Performance Implications of Corporate Real Estate Strategic Orientation

by

Steven L. Duckworth

B.Arch., University of Arizona, 1984

M.Arch., University of Illinois at Urbana-Champaign, 1985

Submitted to the Department of Architecture
in partial fulfillment of the requirements of the degree

DOCTOR OF PHILOSOPHY
in the field of
Building Economics

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
February 1993

Signature of Author_____
Department of Architecture
November 30, 1992

Certified by_____
Ranko Bon
Bovis Professor of Construction Management and Economics
University of Reading, United Kingdom
Co-Thesis Supervisor

Certified by_____
Leon B. Groisser
Professor of Structures
Co-Thesis Supervisor

Accepted by_____
Stanford Anderson
Chairman, Departmental Committee on Graduate Studies

Performance Implications of Corporate Real Estate Strategic Orientation

by

Steven L. Duckworth

ABSTRACT

A central concept in strategic management is that congruence between organizational resources and environmental conditions is critical to performance. There are three basic types of organizational resources: human, monetary, and physical. How well a firm allocates these resources in pursuit of its product-market opportunities determines the level of congruence with its environment. Rapid technological change and shifting patterns of competition have put an intense strain on the ability of organizations to maintain such congruence. In spite of these pressures, limited attention has been given in both management theory and practice to the resource that is perhaps most apt to impair the adaptability of organizations, namely real estate.

The objective of this study is to determine how the strategic orientation or profile of a corporate real estate unit (i.e., its approach to problem solving, its risk propensity, its level of proactiveness, etc.) relates to performance. A six dimensional model of corporate real estate strategic orientation (labeled CRESO) is developed from various literatures and practitioner experiences. This model is validated based on key measurement criteria (e.g., theoretical and observational meaningfulness of concepts, internal consistency of operationalizations, convergent and discriminant validity, nomological validity) and then used to explore important relationships with two dimensions of corporate real estate performance, service and internal operations, and two dimensions of business performance, profitability and growth.

This study contributes to the field of corporate real estate by developing "valid" measures of corporate real estate strategic orientation along multiple theoretical dimensions, and by providing insight into the performance implications of different strategic orientations. Directions for future research in corporate real estate are also proposed.

Co-Thesis Supervisors: Dr. Ranko Bon
                        Bovis Professor of Construction Management and Economics
                        University of Reading, United Kingdom

                        Dr. Leon B. Groisser
                        Professor of Structures

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION

A central concept in strategic management is that congruence between organizational resources and environmental conditions is critical to performance (or its broader notion of effectiveness). This concept is rooted in the classical business policy paradigm (Andrews, 1971; Chandler, 1962), and pervades the industrial organization economics (Hatten, Schendel, and Cooper, 1978; Porter, 1981) and organization theory (Burns and Stalker, 1961; Lawrence and Lorsch, 1967) literatures.

There are three basic types of organizational resources: human, monetary, and physical (Ansoff, 1988: 5). How well a firm allocates these resources in pursuit of its product-market opportunities determines the level of congruence with its environment. Rapid technological change and shifting patterns of competition have put an intense strain on the ability of organizations to maintain such congruence. In spite of these pressures, limited attention has been given in both management theory and practice to the resource that is perhaps most apt to impair the adaptability of organizations, namely real estate (also real property, plant, facilities, buildings, or land). From a physical standpoint, it is immobile, time consuming to acquire and modify, and prone to obsolescence. From a financial standpoint, it is relatively illiquid, and costly to acquire, modify, operate and maintain. More importantly, from a managerial standpoint, it is one of the most neglected of all organizational resources (Bon, 1989; Silverman, 1987; Veale, 1989; Zeckhauser and Silverman, 1983) and is typically managed with far less innovative

methods than other resources of comparable magnitude (Duckworth, forthcoming). The fact that real estate is rarely managed at the executive committee level with human and monetary resources is indicative of this disparity. Moreover, even a cursory look through the strategy literature indicates researchers' propensity to study the performance implications of variables related to human (e.g., Gupta, 1984; Gupta and Govindarajan, 1984; Bourgeois, 1985) and monetary (e.g., Bidwell and Kasarda, 1975; Schoonhoven, 1976, 1981) resources rather than those related to such a major physical resource as real estate.

Real estate is significant on both the corporate balance sheet and income statement (Nourse, 1990). More specifically, about one-quarter of all corporate assets in the United States are in the form of real estate (Zeckhauser and Silverman, 1983), and the total occupancy cost that organizations incur from their real estate constitutes between five and eight percent of their gross sales, which can translate into half of their net income (Bell, 1987). Thus, real estate has considerable bearing on an organization's economic performance.

Although some studies have theoretically discussed or empirically tested propositions (descriptive and normative) that are conditional on real estate related variables (e.g., Fox, 1973; Hambrick, MacMillan, and Day, 1982; Hofer, 1975), strategy research in this area is lacking in two major respects. First, emphasis tends to be placed on the *content* of strategy (what should be done) rather than on the *process* of strategy making (how it is

to be developed). For example, Fox (1973) identified a number of hypotheses about appropriate business strategies over the product life cycle, several of which dealt directly with real estate. He suggested that at the product introduction stage, businesses centralize their pilot plants for production, and at the product growth stage, they shift to owned facilities for physical distribution. If the corporate real estate function (henceforth termed CRE) is not an integral part of the organizational process by which such strategies are developed, as is often the case (Bon, 1989: 116), then the feasibility of implementing them in a timely and cost effective manner is greatly reduced.[1]

Second, strategy at the functional level, where CRE resides in the organizational hierarchy, is not viewed as particularly important in strategic management (Ginsberg and Venkatraman, 1985; Venkatraman, 1989). It focuses on the maximization of resource productivity within each specified function and is usually derived from business level strategy (Hofer and Schendel, 1978). For example, the personnel and finance functions are respectively concerned with the most effective use of human and monetary resources for a given business strategy. Likewise, CRE is concerned with the incremental improvement of real estate performance in line with that same strategy (Bon, 1989: 120). As environmental conditions change at an ever increasing pace, "[c]ompanies are asking

---

[1] This bias is also evident in the operations research literature which is replete with studies on the optimization of facility location (e.g., Klincewicz, 1990; Shulman, 1991; Soland, 1974), expansion (e.g., Fong and Srinivasan, 1981; Lee and Luss, 1987; Luss, 1979), and modernization (e.g., Mason and Combot, 1980; Mason, Girard, and Gu, 1990) for various conditions. While these studies specify *what* plan or policy is optimal from an operational standpoint, they do not address *how* it is to be developed or implemented in real estate terms.

9

corporate staffs and functional departments to play a more strategic role with greater cross-departmental collaboration" (Kanter, 1989: 85). Thus, it is critical that increased attention be given to CRE and its role in the development and implementation of business and corporate level strategy.

1.1 RESEARCH OBJECTIVE

The objective of this study is to determine how the strategic orientation or profile of CRE (i.e., its approach to problem solving, its risk propensity, its proactiveness, etc.) relates to performance. A six dimensional model of corporate real estate strategic orientation (labeled CRESO) is developed from various literatures and practitioner experiences. This model is validated based on key measurement criteria and then used to explore important relationships with two dimensions of CRE performance, service and internal operations, and two dimensions of business performance, profitability and growth. It is believed that this research will contribute to the field of corporate real estate by developing "valid" measures of the strategic orientation of CRE along multiple dimensions, and providing insight into the performance implications of different strategic orientations.

1.2 THESIS OVERVIEW

This document is organized into six chapters. In the second chapter, a systems model is used to delineate the specific role of CRE in maintaining congruence between an

organization's resources and its environmental conditions. Based on this role, the theoretical framework of the CRESO construct is developed across six key dimensions. Published literatures in the corporate real estate, strategic management, organizational power, management information systems, and marketing fields are used to support its dimensionality. The operationalization of these dimensions and the different components of measurement validity (e.g., theoretical and observational meaningfulness of concepts, internal consistency of operationalizations, convergent and discriminant validity, nomological validity) are described in the third chapter, as are the data collection scheme and sample characteristics for the companies and key informants involved the study. The fourth chapter examines the measurement properties for each dimension of CRESO, while the fifth chapter addresses the predictive validity of the CRESO model. In the final chapter, a summary is provided of the overall research effort, and the theoretical, methodological, and managerial implications of the research findings are discussed. Directions for future research in corporate real estate, including possible extensions to this study, are also proposed.

CHAPTER 2. THEORETICAL FRAMEWORK OF CRESO CONSTRUCT

In this chapter, the theoretical framework for the CRESO construct is developed. First, the three levels of organizational strategy relevant to this study are discussed. Second, a systems model is used to delineate the role of CRE in maintaining congruence between organizational resources and environmental conditions. Understanding this role is necessary for conceptualizing the strategic orientation of CRE. Finally, the dimensionality of CRESO is specified based on available theoretical support.

2.1 LEVELS OF ORGANIZATIONAL STRATEGY

Organizational strategy is generally conceptualized at three levels: corporate, business, and functional (Grant and King, 1982; Hofer and Schendel, 1978). Corporate level strategy addresses the question: what set of businesses should our corporation be in? It also focuses on the ways in which the businesses of a firm should be integrated into an effective portfolio. Egelhoff (1982) and Rumelt (1974), for example, view strategy at this level in terms of "the pattern of relationships" among the different businesses constituting the corporate profile.

Strategy at the business level (also referred to as business unit or strategic business unit) deals with the question: how does our firm effectively compete in each of its chosen businesses? In addition, it concerns the integration of various functional areas that

12

comprise a business. Thus, the theoretical issues at this level focus on the need to match environmental opportunities and risks with organizational resources (Bourgeois, 1980; Grant and King, 1982; Hofer and Schendel, 1978; Porter, 1980). The allocation of organizational resources to achieve a competitive advantage is critical.

Functional level strategy concerns the maximization of resource productivity within each of the given functions and is usually derived from business strategy. It is "designed to relate the various functional area policies with changes in the functional area environments" (Schendel and Hofer, 1979: 13). For example, CRE must relate its strategy for effectively meeting the real estate needs of business units with changes in the real estate market.

These different levels of organizational strategy are central to the systems model discussed in the next section. The purpose of the model is to help elucidate the role of CRE in matching organizational resources with environmental conditions. This role will help define the domain in which the dimensions of CRESO will be specified.

