Attorneys</td>
<td>2</td>
</tr>
<tr>
<td>Customer service systems</td>
<td>4</td>
</tr>
<tr>
<td>Data bases/mailing lists</td>
<td>18</td>
</tr>
<tr>
<td>Distribution systems</td>
<td>15</td>
</tr>
<tr>
<td>Engineers/surveyors/consultants</td>
<td>24</td>
</tr>
<tr>
<td>General management expertise</td>
<td>26</td>
</tr>
<tr>
<td>Health care administrators</td>
<td>3</td>
</tr>
<tr>
<td>Information system</td>
<td>13</td>
</tr>
<tr>
<td>Maintenance facilities</td>
<td>4</td>
</tr>
<tr>
<td>Manufacturing (production) expertise</td>
<td>2</td>
</tr>
<tr>
<td>Marketing expertise</td>
<td>33</td>
</tr>
<tr>
<td>Patents and copyrights</td>
<td>7</td>
</tr>
<tr>
<td>Physicians</td>
<td>4</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>32</td>
</tr>
<tr>
<td>Prime locations</td>
<td>15</td>
</tr>
<tr>
<td>Property management expertise</td>
<td>3</td>
</tr>
<tr>
<td>Proprietary technology</td>
<td>19</td>
</tr>
<tr>
<td>Sales force</td>
<td>11</td>
</tr>
<tr>
<td>Service delivery system</td>
<td>9</td>
</tr>
<tr>
<td>Supplier networks</td>
<td>7</td>
</tr>
</tbody>
</table>

of entropy measures of diversification only requires the determination of the per cent of total firm sales that each business contributes and the identification of groups of related businesses (Jacquemin and Berry, 1979; Palepu, 1985; Rumelt, 1974, 1982). The last row of the data-matrix in the questionnaire provided the sales data while the check-marks in the cells of the matrix indicated the existence of relationships among businesses thereby allowing groups of related businesses to be identified based on the internal data.

Once the questionnaires were examined for completeness, but before the questionnaire data were used, we classified the sample firms into one of four categories of corporate diversification strategy—single-business, dominant-business, related-business, and unrelated-business—using data and procedures similar to that used by Rumelt (1974, 1982) and other researchers (Buhner, 1987; Dubofsky and Varadarajan, 1987; Grant and Jammine, 1988; Grant et al., 1988; Hoskisson, 1987; Montgomery, 1979, 1982). Appendix 2 contains definitions of the diversification strategy measures as defined by Rumelt (1974). External data were obtained from publicly available information about the firms from sources such as annual reports, 10-K reports, Moody’s reports, Standard and Poors Register and reports in the business press. These data were used to identify groups of related businesses to compute the specialization and related ratios for each firm. These ratios were then used to classify each firm into one of Rumelt’s diversification strategy categories.

Next, groups of related businesses were identified using only the questionnaire data. The specialization and related ratios were computed and the sample firms were once again classified into one of the four diversification strategy categories. Table 2 presents a cross-tabulation of the results of the two classifications obtained.

The equivalence of the two classifications based on different sources of data can be judged by examining the diagonal in Table 2. If there were no differences in the two sources of data, all the sample firms would lie along the diagonal. Off-diagonal values would indicate differences in the two classifications. Firms above the diagonal would indicate that external sources of data ascribe greater relatedness in their portfolio of businesses. Firms below the diagonal would indicate that external sources of data ascribe greater unrelatedness in their portfolio of businesses. As can be seen from Table 2, for only 39 of the 80 firms (48.75%) do the two sources of data yield the same classifications of their corporate diversification strategies, i.e. lie along the diagonal. Further, based on external data, 24 firms (30%) in our sample were classified as related-business firms although their classification, based on internal data, should have been in the unrelated-business category. Similarly, based on external data 12 firms (15%) were classified as unrelated-business firms, although based on internal data they should have been classified as related-business firms. Hence, in aggregate, external data sources, compared to internal data sources, resulted in a greater number of firms being classified as related-business firms (52 vs. 39) and a fewer number as unrelated-business firms (18 vs. 31).