2.2 AN ORGANIZATION AND ITS ENVIRONMENT: A SYSTEMS MODEL

In conditions of high variability in the environment, successful performance is likely to depend on an organization having the capacity to adapt to changing circumstances (Child, 1975). As shown in Figure 2A, the level of congruence a firm can maintain with its

13

Figure 2A: The Major Contingency Relationships for Maintaining Congruence Between Organizational Resources and Environmental Conditions
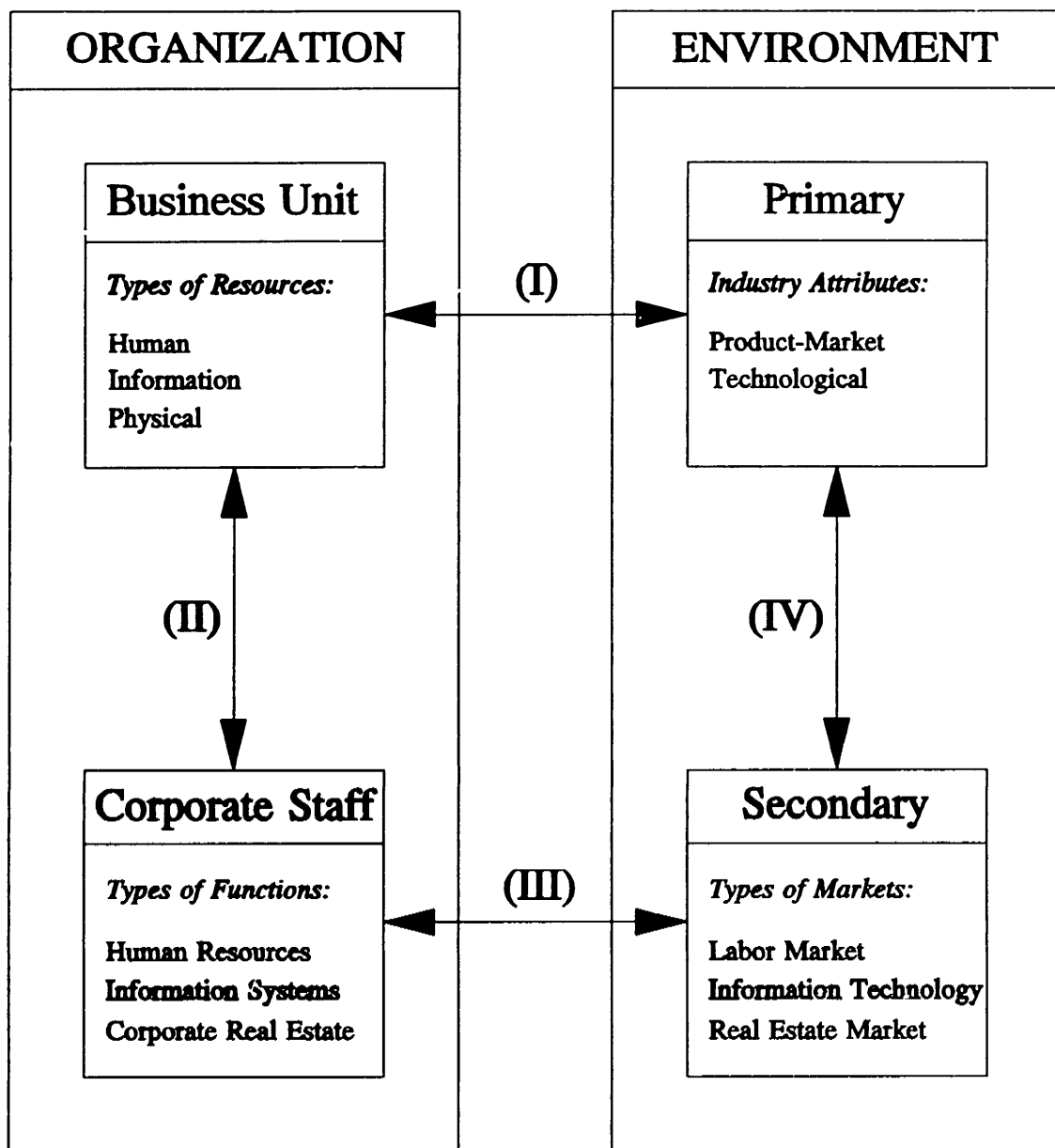
environment is contingent on four major relationships: (I) business unit to primary environment, (II) business unit to corporate staff, (III) corporate staff to secondary environment, and (IV) primary to secondary environment. These contingency

relationships will be discussed in Sections 2.21 through 2.24 with emphasis on the role of CRE.

2.21 Relationship I: Business Unit to Primary Environment

As organizations become more diverse (Chandler, 1962; Rumelt, 1974) and operate in multiple product-market segments, strategy at the corporate level is too aggregated for understanding the strategic responses to environmental influences such as competitive moves and technological changes (Venkatraman, 1989). Thus, relationship I is defined at the level of the business unit rather than at the corporate level. Similarly, since the environmental factors relevant to each strategy level vary (Schendel and Hofer, 1979), relationship I concerns only those environmental factors relevant to the business unit, referred to as the "primary" environment in Figure 2A.

It should be noted that the "primary" environment in this study is synonymous with what is called the "task" environment in the organization theory literature, and what Bourgeois (1980) subsequently termed the "secondary" environment. To alleviate any confusion, all three terms refer to that environment composed of the customers, competitors, suppliers, and regulatory bodies with whom the business unit interacts in pursuit of its objectives. The literature suggests that the most appropriate industry characteristics for measuring such an environment are its product-market and technological characteristics (Beard, 1978; Burns and Stalker, 1961; Child, 1974; Tosi et al., 1973).

15

Every business unit seeks to effectively allocate its resources for the purpose of achieving a competitive advantage in its primary environment. According to Ansoff (1988: 5), "[t]he object is to maximize the efficiency of the firm's resource-conversion process, or, in more conventional language, to maximize profitability of current operations." But rapid change in technology and markets has made it increasingly difficult for business units to maintain congruence between their resources and environmental conditions. To assist in this matter, most large firms have a corporate staff, of which CRE is a part. The business unit-corporate staff relationship will be covered in the following section.

2.22 Relationship II: Business Unit to Corporate Staff

The corporate staff of an organization is composed of various functional units whose purpose is to provide specialized support to the business units. For example, the human resources department is responsible for addressing the personnel needs of business units, the information systems group assists business units in managing their information technology infrastructure, the legal staff provides business units with necessary legal counsel, and CRE supports business units in terms of their real estate requirements. Hence, business units rely on the corporate staff to help them effectively allocate their resources and thereby exploit opportunities and avoid threats in their changing primary environment.

While the most dramatic growth in organizations in recent decades has been in the corporate staff (Mintzberg, 1979), this trend appears to be reversing. Drucker (1988) argues that the need for staffs without operating responsibilities will "shrink drastically" in the future, while Kanter (1989: 89) believes their role will be seriously challenged:

> [Corporate staffs] need to serve as integrators and facilitators, not as watchdogs and interventionists. They need to sell their services, justify themselves to the business units they serve, literally compete with outside suppliers. [...] Now these staffs must prove to the satisfaction of their internal customers that their services add value.

In order to meet this challenge, corporate staffs must be more aware of changes in their respective functional environments. "Environmental scanning is now an important part of a manager's job at every level and in every function" (Kanter, 1989: 89). The next section focuses on this corporate staff-secondary environment relationship.

2.23 Relationship III: Corporate Staff to Secondary Environment

Corporate staffs must not only understand what each business unit needs in terms of specialized support, but also how that support can best be provided under the current and anticipated conditions in their respective functional environments, referred to in Figure 2A as the "secondary" environment. That is, each corporate staff unit must mediate between its particular functional environment (relationship III) and the business units to which it provides support services (relationship II). For example, the secondary environment for CRE is the real estate market. It is clearly distinct from the product-market and technological attributes that business units are concerned about in the primary

17

environment. CRE must monitor the real estate markets where business units have or plan to have a presence in order to help them maximize the productivity of their real estate resources in those areas. Likewise, the human resources department must scan the labor markets from which potential employees are or may be needed by business units.

Since the primary and secondary environments are distinct, however, the needs of business units pursuing their objectives in the primary environment may be incompatible with conditions in the secondary environment. The relationship between the primary and secondary environments will be examined in the following section.

2.24 Relationship IV: Primary to Secondary Environment

The relationship between the primary and secondary environments can generally be in one of four possible states at any given time, as shown in Figure 2B. Assume, for example, that a business unit is experiencing a period of rapid growth due to the ample opportunities currently available in its primary environment. Under these conditions, the state of the primary environment would be categorized as "strong." As a result of this rapid growth, the business unit is in need of additional space.

CRE becomes aware of this need, on either a proactive or reactive basis, and attempts to secure the necessary space on favorable terms under current real estate market conditions. If the real estate market (i.e., secondary environment) is also "strong," then

Figure 2B: Matrix of Primary-Secondary Environment Relationship

Primary Environment

	Strong	Weak
Strong	1	2
Weak	3	4

Secondary Environment

the relationship between the primary and secondary environments would be in state 1, see Figure 2B. A strong real estate market is characterized by low vacancy rates, inflated prices, and a scarcity of available labor in the building industry. Under these conditions, it is likely that CRE would have a difficult time negotiating favorable lease terms with landlords who are looking to increase rents and limit options, or construct a new building in a timely manner. Thus, it would be difficult for CRE to adequately meet this need of the business unit under the environmental conditions associated with state 1.

If, on the other hand, the real estate market is "weak" as in state 3, then CRE would have leverage over landlords who are eager to lease space on virtually any terms, architects and contractors who are willing and able to deliver a new building more

quickly and cheaply, brokers who are desperate for clients, etc. It would therefore be relatively easy for CRE to secure the needed space on very favorable terms.

Now assume that the business unit is going through a period of downsizing due to the limited opportunities currently available in its primary environment. This may be the result of an economic recession and/or inappropriate business strategy. In any case, the state of the primary environment under these depressed conditions would be categorized as "weak." In addition to employee layoffs, the business unit must dispose of excess property in order to remain viable.

CRE becomes aware of this need and attempts to begin the disposition process under current real estate market conditions. If the real market is also "weak," then the relationship between the primary and secondary environments would be in state 4. It is likely that CRE would find it difficult to dispose of the excess property in a real estate market with already high vacancy rates and depressed prices, even on marginally acceptable terms. Hence, it would be difficult for CRE to adequately meet this need associated with business contraction when environmental conditions are commensurate with state 4.

If, however, the real estate market is "strong" as in state 2, then CRE would have little difficulty in disposing of the property on reasonable terms, regardless of the transaction type. For example, owned property would be marketable under such conditions, and

landlords may look favorably on the chance to let the business unit out of certain leases prematurely so that higher rents could be charged to new tenants. Thus, the capacity of CRE to meet the various needs of the business unit, regardless of what those needs may be, is partly contingent on the state of the primary-secondary environment relationship.

Moreover, the relationship between the primary and secondary environments can be further abstracted into symmetrical and asymmetrical states, represented in Figure 2B by the shaded and unshaded quadrants, respectively. As the previous examples illustrate, when the relationship is symmetrical (i.e., states 1 and 4), the two environments are essentially at odds, but when it is asymmetrical (i.e., states 2 and 3), they tend to be complementary. Since these environmental dynamics may significantly affect the level of congruence that CRE can maintain between a business unit's real estate resources and environmental conditions, and thereby affect performance, they were measured in this study.

Although the two types of survey instruments developed for this study will be fully discussed in Section 3.32 (see Appendix 3A for a copy of each type), the specific questions used to measure the state of the business unit's primary environment and CRE's secondary environment will be focused on here. The business informants (see Sections 3.23, 3.34, and 3.37 for discussions on key informants) were asked the following question concerning their primary environment:

IV. Please indicate the statement that best describes your current business conditions.

        ___ Downsizing and trying to dispose of excess property
        ___ Growing and trying to acquire additional property
        ___ Neither of the above

Similarly, the corporate real estate informants were asked one question concerning their secondary environment:

II. Assuming the real estate market influences corporate real estate activities, which of the following is most difficult to achieve in your operations under current real estate market conditions?

        ___ Acquisition of property
        ___ Disposition of property
        ___ Both of the above
        ___ Neither of the above

Based on these two questions, the primary environment would be strong when the business informants indicate that their business unit is "growing and trying to acquire additional property," and it would be weak when they indicate that their business unit is "downsizing and trying to dispose of excess property." The secondary environment would be strong when the corporate real estate informants indicate that the "acquisition of property" is difficult for their CRE to achieve under current real estate market conditions, and it would be weak when they indicate that the "disposition of property" is difficult to achieve under such conditions. In summary, relationship IV would be symmetrical (i.e., at odds) when the primary and secondary environments are both strong (state 1) or weak (state 4), and it would be asymmetrical (i.e., complementary) when the former is strong and the latter is weak (state 3) or visa versa (state 2).

2.3 SPECIFYING THE DIMENSIONALITY OF CRESO

The systems model presented in Section 2.2 provides a systematic framework for conceptualizing the role of CRE in maintaining congruence between the real estate resources and environmental conditions of a business unit. Its four contingency relationships collectively address important issues regarding how CRE may strategically orient itself in fulfilling this role. This section focuses on identifying critical dimensions of corporate real estate strategic orientation (CRESO).

The dimensionality of CRESO can be specified in one of two ways. First, the different dimensions of the construct can be developed *a priori* on the basis of existing theoretical support, and then confirmed or rejected by means of confirmatory factor analysis (CFA). With precise specifications concerning the factor structure and their loadings, CFA provides a strong test for theoretically specified dimensions.

Second, the CRESO dimensions can be empirically derived *post hoc* through exploratory factor analysis (EFA). EFA is a data analytic scheme for exploring the underlying factor structure of an indicator set without any prior specifications concerning the number of factors or their loadings. As Venkatraman (1989: 948) notes:

> This approach is generally considered to be 'theory-free' and is adopted only in those cases where little theoretical basis exists for *a priori* deriving the dimensions. In such cases, the danger is that the dimensions may not be interpretable for use in substantive research and that they may not be stable over different study settings. More importantly, the data analytic scheme occupies a central role in the conceptualization and operationalization of the construct.

23

In comparing the CFA and EFA approaches, Bagozzi (1983: 134-135) observes:

> In their pure forms, the EFA and CFA approaches can be thought of as end points on a continuum. At one extreme EFA represents a procedure for the discovery of structure, while at the other extreme, CFA is a technique for testing hypothesized structure formed on an a priori basis.

Although the theoretical basis for specifying the dimensions of CRESO *a priori* was meager in certain respects, a compilation of theoretical perspectives from various fields was sufficient to guide the construct definition *a priori*. Accordingly, six important dimensions of corporate real estate strategic orientation (CRESO) are identified in Sections 2.31 through 2.36.

2.31 Centrality

The position of CRE in the firm is a key characteristic of its strategic orientation, as noted by Michael Bell, Director of Corporate Real Estate for the Dun and Bradstreet Corporation:

> The corporate real estate function must be positioned in the firm to add value. We must establish an internal network within the organization to tie into the strategic loop. Alliances are critical to repositioning the corporate real estate function.[2]

The degree to which the activities of a subunit are linked with those of other subunits in the firm is a concept referred to in the organizational power literature as centrality.

---

[2] Michael A. Bell, Based on minutes from the Industrial Development Research Foundation's Research Committee meeting, White Plains, New York, September 12, 1991.

Thompson (1967) measured centrality by distinguishing between pooled, sequential, and reciprocal patterns of interdependence among subunits. A similar distinction was made between parallel and interdependent specialization by Blau and Scott (1962). Woodward (1965: 126) also introduced a concept of this kind in her discussion of the critical function in various production systems: "there seemed to be one function that was central and critical in that it had the greatest effect on success and survival."

Perhaps the most notable definition of centrality was developed by Hickson et al. (1971) who used aspects of Emerson's (1962) exchange theory, according to which power is rooted in the exchange partner's dependency. The more a subunit needs the services of its exchange partner, and the fewer alternatives and substitutes it has for these services, the more dependent the subunit. Realizing that centrality is composed of more than one constitutive concept, Hickson et al. (1971) divided it into two further concepts. First, the degree to which the workflows of a subunit connect with the workflows of other subunits is defined as workflow pervasiveness. For example, the activities of the finance department may be well connected to those of other subunits through the budgeting system, whereas the research department may only interface with a single production subunit and therefore have relatively low workflow pervasiveness. According to Nourse (1990: 133, 136):

> The real estate staff function is closely linked to finance. In particular, the finance staff controls and monitors the capital budget, financing alternatives, tax matters, and insurance. In implementing acquisitions and dispositions the real estate staff helps to create the capital budget through assistance in planning and works to meet goals through their negotiations of purchase, sales, and leases. Their control of real estate assets is linked to finance in developing asset

organization to reduce taxes, in monitoring property taxes for their control, and in valuation to determine whether assets are appropriately deployed.

The real estate staff function is closely linked to operations. In particular, the operations staff is responsible for assessing the need for new facilities, the renovation of facilities, the abandoning of facilities, and the design and location of facilities. Here we are not only thinking of operations as manufacturing production, but also as the production of services, as in retailing, insurance, or banking. The real estate executives participates in and even heads the site selection team. The real estate staff's control of space enables the corporation to more quickly redeploy its assets to maintain or enhance their value.

The real estate staff is closely linked to the legal staff. The legal staff approves the sales contracts, leases, listing agreements, deeds, easements, and other legal documents that are part of all real estate transactions. If the real estate staff is large enough, one or more lawyers may be assigned directly to the real estate staff.

The real estate staff is also linked to marketing and personnel. In the selection of new retail sites, real estate and operations must coordinate with marketing for advertising plans and marketing goals. In the selection of sites for any type of building, personnel is a participant on the site selection team to assist in evaluating labor markets and in planning for the new employees required.

Chronley (1987: 81) also observes that "coordination between marketing, construction, operations, finance and accounting, legal services, and real estate units is essential for the successful conduct of business."

Second, the speed and severity with which the workflows of a subunit affect the final outputs of the organization is defined as workflow immediacy. Hinings *et al.* (1974) provide a useful example of the difference between speed and severity. They note that a machine breakdown might be immediate in terms of speed, but could be adjusted within an hour and have a very limited overall effect. Lack of a cash forecast, on the other

26

hand, may not affect finished goods for many months, but eventual lack of cash could stop everything indefinitely.

To increase the rigor of the concept and the accuracy of its assessment, Ashar and Shapiro (1988) argue that another element--criticality--should be incorporated in the centrality measure. Criticality is the extent to which a resource is absolutely necessary for the effective operation of a department (Salancik and Pfeffer, 1974). That is, a department is central only when its contribution to the organization is critical. In determining whether an academic department's course offerings (i.e., resources) are critical, Ashar and Shapiro (1988) measured the number of nonmajor students (outsiders) in a department. The number of outsiders indicates the degree to which other academic departments need and make use of the educational credits offered by a particular department.

Similarly, the extent to which business units need and make use of the services offered by CRE may be measured by the number of units securing these services from alternative sources (e.g., consultants, brokers, developers). The less that alternative sources are utilized, the more that CRE's services are critical and therefore central to the organization. Concepts relating to the availability of alternatives pervade the organizational power literature and are usually referred to as substitutability. Hickson et al. (1971) defined substitutability as the ability of the organization to obtain alternative performance for the activities of a subunit. This concept is highly relevant to CRE as

"the need for service staffs--that is, for people without operating responsibilities who only advise, counsel, or coordinate--shrinks drastically" (Drucker, 1988: 47). The managers and professionals on these staffs "need to sell their services, justify themselves to the business units they serve, literally compete with outside suppliers" (Kanter, 1989: 89).

Thus, a combination of three elements will serve as the theoretical basis for operationalizing the concept of centrality in this study: (1) workflow pervasiveness, (2) workflow immediacy, and (3) substitutability. Indicators for each of these elements will be used in the operationalization.

2.32 Analysis

This dimension refers to the analytical orientation of CRE in its decision making processes. It reflects Bon's (1989, 1990) concept of real property portfolio management (RPPM), simultaneously concerning the physical, financial, and organizational aspects of real property decisions. As Bon (1989: 117) notes:

> This orientation is distinct from real estate development, insofar as it concerns the entire real property life cycle, as well as the entire real property portfolio. Both cross-sectional and longitudinal or time-series analyses of the portfolio are required for this task.

Duckworth (forthcoming) employed this concept in a methodology aimed at synthesizing the cross-sectional and time-series aspects of conventional real property analyses. He argued that by continually monitoring the performance of the entire real property portfolio, rather than making decisions on a property-by-property or moment-to-moment

28

basis, real property managers can develop a better understanding of portfolio characteristics (i.e., enhance their mental models) and thereby make more effective decisions. This dimension also reflects the extent to which appropriate management systems (planning and control systems, space accounting and planning systems, capital budgeting systems, decision support systems, etc.) are used in these analyses.

Several studies in the strategic management literature are useful in further establishing a theoretical basis for this dimension. Miller and Friesen (1978) used *analysis* as a variable in their empirical study on archetypes of strategy formulation and defined it as the amount of systematic thought and deliberation devoted to a problem and the array of proposed responses. They consider it to be an important characteristic of organizational decision making, postulating that "the more *analysis* is performed by key decision makers, that is, the greater the tendency to search deeper for the roots of problems and to generate the best possible solution alternatives, the more likely it is for innovation opportunities to be discovered and actualized" (1982: 5).

A related concept is *comprehensiveness*, defined by Fredrickson (1984) as the extent to which an organization attempts to be exhaustive or inclusive in making and integrating strategic decisions. Organizations with comprehensive strategic decision processes view decision making as a largely analytical activity, where the search for information tends to be far-reaching and unbiased by managerial experience or functional orientation. For example, a decision is likely to be conceptualized in terms of its broad impact, involving

other departments and divisions to ensure that its overall effect is not underestimated. Conversely, in noncomprehensive firms individual decisions tend to be viewed in isolation and are regarded as distinct incidents. For example, a decision concerning a new manufacturing facility is likely to be viewed as the responsibility of the production personnel, and suggestions to involve participants from other areas would be considered inappropriate.

Venkatraman (1985, 1989) identified *analysis* as one of six dimensions in his model of the strategic orientation of business enterprises. He primarily drew theoretical support for it from the Miller and Friesen (1982) and Fredrickson (1984) studies previously discussed.

2.33 Entrepreneurship

This dimension refers to the profit-seeking orientation of CRE, as noted by Levy and Matz (1987). They conceptualized entrepreneurial real estate as the most aggressive of three alternative approaches to corporate real estate management (aspects of the other two approaches, facilities management and asset management, are considered in the following sections). An entrepreneurial CRE has a relatively comprehensive profit-making outlook and is generally willing to take more risk to achieve its profit objectives. Moreover, satisfying the real estate needs of the business units often comes into conflict with its

drive for profit maximization. As a result, real estate profits may be enhanced at the expense of business profitability.

Many of these characteristics are analogous to those found in Collins and Moore's (1970) and Mintzburg's (1973) entrepreneurial firms, Miles and Snow's (1978) prospectors, and Miller and Friesen's (1978) adaptive, innovative, and impulsive firms. Such firms tend to innovate boldly and regularly while taking considerable risks in their product-market strategies (Miller and Friesen, 1982).

2.34 Proactiveness

This dimension reflects the proactive behavior of CRE in relation to emerging real estate opportunities or problems within and without the corporation. Such behavior characterizes the asset management concept of Levy and Matz (1987), and Bon's (1989, 1990) notion of real property portfolio management (RPPM). The former involves "searching for ways to increase the value of real estate to the firm and to increase shareholder value" (Nourse, 1990: 2), while the latter postulates that "a systematic watch of building performance indicators offers many opportunities for discovery and learning" (Bon, 1989: 118). Both approaches entail a high level of initiative to find opportunities that can be exploited and problems that can be solved through proactive managerial action.