We also computed SIC-based entropy measures of corporate diversification for the firms in our sample based on data obtained from the COMPUSTAT business segment data base and without considering any of the data collected by questionnaire from the firms (Jacquemin and Berry, 1979; Palepu, 1985). This method relies
on the 2- and 4-digit SIC codes for each business to determine relationships among businesses. Businesses are considered related if the 4-digit SIC codes for a set of businesses lie within the same 2-digit SIC code. Otherwise, they are considered unrelated. The extent of related diversity within a set of businesses with the same 2-digit SIC code is indicated by the different 4-digit SIC codes assigned to each business. This procedure yields three measures that describe the corporate diversification strategy of firms: total diversification, related diversification, and unrelated diversification. Appendix 2 contains definitions of these measures.

Next, instead of the 2- and 4-digit SIC codes, we used the questionnaire data to establish relationships based on common resources used among businesses. We, then, recomputed the entropy measures. Table 3 presents arithmetic means and tests of significance for differences between the arithmetic means of the three entropy measures obtained on the basis of the data collected from the two sources.

As given in Table 3, except in the case of Total Diversity, the test results indicate that there are significant differences between the means obtained in our sample for the entropy measures of corporate diversification based on external data and those based on internal data obtained from the CEOs of diversified firms. Measures based on external data indicate greater relatedness, and consequently greater unrelatedness, in the business portfolios of the sample firms than measures based on internal data. The insignificant difference between the means for the Total Diversity measures simply reflects the high degree of correspondence between primary and secondary sources of data on the number and size of businesses of diversified firms and it offers limited support for the reliability and validity of the primary data collected from the firms. The insignificant difference for Total Diversity was expected because, in both cases, it is based on the number and size of business segments in diversified firms which is also reported by firms on their 10-K filings and is, therefore, accessible as an external data source.
Table 4. Means of entropy measures of total diversification across the Rumelt-type classification of sample firms based on data from internal sources

<table>
<thead>
<tr>
<th>Rumelt-type category</th>
<th>Total diversity entropy measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single business</td>
<td>0.901(−)∗</td>
</tr>
<tr>
<td>Dominant business</td>
<td>0.792(−)∗</td>
</tr>
<tr>
<td>Related business</td>
<td>1.416(+)∗</td>
</tr>
<tr>
<td>Unrelated business</td>
<td>0.736(−)∗</td>
</tr>
<tr>
<td>Overall mean</td>
<td>1.043</td>
</tr>
<tr>
<td>F-ratio</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The (+) and (−) sign adjacent to each category mean indicates direction of deviation from the overall mean for the other categories (t-tests). The F-ratio was used to test the hypothesis that category effects were absent. 'p < 0.01.

Consistent with Montgomery (1982), we compared the two measures—Rumelt-type category assignments and total diversification entropy values—obtained from the internal data. Table 4 contains the results of this comparison. The F-ratio indicates the presence of a highly significant relationship between these measures in our sample. The t-tests reaffirm the relationships. Note that contrary to Montgomery's (1982) results, our continuous measure of total diversification (the entropy measure) does not increase monotonically across the Rumelt-type strategy categories. In fact, there is no reason to believe that it should, as Montgomery (1982) has also noted. This nonmonotonic relationship implies that, category effects notwithstanding, continuous entropy measures of total diversity and category-type measures of diversification strategy based on internal data are not substitutes for each other.

CONCLUSIONS

Comparisons of the results of measures of diversification strategy based on external and internal data found little evidence of any similarity between them. It appears that the measurement of corporate diversification strategy based on external observation is different from its measurement based on internal data. This paper offers one set of reasons for this difference. Difficulties in implementing related diversification strategies may force firms to forego the benefits of relatedness among their businesses. Consequently, externally observed similarities in products, markets or technologies may not reveal actual relatedness among businesses in diversified firms.

This paper presents data that suggest a need for a re-examination of corporate diversification strategies. Previous studies that have attributed relatedness among businesses based on an external examination of the businesses in which a diversified firm participates may have assigned too many firms to the related diversified category. It is possible that at least some of those firms may either be unable to, or may have chosen not to, exploit any relatedness among their businesses. It is likely, therefore, that some firms that were thought to be pursuing a related diversification strategy were, in fact, pursuing an unrelated diversification strategy.