Proactiveness is a key trait of the strategic orientation of CRE, as noted by Arun Daga, General Manager of Real Estate and General Services for the Xerox Corporation:

> I guess what I'm struggling with is that I think changes are taking place, very clearly. And we've got to be more proactive instead of reactive. We need a different kind of mindset, a different kind of training, different kinds of professionals, and different kinds of missions of the [real estate] departments. We should set them up that way. We must get them involved in strategic discussions.[3]

Moreover, Henrik Petersen, Senior Vice President of Real Estate and Purchasing for American Express TRS, observes:

> We need to proactively define what bearing real estate has on existing problems in the firm, and present the different options to top-level management. This way we are defining the problem to top-level management, not visa versa. In other words, we must develop a lens for the CEO to look through to recognize the strategic value of corporate real estate. Rather than asking how we can position ourselves to better add value, identify the value we can offer and present it to top-level management.[4]

Proactiveness has also been used as a variable in strategy research at the business level. For example, Miller and Friesen (1978) selected it as a strategy making variable in their empirical study on archetypes of strategy formulation, postulating that a firm can either *shape* the environment by introducing new products, technologies, and administrative techniques, or it can merely react to environmental trends. Also, Venkatraman (1989) argued that proactiveness is an important theoretical dimension of business strategic orientation. He expected proactive behavior to be manifested in terms of businesses

---

[3] Arun Daga, Based on minutes from the Industrial Development Research Foundation's Research Committee meeting, New York, NY, March 11, 1990.

[4] Henrik T. Petersen, Based on minutes from the Industrial Development Research Foundation's Research Committee meeting, White Plains, New York, September 12, 1991.

seeking new opportunities which may or may not be related to their present line of operations, introducing new products and brands ahead of the competition, and strategically eliminating operations which are in the mature or declining stages of life cycle. Although proactiveness at the business and functional levels of an organization is conceptually different in certain respects, sufficient similarities exist to provide additional theoretical support for the use of proactiveness as a dimension in this study.

2.35 Riskiness

This dimension reflects the risk propensity of CRE in relation to its overall pattern of decision making. In recent years, risk management has been an area of increasing concern to corporate real estate executives, as exemplified by this comment from Bruce Russell, Director of Corporate Real Estate for the Eastman Kodak Company:

> We need to move toward shared or distributed risk corporate real estate. When the business cycle is six months and the real estate cycle is five years, there must be new mechanisms developed that distribute the risk generated by this time difference.[5]

Such risk considerations are an important influence on the strategic orientation of CRE. Although strategic risk taking has been generally regarded as a characteristic of individual decision makers (Venkatraman, 1985, 1989), it is viewed in this study as a functional-level construct and is expected to be reflected in criteria for real estate

---

[5] H. Bruce Russell, Based on minutes from the Industrial Development Research Foundation's Research Committee meeting, White Plains, New York, September 12, 1991.

33

decisions such as capital budgeting and financing (Holst, 1987; Redman and Tanner, 1991).

Risk has been traditionally defined in texts as a condition in which the consequences of a decision and the probabilities associated with the consequences are known (Knight, 1921). In making strategic decisions, however, all of the possible results that might occur, and the probabilities of their occurrence are rarely, if ever, known (Baird and Thomas, 1985). This condition is referred to as uncertainty, a term whose usage in the strategy literature often overlaps that of risk.

This overlap is also present in the real estate literature even though risk and uncertainty are largely distinct concepts. According to Pyhrr and Cooper (1982), the most widely accepted definitions of risk are: (1) the probability of loss, (2) the probability of not receiving what is expected, (3) the difference (or potential variance) between expectations and realization, (4) the possible variance of returns relative to the expected or most likely return, and (5) the chance or probability that the investor will not receive the expected or required rate of return that is desired on the investment. Uncertainty refers to anything that is not known about the outcome of a venture at the time when the decisions are made (Byrne and Cadman, 1985). Thus, risk deals with the probability and variance of outcomes, while uncertainty concerns the quality of, and access to information. In this study, riskiness is conceptualized very broadly, encompassing aspects of both risk and uncertainty in CRE's general pattern of decision making.

34

The concept of riskiness has been employed extensively in strategy research. For example, it was used as one of six dimensions in Venkatraman's (1985, 1989) model of the strategic orientation of business enterprises, capturing the extent of riskiness reflected in various resource allocation decisions as well as choice of products and markets. Miller and Friesen (1978) included risk taking as a variable in their study on archetypes of strategy formulation and defined it as the degree to which managers are willing to make large and risky resource commitments (i.e., those which have a reasonable chance of costly failure). To help understand the nature of strategic risk taking and the formulation of strategic risk policy, Baird and Thomas (1985) developed a model of strategic risk taking that incorporated environmental, industrial, organizational, decision maker, and problem variables.

2.36 Serviceability

This dimension refers to the posture adopted by CRE in its provision of support services to the corporation's primary businesses. It reflects Mintzberg's (1979) view of CRE as part of the "support staff" whose purpose is to provide support to the "operating core" of the organization--that is, the operators (i.e., business units) of the organization that perform the basic work related directly to the production of its products and services. As Mintzberg (1979: 31) argues:

> **A glance at the chart of almost any large contemporary organization reveals a great number of units, all specialized, that exist to provide support to the organization outside the operating work flow. Those comprise the *support staff*. For example, in a university, we find the alma mater fund, building and**

35

grounds department, museum, university press, bookstore, printing service, payroll department, janitorial service, endowment office, mailroom, real estate office, security department, switchboard, athletics department, student placement office, student residence, faculty club, guidance service, and chaplainery. None is a part of the operating core, that is, none engages in teaching or research, or even supports it directly (as does, say, the computing center or the library), yet each exists to provide indirect support to these basic missions. In the manufacturing firm, these units run the gamut from legal counsel to plant cafeteria.

This notion of the real estate office (i.e., CRE) being part of a firm's support staff is closely related to Levy and Matz's (1987) facilities management concept of corporate real estate activities. A facilities management approach entails operating existing facilities, supervising the construction of new facilities, and buying, selling, and leasing properties as primary business needs change. In other words, "facility management is real estate management that is passive to requests from the rest of the firm" (Nourse, 1990: 2).

This dimension is expected to be manifested in terms such as the detachment of CRE from the mainstream strategic planning of the corporation as a whole, CRE task functions being split among several dispersed units with different reporting lines, a lack of emphasis on bottom-line performance by CRE, the assignment of retreaded personnel from the firm's primary businesses to CRE, and CRE staff having little or no meaningful prior experience in real estate or construction (Levy and Matz, 1987).

2.4 SUMMARY OF CHAPTER 2

This chapter addressed important theoretical aspects of the CRESO construct. The first section highlighted three leveis of organizational strategy pertinent to this study: corporate, business, and functional. The second section employed these concepts in a systems model whose purpose was to elucidate the role of CRE in maintaining congruence between the real estate resources and environmental conditions of a business unit. The dynamics among four contingency relationships were examined in the model: (I) business unit to primary environment, (II) business unit to corporate staff, (III) corporate staff to secondary environment, and (IV) primary to secondary environment. These relationships collectively addressed key issues regarding how CRE may strategically orient itself in fulfilling this role. The final section identified six important dimensions of corporate real estate strategic orientation (CRESO): centrality, analysis, entrepreneurship, proactiveness, riskiness, and serviceability. Perspectives from various fields were used to theoretically buttress the dimensions on an *a priori* basis.

CHAPTER 3. MEASUREMENT VALIDITY AND RESEARCH DESIGN

This chapter focuses on the linkage between the theoretical model of CRESO presented in the previous chapter and its measurement. First, the "holistic construal" (Bagozzi and Phillips, 1982) paradigm for representing and testing organizational theories is discussed and applied to CRESO. Second, various components of validity relevant to this research are reviewed. Finally, the research design and countermeasures employed to protect against threats to the validity of this study are summarized.

3.1 THE HOLISTIC CONSTRUAL PARADIGM

This section discusses the benefits of using the holistic construal approach for linking theory construction and theory testing in organizational research. The basic concepts and relationships in the approach are presented and applied to the CRESO model. The specific benefits in adopting the approach are then described.

3.11 Concepts in the Holistic Construal

A theory may encompass three types of concepts: theoretical, derived, and empirical. Theoretical concepts are abstract, unobservable properties or attributes of a social unit. They achieve their meaning through direct or indirect (i.e., through derived or other theoretical concepts in the overall nomological network) connections to empirical

38

concepts. In the context of this study, corporate real estate strategic orientation (CRESO) is the only theoretical concept, depicted in Figure 3A as a large ellipse. As shown in Table 3A, it obtains its meaning through its relation to (1) the derived concepts of analysis, centrality, entrepreneurship, proactiveness, riskiness, and serviceability, and (2) the empirical concepts connected to these six derived concepts or dimensions.

Derived concepts, like theoretical concepts, are unobservable. Unlike theoretical concepts, however, they must be tied directly to empirical concepts, and they are typically at a lower level of abstraction than theoretical concepts. The six dimensions of CRESO are the derived concepts in this study, depicted in Figure 3A as small ellipses. As shown in Table 3A, they collectively result in the determination of the strategic orientation of a corporate real estate unit and thus are subsumed under the broader and more abstract theoretical concept of CRESO. They represent unique characteristics of strategic orientation, however.

Empirical concepts refer to "properties or relations whose presence or absence in a given case can be intersubjectively ascertained, under suitable circumstances, by direct observation" (Hemple, 1965: 22, quoted by Bagozzi and Phillips, 1982: 465). Depicted in Figure 3A as squares, empirical concepts are measured through experimental or objective means and may be assigned numerical or symbolic coding by the researcher. In this study, they refer to the data collected from key informants (e.g., senior real estate
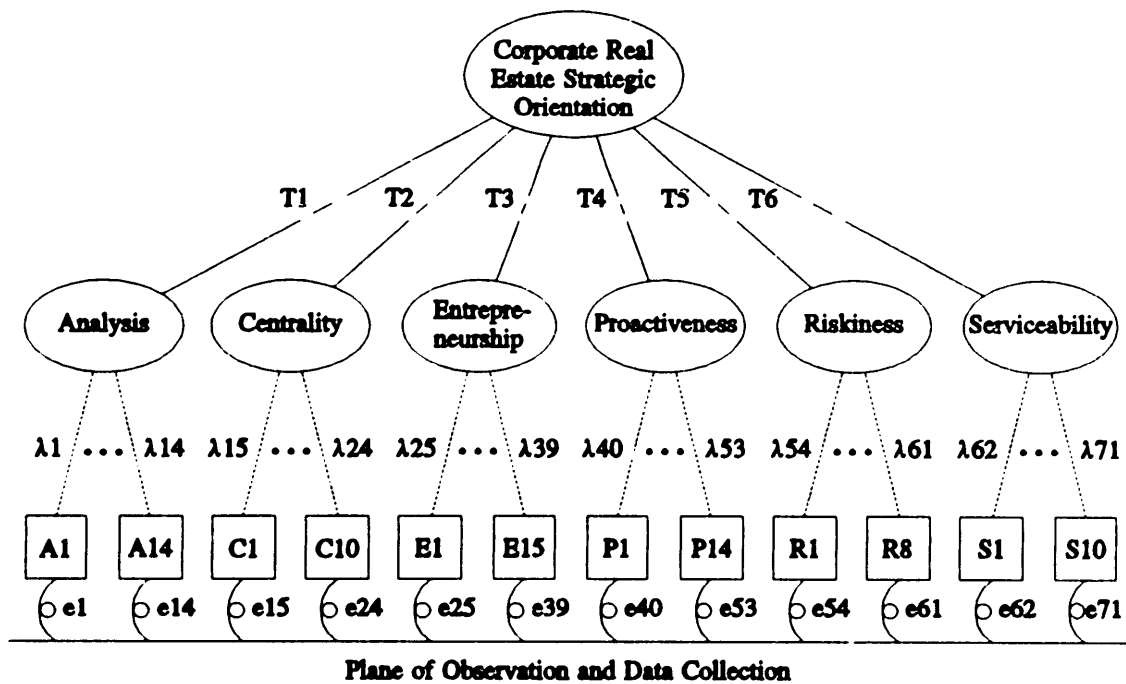
Figure 3A: Structure of the Holistic Construal Applied to the CRESO Model

and business managers) through the various indicators of the survey instruments. Table 3A summarizes the initial empirical measures in the CRESO model.

3.12 Relationships in the Holistic Construal

Four possible types of relationships connect the theoretical, derived, and empirical concepts of theories: nonobservational hypothesis, theoretical definition, correspondence rule, and empirical definition. The nonobservational hypothesis (i.e., theoretical law, hypothetical law, nonobservational proposition, axiom, postulate, causal relation, or hypothesis) links theoretical concepts with other theoretical concepts, while the theoretical definition (indicated in Figure 3A by solid lines with a single break) connects theoretical

Table 3A: Central Concepts in the CRESO Model Represented in Figure 3A

Concept	Definition
Theoretical Concept	
CRESO Construct	The general pattern of means employed by CRE to achieve its objectives and those of the business units it serves.
Derived Concepts	
Analysis	Overall analytical posture of CRE in its decision making processes.
Centrality	Degree to which the activities of CRE are linked with those of other subunits in the corporation.
Entrepreneurship	Profit-seeking orientation of CRE.
Proactiveness	Extent of proactive behavior exhibited by CRE in relation to emerging real estate opportunities or problems within and without the corporation.
Riskiness	Risk propensity of CRE in relation to its overall pattern of decision making.
Serviceability	Posture adopted by CRE in its provision of support services to the corporation's primary businesses.
Empirical Concepts	
Analysis	
A1	Our information systems provide support for decision making.
A2	When confronted with a major decision, we usually try to conduct a thorough analysis and explore alternatives.
A3	We emphasize effective coordination among different organizational units involved in real estate decisions.
A4	We analyze the performance of our real estate portfolio on both a cross-sectional and time series basis.
A5	We try to search deeper for the roots of problems in order to generate the best possible solution alternatives.
A6	Our search for information tends to be far-reaching and unbiased by managerial experience or functional orientation.
A7	We view decision making as a largely analytical activity.
A8	Our decision processes can be characterized as comprehensive.
A9	We try to facilitate our decision processes by limiting the involvement of other organizational units as much as possible (reverse scored).
A10	Use of project management techniques.
A11	Use of management information and control systems.
A12	Use of decision support systems.
A13	Use of real estate inventory and accounting reports.
A14	Use of space accounting and planning systems.
Centrality	
Workflow	
Pervasiveness	
C1	Many of the business units regularly seek our advice concerning the real estate implications of their major decisions.
C2	A large number of the business units routinely rely on our real estate services.

Table 3A (Cont.): Central Concepts in the CRESO Model Represented in Figure 3A

Concept	Definition
C3	The management processes of the business units are well linked to those of the corporate real estate unit.
C4	Our real estate activities are not well connected to the workflows of the business units (reverse scored).
Immediacy	
Speed	
C5	The closing of the corporate real estate unit would quickly affect the business units' output of finished goods and services.
C6	If our real estate services were not available, it would not affect the final output of the business units for several months (reverse scored).
Severity	
C7	The lack of our real estate services would severely hamper the ability of the business units to produce goods and services.
C8	If our real estate activities ceased, it would have a very limited effect on the output of finished goods and services by the business units (reverse scored).
Substitutability	
C9	Real estate services equivalent to ours are readily available outside the corporation (reverse scored).
C10	The business units often seek the services of external real estate consultants without our involvement (reverse scored).
Entrepreneurship	
E1	We manage our real estate as a profit center.
E2	We are generally more involved with development activities than with leasing, acquisitions, and divestiture.
E3	We strive to use our real estate assets to generate revenue for overall corporate purposes.
E4	We are usually responsible for identifying new real estate needs in the company.
E5	Our real estate activities tend to be profit oriented.
E6	Our real estate decisions are usually based on operational factors rather than a concern with the investment potential of the property (reverse scored).
E7	The success of the corporate real estate unit is primarily based on its profitability.
E8	The mission of the corporate real estate unit is solely driven by the mission of the overall corporation (reverse scored).
E9	We have been able to attract and retain the highest caliber of real estate professionals.
E10	Our real estate objectives often conflict with the objectives of the business units.
E11	Our real estate profits are often enhanced at the expense of business profitability.
E12	Our real estate returns are generally equal to or greater than overall corporate returns.
E13	Real estate goals tend to drive our real estate decisions.

Table 3A (Cont.): Central Concepts in the CRESO Model Represented in Figure 3A

Concept	Definition
E14	Meeting the real estate needs of the business units is only one of our objectives.
E15	We generally give higher priority to development activities and lower priority to operational concerns.
Proactiveness	
P1	Our decisions seem to reflect a "putting out the fires" mentality (reverse scored).
P2	Our decisions tend to be reactive in nature (reverse scored).
P3	We rarely propose real estate actions to the business units (reverse scored).
P4	We are continually searching for opportunities that can be exploited and problems that can be solved.
P5	We emphasize solving existing problems over searching for potential problems (reverse scored).
P6	Our real estate activities can be characterized as proactive rather than reactive.
P7	We have a tendency to address the real estate needs of business units on a tactical basis rather than from a strategic perspective (reverse scored).
P8	We try to anticipate the real estate needs of business units through planning techniques.
P9	We monitor and forecast key operational indicators.
P10	Our attention seems to be shifted from one real estate transaction to another (reverse scored).
P11	We formally track real estate market trends.
P12	We formally track lease renewals and options.
P13	We use sensitivity ("what if") analysis of critical issues.
P14	We formally track building maintenance cycles.
Riskiness	
R1	We seem to adopt a rather conservative view when making major real estate decisions (reverse scored).
R2	We generally favor risky projects over safe ones.
R3	We are usually willing to sacrifice returns for lower risk (reverse scored).
R4	We have a tendency to support real estate projects where the expected returns are certain (reverse scored).
R5	We strive to transfer risk to our suppliers (reverse scored).
R6	Our real estate operations can be characterized as risk averse (reverse scored).
R7	We often experiment with new approaches to corporate real estate rather than following the "tried and true" paths.
R8	We are generally receptive to significant levels of risk.
Serviceability	
S1	Our real estate activities are largely detached from the mainstream strategic planning of the corporation as a whole.
S2	The corporate real estate unit has no bottom-line emphasis.

Table 3A (Cont.): Central Concepts in the CRESO Model Represented in Figure 3A

Concept	Definition
S3	Many on the corporate real estate staff previously held positions in the company that were not related to real estate.
S4	Real estate functions are often divided among several organizational units with different reporting lines.
S5	A number of the corporate real estate managers have little prior experience in real estate or construction.
S6	Our real estate activities are centralized under one corporate real estate executive (reverse scored).
S7	Our real estate operations can be characterized as highly efficient and service oriented.
S8	We generally try to conform our real estate activities to the changing needs of the business units.
S9	Meeting the real estate needs of the business units is usually our sole concern.
S10	We are generally passive to requests from the business units.

concepts to derived concepts. These two types of relationships will be critical when exploring substantive issues in the next stages of research.

The correspondence rule (indicated in Figure 3A by dashed lines) expresses the relationship between an unobservable concept (theoretical or derived) and an empirical concept. While the nature of this relationship is under debate, a causal view of correspondence rules is adopted in this study. From this perspective:

> [T]he existence of a theoretical concept implies the occurrence of one or more observable events linked to that concept. The observable events provide evidence for the concept as antecedent. The greater the number and complexity of consequent events as a function of a concept, the greater the opportunity to operationalize and specify the meaning of the concept. The logical form of the causal indicator model is Tx → [O(x) → R(x)], which reads "if x has theoretical property T, then if operation or test condition O is applied, it will yield result (response) R" (Bagozzi and Phillips, 1982: 466-467).

The following example represents a causal indicator correspondence rule connecting centrality to its measures: "If corporate real estate unit x exhibits centrality, then when

measures C1 through C10 are applied through key-informant reports, they will show that the activities of x are well linked to those of other subunits in the corporation." The validity of these measures is a function of their convergence on the concept of centrality, as well as their discriminability from the measures of other dimensions in CRESO.

The empirical definition (indicated in Figure 3A by looped curved lines) gives meaning to an empirical concept by equating it with actual physical events in the plane of observation. These last two types of relationships are of primary importance in this study.

3.13 Benefits of the Holistic Construal

Adoption of the holistic construal methodology offers several import int advantages when compared to past practice in organizational research (Bagozzi and Phillips, 1982). From a philosophical standpoint, it conforms more closely to the structure of theory proclaimed by contemporary philosophers of science. From a theoretical standpoint, it forces the researcher to specify and explain concepts, theory, and measures more fully and allows for a deeper modeling of organizational phenomena. From an empirical standpoint, it enables the researcher to examine construct validity, to identify and correct for random and systematic errors in measurement, and to derive uncontaminated representations of unobservable concepts and hypotheses.

As Venkatraman (1985) notes, the data analytic scheme underlying this methodological approach is the analysis of covariance structures by Joreskog (1969) and Joreskog and Sorbom (1978, 1979). This scheme has been used to evaluate a variety of measurement models in marketing (see Bagozzi, 1980), information systems (e.g., Cooprider, 1990; Goodhue, 1988), strategic management (e.g., Venkatraman, 1989, 1990), and other disciplines (see Fornell, 1982). The important components of validity associated with it and other analytical schemes are discussed in the following section.

3.2 COMPONENTS OF CONSTRUCT VALIDITY

Construct validity is the degree to which an observation measures the concept it is intended to measure (Bagozzi and Phillips, 1982). This section examines specific threats to achieving construct validity in this study. The first key area of concern is measurement validity. Based on the measurement criteria outlined by Bagozzi (1980), a series of tests for assessing the validity and reliability of a measurement scheme is described. Cook and Campbell's (1979) criteria are subsequently used to elucidate other threats to validity in cross-sectional field research. Finally, validity concerns associated with key informant analysis are addressed.

3.21 Measurement Validity

According to Bagozzi (1980), six components of validity are relevant for evaluating the

properties of a measurement scheme: (1) theoretical meaningfulness of concepts, (2)

observational meaningfulness of concepts, (3) internal consistency of operationalizations,

(4) convergent validity, (5) discriminant validity, and (6) nomological (i.e., predictive)

validity.