Similarly, it is possible that there exist externally invisible linkages among businesses. This raises the possibility that firms which were previously thought to be unrelated diversified may, in fact, be related diversified. Primary data collected from firms attempts to minimize such possibilities. Hence, the study of corporate diversification strategies may benefit by using primary data collected from diversified firms. It is entirely possible, for example, that the extent contradictory findings of the performance effects of diversification strategies (Ramanujam and Varadarajan, 1989) and much of the confusion surrounding empirical research on corporate diversification (Reed and Luffman, 1986) may be a consequence of the measurement of corporate diversification based on potential, not actual, relatedness though it is the latter, not the former, that determines firm performance. This is because actual relatedness in diversified firms leads to economies of scope which are considered to be a major motive for related diversification.

The findings of this study are also consistent with the view that differences in the abilities of firms to implement corporate diversification strategies should impact not only the performance of firms but also their strategic choices. Firms with greater ability to implement related diversification strategies are likely to adopt such strategies and successfully realize the benefits such strategies offer. Conversely, firms lacking in such abilities ought to desist from undertaking related diversification.

Differences in potential and actual relatedness
found in our sample of firms suggest that some firms have found it difficult to attain the potential benefits of relatedness. If this is due to the kind of implementation difficulties that have been suggested in the literature, it follows that greater research attention ought to be directed toward examining ways in which firms can organize themselves to obtain greater benefits from relatedness.

Another consideration relevant to the measurement of corporate diversification strategy is the difference between perceptions and reality. Observers of organizations, both internal and external, given their particular biases and sources of information might perceive that businesses are related in certain ways. Perceptions of internal observers might diverge from those of external observers because the former might have information not generally available to the latter (Williamson, 1975). Further, these perceptions of relatedness might also diverge from reality due to the absence of complete and unbiased information about real relationships among businesses. This would be especially true if relationships among businesses were based on intangibles such as a dominant logic, sociocognitive similarities, common managerial capabilities, common routines and repertoires, and information asymmetries. It is entirely likely, moreover, that no one would be able to truly ascertain the full extent of true relatedness among businesses. In fact, measuring actual relatedness may be akin to shooting at a moving target because discovering new and unique ways to combine and leverage factors of production is the definition of entrepreneurship.

Therefore, not only is actual relatedness likely to diverge from potential relatedness but also internally and externally perceived relatedness are likely to differ from one another and from the reality of true relationships among businesses in diversified firms. These differences pose considerable measurement problems for research on corporate diversification strategies. Ideally, measures of corporate diversification energy should reflect true actual relationships among businesses.

Consistent with recent cognitive approaches to the study of organizations (Daft and Weick, 1984; Dutton and Jackson, 1987; Ginsberg, 1990; Porac and Thomas, 1990), it follows that corporate diversification may be better understood by studying the systems, processes and mental models that managers use to structure and manage relatedness (Ginsberg, 1990; Prahalad and Bettis, 1986). Since decision makers play a role in determining organizational strategy and design, it may be instructive to inquire about social psychological factors which influence how decision makers frame diversification decisions.

From a cognitive perspective, decision makers act on mental models of their firm and its environment. In the context of competitor definition, for example, Porac and Thomas (1990) suggest that 'it is meaningful to describe competitive boundaries from an insiders subjective point of view' (p. 235). Similarly, Ginsberg (1990) discusses the role of managerial cognition in the process of diversification. He suggests that managerial conceptualization of business relationships determines both the nature of the relationships that are exploited and the coordination of the goals and strategies of related business units. Recognizing that studying cognitive processes of top managers presents significant difficulties, Ginsberg (1990) suggests the use of laboratory studies as an alternative. In a similar vein, Prahalad and Bettis (1986) also suggest the use of longitudinal clinical methods to study diversification strategies.