The first two criteria do not involve statistical tests but deal with semantic issues. "The

theoretical meaningfulness of a concept refers to the nature and internal consistency of

the language used to represent the concept" (Bagozzi, 1980: 117). That is, for a concept

to be "meaningful," the terminology used to describe it must accurately reflect its scope,

range, or degree of specificity. Lachenmeyer (1971, quoted by Bagozzi 1980: 118)

suggests four linguistic problems with the theoretical meaningfulness of terms:

1. Vagueness. A term is said to be *vague* when the range of object predicates forming a term's referential meaning has not been specified: the term's connotative meaning is greater than its denotative meaning.

2. Ambiguity. Any term is *ambiguous* when more than two but a finite number of object predicates have been specified as equiprobable members of the set comprising its referential meaning.

3. Opacity. *Opacity* refers to the failure of a term's reference function because there is no referent object of the sort represented by the term's object predicate.

4. Contradiction. *Contradiction* is a special case of ambiguity that occurs when a term has two different, equiprobable object predicates specified as its referential meaning and these object predicates are logically inconsistent. In this case, the predicates cannot both stand in identity relation with the nominal, since they both cannot be equivalent to the nominal. The most common form of contradiction is

the assertion that a thing is both something and not something, one being the converse of the other...

Since a high level of theoretical meaningfulness is necessary for achieving construct validity, these concerns must be addressed in theory design and research.

"[T]he *observational meaningfulness* of concepts refers to the relationship between theoretical variables (which are unobservable) and their operationalizations (which, of course, are observable)" (Bagozzi, 1980: 121). There are several schools of thought concerning this relationship which is represented through correspondence rules. The operational definition model is an early approach based on the notion that a one-to-one correspondence between a theoretical concept and an observable concept can always be found; a concept *is* its measure and nothing more. Researchers implicitly follow this model when they rely exclusively on observable variables in their theories or on empirical associations to model and test them, or assume no measurement error.

A second type of correspondence rule, termed the partial interpretation model, was developed to address the shortcomings of the operational definition model. While the relationship between theoretical and observable concepts is still assumed to be logical, it is dependent on the context of particular test conditions. Also, rather than each theoretical term having a single operationalization, it has multiple operationalizations. This allows researchers to determine measurement error and methods variance for constructs. Both the operational definition and partial interpretation models, however, have been criticized for their overly restrictive reliance on a verificationist theory of

meaning and an independent observation language, among other difficulties (Hesse, 1970;

Keat and Urry, 1975; Petrie, 1971, cited by Bagozzi, 1980).

In recent years, the realist model has emerged from an alternative school of thought for

representing correspondence rules. It is favorable to the other approaches in that it

employs a causal interpretation of the relationship between theoretical and observable

concepts rather than a strictly logical connection. Bagozzi (1980: 125) summarizes its

advantages as follows:

> First, the approach is consistent with the falsificationist school of thought which
> states that observations can only refute, and not confirm, one's theories (e.g.,
> Popper, 1963). Second, the model allows for the fact that concept may be
> multiply operationalized. This, in turn, facilitates the representation of
> measurement error and methods variance. Third, consistent with contemporary
> thinking on theoretical structures (e.g., Hempel, 1952; Carnap, 1966; Feigl,
> 1970), it is possible for theoretical concepts to achieve their meaning
> independently of direct test procedures (i.e., through their relationships with other
> theoretical terms and derived concepts).

In light of the characteristics of each of these approaches, it is generally agreed that

researchers can use either the partial interpretation or realist models for achieving

observational meaningfulness of concepts.

"The *internal consistency of operationalizations* is a third criterion for construct validity

and is concerned with the homogeneity or single factoredness of observations" (Bagozzi,

1980: 125). It encompasses two related but independent concepts, unidimensionality and

reliability. Unidimensionality is achieved when a set of indicators represents or measures

49

the underlying construct being considered, regardless of measurement error. It may be determined with factor analysis or a general linear model.

Assessing the reliability of operationalizations in terms of measurement error is also an important indication of internal consistency. Reliability is achieved when indicator variance is largely attributable to the underlying construct rather than to random error. The typical index of measurement error is the Cronbach α coefficient (Cronbach, 1951; Venkatraman and Grant, 1986). Its value ranges from 0 to 1 and has the desirable property of being a lower bound of reliability (Lord and Novick, 1968). The closer the value of α is to 1, the more reliable is the measurement of the underlying construct. But it is important to note that this index provides an unbiased estimate of reliability only if the set of indicators is unidimensional. Hence, the value of α can be interpreted only after the unidimensionality of the indicator set has been established.

Several assumptions underlying the Cronbach α coefficient are problematic, however. First, all indicators are given equal importance even though some may be more appropriate than others in certain situations. Second, zero errors in measurement are assumed, preventing the separation of random error from the effect of the underlying construct. Third, no explicit goodness-of-fit test is available for accepting or rejecting a particular application. These deficiencies can be overcome with alternative methods which provide explicit statistical tests for unidimensionality and reliability, such as the Analysis of Covariance Structures framework by Joreskog (1974).

50

Reliability is conceptualized in the Analysis of Covariance Structures methodology as that proportion of measure variance attributable to the underlying trait (i.e., theoretical construct). Thus, following Werts, Linn, and Joreskog (1974), the reliability (ρ_c) of n indicators can be calculated as follows:

$$\rho_c - (\sum_{i-1}^{n} \lambda_i)^2 \ Variance \ (A) \ / \ ((\sum_{i-1}^{n} \lambda_i)^2 \ Variance \ (A) \ + \ \sum_{i-1}^{n} \varepsilon_i) \quad (1)$$

where ρ_c is the composite measure reliability, n is the number of indicators, and λ_i is the factor loading which relates item i to the underlying theoretical dimension (A). If the value of ρ_c is greater than 50%, then the variance captured by the trait is more than that by error components (Bagozzi, 1981). This method is preferred for assessing reliability (Phillips and Bagozzi, 1986) since it does not assume equal importance across indicators and provides reliability estimates for individual items as well as the composite of all items.

The next two criteria for establishing construct validity are convergent and discriminant validity. Convergent validity is the degree to which two or more attempts to measure the same concept through maximally different methods are in agreement; discriminant validity is the degree to which a concept differs from other concepts (Campbell and Fiske, 1959, cited by Bagozzi, 1980: 129-130). Joreskog (1971) presents a procedure for simultaneously assessing these two aspects of validity through confirmatory factor analysis. Specifically, the model for convergent validity is written as:

51

$$\chi - \Lambda\xi + \delta \tag{2}$$

where χ is a vector of actual measurements, ξ is a vector of theoretical constructs (i.e., traits), δ is a vector of error terms, and Λ is a matrix of factor loadings relating χ to ξ.

The observed variances and covariances, Σ, among the measures, χ, can be written as:

$$\Sigma - \Lambda\Phi\Lambda + \Psi \tag{3}$$

where Φ is the matrix of intercorrelations among the traits, and Ψ is a diagonal matrix of error variances for the measures. As Bagozzi and Phillips (1982) note:

> Statistically, equations (2) and (3) represent the null hypothesis implied by convergent validity; that is, the model of equations (2) and (3) is the basis of the hypothesis that all of the variation in measurements of organizational properties can be accounted for by the theoretical concepts that the measurements are intended to capture, plus random error.

The LISREL Program by Joreskog and Sorbom (1978) enables researchers to obtain a χ^2 goodness of fit index for the null model implied by equations (2) and (3), and maximum likelihood (ML) estimates for parameters Λ, Φ, and Ψ. χ^2 values with an associated probability greater than the 0.10 level of significance generally indicate that the model provides a satisfactory fit to the data (Lawley and Maxwell, 1971).

The χ^2 statistic is often complemented by Bentler and Bonett's (1980) incremental fit index Δ. It is an indication of the practical significance of the model in explaining the data and is represented as:

$$\Delta - (F_O - F_k) / F_O \tag{4}$$

where F_o = chi-square value obtained from a null model specifying mutual independence among the indicators, and F_k = chi-square value for the specific model. It is generally accepted that Δ should be greater than 0.90 (Bentler and Bonett, 1980), but Bearden, Sharma, and Teel (1982) argue that it should exceed 0.95.

The final criterion outlined by Bagozzi (1980) is nomological or predictive validity, defined as the degree to which predictions from a formal theoretical network containing the concept under scrutiny are confirmed (Campbell, 1960). While the previous components of construct validity focused primarily on statistical issues, predictive validity deals with substantive issues such as whether the measures behave according to the wider body of theory on which the measurement process was initially based.

In this study, two different assessments of predictive validity are made. First, the relationships among the six dimensions of CRESO are examined based on pairwise analysis. Second, the relationship between these six dimensions and four key dimensions of performance is evaluated; two dimensions of CRE performance, service and internal operations, and two dimensions of business performance, profitability and growth. The theoretical basis for and operationalization of these four performance dimensions will be discussed in greater detail in the fifth chapter.

It is important to distinguish between construct and substantive validation tests when interpreting such relationships (Venkatraman, 1985). As noted previously, construct

validation tests are used to evaluate the level of correspondence between the results obtained through a particular measurement scheme and the meaning attributed to those results. In contrast, substantive validation tests focus on the specific relationships between constructs within a broadly defined theoretical framework, and these relationships depend on construct validation. Depending on the veracity of the hypotheses linking the constructs of interest, a study can be interpreted as either supporting construct or substantive validity (Schwab, 1980). Given the relatively meager theoretical basis on which the field of corporate real estate is currently positioned, the results of this study should be interpreted as evidence of construct validity rather than as tests of specific substantive relationships.

3.22 Validity Threats for Quasi-experiments

In addition to the various validity issues regarding measurement discussed in the previous section, there are several other validity concerns which must be addressed in this study. Cook and Campbell (1979) outline four types of validity threats for quasi-experiments: (1) statistical conclusion validity, (2) internal validity, (3) construct validity, and (4) external validity.

Statistical conclusion validity deals with threats to drawing valid inferences about whether two variables covary. Achieving this type of validity is quite similar to meeting the criterion of internal consistency proposed by Bagozzi (1980), but places special emphasis

on the assumptions underlying the statistical techniques employed. Internal validity stresses the importance of considering alternative explanations (other than the theory being tested) which might account for any findings, such as selection bias, historical events, etc. Although construct validity is thoroughly addressed in Bagozzi's (1980) framework, Cook and Campbell's (1979) external validity is unique. It refers to the level of confidence the researcher has in generalizing the findings associated with a specific sample to the general population.

Despite their considerable overlap of content, the sets of criteria for construct validation by Bagozzi (1980) and Cook and Campbell (1979) both make important and unique contributions to theory testing and research design. Each criterion will be addressed in Section 3.3 on research design.

3.23 Key Informant Analysis

Key informant analysis involves the collection of information about a social setting by interviewing a selected number of participants (Phillips, 1981). The informants are not chosen on a random basis but because they posses special qualifications such as specialized knowledge, particular status, or accessibility. While the use of this method for gathering information has traditionally been associated with ethnographic research (Lofland, 1971), it has been frequently employed in a survey context to obtain quantifiable data on various organizational characteristics (Phillips, 1981; Phillips and

Bagozzi, 1986). In such a context, survey respondents assume the role of key informants and provide information at an aggregate or organizaticnal unit of analysis rather than reporting personal attitudes and behaviors (Campbell, 1955; Seidler, 1974).

Despite the increasing use of key informant analysis in a variety of fields (e.g., see Phillips and Bagozzi, 1982, for a review in marketing), concern over the potential sources of error in informant reports is warranted for several reasons. For example, key informants have often been asked to perform complex tasks of social judgment on potentially sensitive or controversial issues (Phillips, 1981; Seidler, 1974). In doing so, they have been required to summarize and interpret a range of organizational events, and then provide a set of responses that presumably reflects these events. Due to the cognitive burden associated with this process, however, considerable measurement error may be introduced. Cannell, Oksenberg, and Converse (1977: 309) conclude, "[t]he demands placed on the respondent by many survey questions are greater than generally has been realized, and the respondent's inability or unwillingness to meet these demands is a major source of invalidity."

Lee (1989, cited by Cooprider, 1990) outlines three categories of validity threats that researchers should address when using key informant analysis: (1) motivational barrier, (2) perceptual and cognitive limitations, and (3) lack of information. If informants believe that providing certain information could be detrimental to their careers or professional standing, then a motivational barrier to their participation exists. Huber and

56

Power (1985) suggest removing as many motivational "disincentives" to participation as possible. Also, because perceptual and cognitive limitations of informants can lead to biased or inaccurate reports (Huber and Power, 1985; Silk and Kalwani, 1982), survey questions should be pretested and as specific and simple as possible. Finally, researchers often select informants who are accessible but not well informed about the areas covered in the survey. Campbell and Fiske (1959), Huber and Power (1985), and Seidler (1974) stress the importance of selecting informants who are knowledgeable about the survey topics, have access to relevant data on these topics, and differ as much as possible in terms of their roles.

The issue of whether to employ single or multiple informants in operationalizing constructs like CRESO has long been controversial. Venkatraman (1985: 44) states:

> For treating strategy as an organization-level construct, the general feeling is that data should be collected from multiple informants to ensure that strategy measures exhibit convergent and discriminant validity at the *multimethod level of analysis*. [...] However, in this phase of research, where the focus is on developing and purifying measures such that they reflect the underlying theoretical dimension, a single informant is considered adequate.

This research is also at an early stage where the focus is on developing and purifying measures for key dimensions of corporate real estate strategic orientation. Although construct validity was not tested at the multimethod level of analysis, an additional step was taken beyond just employing a single informant in order to help protect against common method bias. This step entailed sampling multiple informants from each firm, selecting the two most different informants by job title, and averaging the responses. The procedure used to select the informants will be explained in the following section.

3.3 RESEARCH DESIGN

This section focuses on the development and implementation of a suitable survey instrument(s) and data collection scheme for testing the CRESO model described in the previous chapter. The discussion begins with the process whereby a set of measurement items were generated and refined for each of the CRESO dimensions. The dual questionnaires (i.e., one for CRE and the other for the business units serviced by CRE) used in the field survey will then be described, followed by an explanation of both the organizational and key informant sampling procedures. Also, the countermeasures reflected in these procedures to protect against the validity threats outlined in Section 3.2 will be summarized. Finally, the sample characteristics of the organizations and key informants involved in this study will be presented.

3.31 Developing Measures for the CRESO Construct

Multi-item measures for the six dimensions of the CRESO construct were developed in a two-step process, adapted from Churchill (1979). Before each of these steps is discussed, it is important to note the advantages of multi-item verses single-item measures of a construct, as summarized by Churchill (1979: 66):

> [...] Multi-item measures have much to recommended them. First, individual items usually have considerable uniqueness or specificity in that each item tends to have only a low correlation with the attribute being measured and tends to relate to other attributes as well. Second, single items tend to categorize people into a relatively small number of groups. For example, a seven-step rating scale can at most distinguish between seven levels of an attribute. Third, individual

58

items typically have considerable measurement error; they produce unreliable responses in the sense that the same scale position is unlikely to be checked in successive administrations of an instrument.

All three of these measurement difficulties can be diminished with multi-item measures: (1) the specificity of items can be averaged out when they are combined, (2) by combining items, one can make relatively fine distinctions among people, and (3) the reliability tends to increase and measurement error decreases as the number of items in a combination increases.

The imprudence of using single-item measures is further illustrated by a question posed by Jacoby (1978: 93):

> How comfortable would we feel having our intelligence assessed on the basis of our response to a *single* question? Yet that's exactly what we do in consumer research [...] The literature reveals hundreds of instances in which responses to a single question suffice to establish the person's level on the variable of interest and then serves as the basis for extensive analysis and entire articles.
>
> [...] Given the complexity of our subject matter, what makes us think we can use responses to single items (or even to two or three items) as measures of these concepts, then relate these scores to a host of other variables, arrive at conclusions based on such an investigation, and get away calling what we have done "quality research?"

Even with these advantages, it is necessary for multi-item measures to be developed along certain guidelines so that the intended construct is actually captured by them.

The first step in developing measures for the CRESO construct involved generating an initial set of items by two means: literature searches and focus groups. The literature searches consisted of a thorough review of both academic and professional publications from a variety of fields, including corporate real estate, building economics, real estate finance and investment, strategic management, organizational power, management information systems, and marketing. The focus groups were part of a two-day retreat

59

attended by nine top corporate real estate executives on the research committee of the Industrial Development Research Foundation. The corporations represented by these executives were diverse in terms of industry type and size. A facilitator was used to lead discussions on a wide range of strategy issues confronting the corporate real estate field. Comprehensive minutes were taken of the meetings for future reference.

From these two sources a pool of 79 items was generated to measure the CRESO construct. An effort was made to include items with slightly different shades of meaning since this initial list was subject to further refinement. By incorporating slightly different nuances of meaning in statements in the item pool, the researcher provides a better foundation for the eventual measure (Churchill, 1979).

The second step in the process of measurement or operationalization dealt with refining the measures. The initial pool of items was reviewed by a group of "experts" composed of two faculty members engaged in corporate real estate research and one corporate real estate executive who was knowledgeable about research methods. The purpose of their critique was twofold: (1) eliminate those items from the list thought to be "outliers" rather than at the "core" of their respective dimensions, and (2) add items to the list thought to be overlooked in the first step of the process. The wording of each item was also reviewed so that it would be as precise as possible. Some of the items were recast to be positively stated, while others were negatively stated to reduce the possibility that respondents would simply agree or disagree with all of the items without providing

adequate attention to reading and interpreting them. Based on this evaluation, the initial list of items was refined down to the 71 statements shown in Table 3A. These statements were then reordered and packaged into the actual survey instrument(s) which will be described in the following section.

3.32 The Survey Instruments

This section focuses on the two types of questionnaires used for data collection in this study: Corporate Real Estate Unit Questionnaire and Business Unit Questionnaire (see Appendix 3A for a copy of each). The Corporate Real Estate Unit Questionnaire was used to measure the strategic orientation of CRE and was completed by the key informants identified in CRE (see Section 3.34 for a discussion on the process used to identify these key informants). This questionnaire incorporated the 71 statements referred to in the previous section and listed in Table 3A. It was color-coded white in the package of materials sent to each of the participating companies.

The Corporate Real Estate Unit Questionnaire opened with a description of the project and some general instructions. When responding to each question, informants were instructed to not base their opinion on any one particular decision or situation, but to choose the item that best described the general pattern of their CRE decision making and experiences. This distinction was essential in order to capture phenomena at an organizational level rather than at a personal level.

The core of the Corporate Real Estate Unit Questionnaire was organized into four sections. The first section consisted of 62 statements. Informants were asked to indicate the extent to which they agreed or disagreed with these statements on a 5-point scale with scale stems of 1 = strongly disagree, 2 = inclined to disagree, 3 = neutral, 4 = inclined to agree, and 5 = strongly agree. The second section was a single question designed to assess whether the environmental conditions discussed in Section 2.1 were symmetrical or asymmetrical. Informants were asked to choose one of four alternatives. The third section asked informants to identify the extent to which each of nine management systems were used in their CRE operations. This rating was based on a 5-point scale with scale stems of 5 = always used, 4 = often used, 3 = sometimes used, 2 = rarely used, and 1 = never used. The fourth section asked informants for background information such as their title, the number of years they have been with their company and its CRE, and some basic statistics on their real estate portfolio.

The Business Unit Questionnaire was aimed at key informants (see Section 3.34 for a discussion on the process used to identify these key informants) in the business units serviced by CRE. Its purpose was to measure two aspects of CRE performance, service and internal operations, and two aspects of business performance, profitability and growth (see Chapter 5 for a detailed discussion on how these aspects of performance were conceptualized and measured). This questionnaire included 14 empirically proven performance measures, six pertained to CRE performance (adapted from Cooprider, 1990) and eight dealt with business performance (Venkatraman, 1985, 1989) . To

distinguish it from the other questionnaire, the Business Unit Questionnaire was color-coded blue in the package of materials sent to each of the participating companies.

With an introduction similar to the other questionnaire, the Business Unit Questionnaire was structured into six core sections. The first and third sections focused on business performance. Informants were asked in the former to indicate the extent to which they were satisfied with the performance of their business unit. Level of satisfaction was assessed on a 5-point scale with scale stems of 1 = highly dissatisfied, 2 = generally dissatisfied, 3 = neutral, 4 = generally satisfied, and 5 = highly satisfied. Informants were asked in the latter to indicate the position of their business unit relative to its major competition. Relative position was based on a 5-point scale with scale stems of 5 = much better than competition, 4 = better than competition, 3 = same as competition, 2 = worse than competition, and 1 = much worse than competition. The second section asked informants to rate the performance of CRE on a 5-point scale with scale stems of 1 = very weak, 2 = generally weak, 3 = about average, 4 = generally strong, and 5 = very strong. The fourth section (like the second section of the other questionnaire) was a single question designed to assess whether the environmental conditions discussed in Section 2.1 were symmetrical or asymmetrical. Informants were asked to choose one of three alternatives. The fifth section concerned the ranking of seven performance measures, while the sixth section asked informants for background information on themselves and their business unit.

3.33 Organizational Sampling Procedures

The sampling frame for this study was the 679 companies listed in The Brendan Partner's 1992 Corporate Edition of The ONE LIST. An attempt was made to contact by phone the top corporate real estate manager of all companies within the sampling frame. After approximately one month of calling, I was able to personally discuss the study with 362 of these managers. The discussion covered four key areas: (1) purpose of the study, (2) requirements for participating in the study, (3) assurance of anonymity for all persons and companies, and (4) source used to obtain contacts (i.e., The ONE LIST).

In general, there were three types of responses. First, 206 of the managers expressed interest in the study and were willing to commit their firms to it. Second, 57 of the managers either expressed interest in the study but were not able to have their firms participate (e.g., corporate policy prohibited employees from participating in any external study) or believed that the study was valuable but not appropriate for their companies (e.g., some firms had no CRE at all, while others had only a single CRE staff member and therefore could not be tested for convergent and discriminant validity at the multimethod level of analysis--see Section 3.23 on this issue). Third, 99 of the managers were not willing to include their companies in the study (e.g., inability to commit the necessary time, lack of interest in the topic, did not want to involve the business units).

A package of materials containing a cover letter (see Appendix 3B for a copy of the letter), five Corporate Real Estate Questionnaires with postage-paid return envelopes, and five Business Unit Questionnaires with postage-paid return envelopes were sent to each of the 206 participating firms. The cover letter described the purpose of the study and the procedures for identifying three to five key informants to complete each type of questionnaire. One week was given to identify the key informants and distribute the proper questionnaires to them. Two additional weeks were given for the key informants to complete and return the questionnaires. Those firms that were sluggish in responding were reminded by phone up to two times. The following section will explain the procedures for identifying the key informants for each type of questionnaire.