While our methodology is a step in this direction, it is far from the ideal. As is the case with every methodology, it too suffers from weaknesses. First, we relied on CEOs as the only informant from each firm. While our pilot-test procedures and limited reliability tests on multiple questionnaires returned from 23 firms did not indicate the presence of any difficulties in identifying significant resources, the question of whether or not those resources that truly provide diversified firms with benefits from related diversification were identified remains. Since a list of such resources is essentially infinite and subject to grow due to the identification of new and unique ways to utilize and combine resources, perhaps only a more clinical approach would be likely to fully uncover all such resources in diversified firms.

A second concern is the dilemma posed by the need to assess relatedness encompassing both shared resources and core competences leveraged across multiple businesses. Ensuring that the latter form of relatedness was adequately considered resulted in a bias in our methodology.
Although the bias is against our results, its presence draws attention to the need to further develop ways to study relatedness in diversified firms.

Third, it is possible that some CEOs simply relied on their perceptions when completing the questionnaire. This may have resulted in our obtaining subjective, rather than objective, data about the diversification strategy of their firms. Unfortunately, even full concurrence among multiple respondents from each firm might simply indicate the presence of shared perceptions and, therefore, not serve to provide objective data. Again, perhaps only a clinical approach would resolve this problem. Finally, since our sample was drawn from among large U.S. service firms its results should be interpreted with caution in other contexts. These limitations suggest that further research to develop other methods and to replicate and extend the results of this study to other sample frames is needed.

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**APPENDIX I: FORMAT OF MATRIX USED TO COLLECT DATA FROM FIRMS**

A resource base is anything that could be thought of as a strength, or asset, of a firm. For example, it could be physical plant or equipment. Or, it could be specialized knowledge or skills of a firm's personnel. Or, it could be special routines or repertoires which are used in a firm. A resource base can be used either in the production and delivery of your firm's products or in the management of your firm.

1. Please identify the 10 most significant resource bases used in the businesses of your firm and list them in the spaces below.
2. Please identify the 10 most significant businesses of your firm and list them in the spaces provided below.
3. In the last row, please indicate the proportion of total firm sales obtained from each business of your firm.
### APPENDIX 2: DEFINITIONS OF DIVERSIFICATION STRATEGY MEASURES

**Definitions of Rumelt's categories**

1. **Single Business**: firms that are basically committed to a single business. Single business firms are those with specialization ratios of 0.95 or more. Specialization ratio is defined as the proportion of a firm's revenues that is attributable to its largest discrete product-market activity.

2. **Dominant Business**: firms that have diversified to some extent but still obtain the preponderance of their revenues from a single business. Dominant business firms are those with specialization ratios greater than or equal to 0.7 but less than 0.95.

3. **Related Business**: firms that are diversified having specialization ratios less than 0.7, and in which diversification has been primarily accomplished by relating new activities to old, so that the related ratio is greater than or equal to 0.7. Related ratio is defined as the proportion of a firm's revenues that are attributable to the largest group of businesses that are related in some way to one another.

4. **Unrelated Business**: firms that have diversified chiefly without regard to relationships between new businesses and current activities. Unrelated business firms are those with specialization ratios and related ratios less than 0.7.

**Definitions of entropy measures of diversification**

1. **Firm total diversification** is given by:

   \[
   \text{Firm total Diversification} = \sum_{i=1}^{N} P_i \ln(1/P_i)
   \]

   where \( P_i \) is the share of the \( i \)th business in the total sales of the firm and \( N \) is the total number of businesses of the firm.

2. **Group related diversification** (GRD) is computed in two steps as follows:

   \[
   \text{Group Related Diversification (GRD)} = \sum_{i} P_i \ln(1/P_i)
   \]
where $P_{ij}$ is the share of business $i$ of group $j$ in the total sales of the group of related businesses of the firm.

$$\text{Firm Related Diversification} = \sum_{j=1}^{M} \text{GRD}_j P_j$$

where $P_i$ is the share of the $i$th group of related businesses in the total sales of the firm and $M$ is the total number of groups of related businesses in the firm.

3. **Firm unrelated diversification** is given by:

$$\text{Firm Unrelated Diversification} = \sum_{j=1}^{M} P_j \ln(1/P_j)$$