3.34 Key Informant Sampling Procedures

The corporate real estate managers who committed their companies to the study were responsible for identifying the key informants in their respective firms. They were instructed in the cover letter to identify corporate real estate informants (i.e., persons who were qualified to complete the Corporate Real Estate Unit Questionnaire) through a two-step process:

1. Select three to five individuals, including yourself if appropriate, from the corporate real estate unit who are knowledgeable about its:

    a. internal operations and objectives
    b. role and responsibilities within Company XYZ
    c. decision processes and the information systems used to support them
    d. personnel
    e. relationship with the business units

      f. internal organizational structure

      g. position within the corporate organizational structure

      h. real estate portfolio characteristics

2. Distribute a <u>white</u> questionnaire with its attached return envelop to each of these corporate real estate informants. This questionnaire should take about 20 minutes to complete. A short note or phone call from you encouraging their participation would help increase the response rate.

Similarly, business informants (i.e., persons who were qualified to complete the Business Unit Questionnaire) were identified through a three-step process outlined in the cover letter:

1. Identify three to five business units (typically divisions) within Company XYZ that are provided services by the corporate real estate unit. They should be as diverse as possible, varying in size, location, product/service type, etc.

2. Select an individual (<u>not</u> real estate related) from each of these business units who is knowledgeable about:

      a. the profitability (e.g., net profit, financial liquidity) of his/her business unit relative to its major competition

      b. the growth (e.g., market share gains, sales growth rate) of his/her business unit relative to its major competition

      c. the ability of the corporate real estate unit to effectively support his/her business operations.

3. Distribute a <u>blue</u> questionnaire with its attached return envelop to each of these business informants. This questionnaire should take about 15 minutes to complete. Again, a short note or phone call from you encouraging their participation would help increase the response rate, especially in this case of line personnel.

The cover letter suggested that only senior corporate real estate managers were likely to have the breadth of knowledge required to complete the Corporate Real Estate Unit Questionnaire, and only senior business managers were likely to be qualified to complete the Business Unit Questionnaire.

3.35 Threats to Validity and Their Countermeasures

This section provides a summary (see Table 3B) of the countermeasures taken in this study to protect against validity threats in cross-sectional field research (Section 3.22) and key informant analysis (Section 3.23). The threats to measurement validity (Section 3.21) will be addressed in Chapter 4.

Table 3B: Threats to Validity and Their Countermeasures

Validity Threat	Reference	Countermeasure
Cross-sectional Field Research		
Statistical Conclusion Validity	Cook & Campbell, 1979	Checked skewness & kurtosis values for all measures, examined normality of residuals (LISREL)
Internal Validity	Cook & Campbell, 1979	Large cross-sectional study of firms in various industries, informants held various organizational positions
External Validity	Cook & Campbell, 1979	Completely random character of sample cannot be assured due to possible self-selection bias (e.g., may be biased toward firms with strong relationships between CRE and business units)
Key Informant Analysis		
Motivational Barrier	Huber & Power, 1985	Anonymity of responses was assured for all informants and companies, postage-paid return envelope included in each questionnaire
Perceptual & Cognitive Limits	Huber & Power, 1985 Silk & Kalwani, 1982	Items were checked for relevancy & wording by "experts," length of questionnaires were limited
Lack of Information	Huber & Power, 1985 Seidler, 1974	Used multiple informants who were knowledgeable & held various organizational positions

3.36 Sample Characteristics of the Organizations

For a company to be included in the study, responses had to be received from at least two corporate real estate informants. In addition, to be included in the performance analysis, at least two corporate real estate informants and two business informants must have responded. A total of 2,060 questionnaires were mailed, five Corporate Real Estate Unit Questionnaires and five Business Unit Questionnaires for each of the 206 participating companies. Table 3C shows those companies qualifying with two, three, four, or five respondents per questionnaire type.

Table 3C: Companies With Two, Three, Four, or Five Respondents Per Questionnaire Type

Respondents Per Company	Corporate Real Estate Unit Questionnaire	Business Unit Questionnaire
2	34	30
3	31	22
4	18	16
5	11	9
Total Companies	94	77

Thus, 46% of the companies completed at least the minimum number of questionnaires to be included in the study, while 37% of them also qualified for the performance analysis.

Table 3D shows the range of industries represented by the companies in the study. While it would have been ideal for the purpose of external validity to have randomly

Table 3D: Diversity of Companies, by Industry Type

Industry Type	Frequency
Aerospace	3
Automotive	1
Chemicals	4
Commercial Banking	10
Computers & Equipment	6
Conglomerate	1
Consumer Products	2
Diversified Financial	6
Diversified Service	2
Food	2
Health Care/Pharmaceutical	3
Hospitality & Leisure	4
Industrial Manufacturing	1
Insurance	5
Metals	2
Paper & Forest Products	2
Petroleum Refining	5
Precision Instruments	7
Publishing	3
Retail	7
Telecommunications	7
Tobacco	1
Transportation	5
Utilities	5
Total Companies	**94**

chosen these companies, it was not feasible to do so in this study. Since all companies agreeing by phone to participate were included, the possibility of self-selection bias cannot be entirely discounted. Given the diversity of firms in the sample, however, it is unlikely that unmonitored explanations would cause the observed effects. Moreover,

the participating companies are also diverse in terms of the book value of their total assets, and the size of their real estate portfolio (both total square feet and number of sites).

3.37 Sample Characteristics of the Key Informants

It is also necessary to demonstrate that the key informants in the study constituted an appropriate sample. Several characteristics of the informants bear on this issue. First, when different observers are used as methods, they should differ as much as possible in terms of their roles so as to help rule out the possibility that interinformant agreement might be due to a shared methods factor such as a positional bias (Campbell and Fiske, 1959). In this study, the title and positional status of the informants differed considerably, as shown in Table 3E.

Second, the length of time that the informant had worked in his or her company and particular organizational unit was viewed as important because it is a potential factor relating to the difficulty of observation (Seidler, 1974). Operationalized by a self-report measure, the average number of years that the corporate real estate informant had worked in his or her firm and corporate real estate unit was 14.9 and 8.3, respectively. The average number of years that the business informant had worked in his or her firm and business unit was 17.8 and 8.5, respectively. These data suggest that any failure to observe convergence in informant reports is unlikely to be due to the sample being

Table 3E: Diversity of Informants, by Job Title

Job Title	Frequency
Corporate Real Estate Informants	
President, CFO	3
Executive/Senior Vice President (administrative services, real estate, facilities)	10
Vice President (real estate, property management, development, administration)	66
Assistant Vice President (property management, buildings and services)	7
General Manager Corporate Services	7
Director Real Estate	50
Director (various real estate functions, e.g., design, construction, planning, engineering)	24
Manager Real Estate	49
Manager (various real estate functions, e.g., leasing, contracts, planning, construction)	27
Facilities Manager	9
Project Manager	11
Real Estate Personnel (supervisor, specialist, analyst, representative)	25
Total	**288**
Business Informants	
President, CEO, CFO, COO	40
Executive/Senior Vice President	26
Vice President (various functional areas, e.g., sales, planning, operations)	78
General Manager	12
Controller	9
Director (various functional areas, e.g., finance, distribution, purchasing)	19
Manager (various functional areas, e.g., marketing, environmental protection, operations)	38
Other Personnel	13
Total	**235**
Total Informants	**523**

71

composed of informants who were relatively new members to either their company or organizational unit and therefore had only limited knowledge of organizational issues.

3.4 SUMMARY OF CHAPTER 3

This chapter addressed several key aspects concerning the measurement validity and research design of this study. The first section described Bagozzi and Phillips' (1982) holistic construal approach for linking the construction and testing of theory in organizational research. The benefits in adopting this approach were also discussed. The second section focused on various threats to achieving construct validity, including Bagozzi's (1980) six criteria, Cook and Campbell's (1979) four types of validity threats for quasi-experiments, and the potential sources of error associated with key informant analysis, as noted by Huber and Power (1985), Seidler (1974), and Silk and Kalwani (1982). The third section dealt with the development and implementation of a suitable survey instrument and data collection scheme for testing the CRESO model. The process used to generate and refine a set of measurement items for each of the CRESO dimensions was outlined, then a description of the two types of questionnaires employed in the field survey was provided, followed by an explanation of the organizational and key informant sampling procedures. The countermeasures inherent in those procedures to protect against validity threats were also summarized. The chapter concluded with a presentation of the sample characteristics for the companies and key informants in the study.

APPENDIX 3A: SURVEY INSTRUMENTS

PERFORMANCE IMPLICATIONS OF CORPORATE REAL ESTATE STRATEGIC ORIENTATION

A Research Project

Corporate Real Estate Unit Questionnaire

Steven L. Duckworth

Ph.D. Candidate in Building Economics
Massachusetts Institute of Technology

127 College Street
South Hadley, MA 01075
(413) 533-3283

as of January 1, 1993

Assistant Professor of Building Economics
Carnegie Mellon University

PROJECT DESCRIPTION AND GENERAL INSTRUCTIONS

Rapid technological change and shifting patterns of competition have put an intense strain on the ability of corporations to keep pace. As a result of these pressures, the corporate real estate function is undergoing a significant transformation. Perhaps the most important development is its emerging strategic role in the firm. Although there has been considerable discussion in professional and academic circles about the benefits of strategic corporate real estate management, little is actually known about how a corporate real estate unit should strategically orient itself and what the performance implications of different strategic orientations are.

The objective of this study is to determine how the strategic orientation or profile of a corporate real estate unit (i.e., its approach to problem solving, its risk propensity, its level of proactiveness, etc.) relates to performance. Two aspects of corporate real estate performance, service and operations, and two aspects of business performance, profitability and growth, will be explored.

A short questionnaire has been developed to obtain your views as a manager of the corporate real estate unit who is knowledgeable about its operations and services. It can be completed in about 20 minutes and will be supplemented by another questionnaire aimed at line managers.

Most of the questions can be answered by choosing one of the alternatives provided. There are no correct or incorrect answers. Your opinion as to which item best describes your organizational context is of primary interest. When responding to each question, please do not base your opinion on any one particular decision or situation, but choose the item that best describes the general pattern of your decision making and experiences in this corporate real estate unit.

Your responses will be treated in the strictest confidence. They will be entered in coded form and in no instance will any person or organization be identified with a particular response or opinion.

If you would like an Executive Summary of the study, please give your mailing address in the space provided at the end of the questionnaire. It would be most helpful if you could return the completed questionnaire within two weeks. A postage-paid envelope is enclosed for your convenience.

Thank you very much for your cooperation!

I. Please indicate the extent to which you agree or disagree with the following statements as they relate to your corporate real estate unit. Circle the appropriate number for each item.

	Strongly Disagree	Inclined to Disagree	Neutral	Inclined to Agree	Strongly Agree
We manage our real estate as a profit center	1	2	3	4	5
Many of the business units regularly seek our advice concerning the real estate implications of their major decisions .	1	2	3	4	5
We are usually willing to sacrifice returns for lower risk	1	2	3	4	5
Our decisions seem to reflect a "putting out the fires" mentality	1	2	3	4	5
Our information systems provide support for decision making . .	1	2	3	4	5
Our real estate activities are largely detached from the mainstream strategic planning of the corporation as a whole . . .	1	2	3	4	5
We are generally more involved with development activities than with leasing, acquisitions, and divestiture.	1	2	3	4	5
We seem to adopt a rather conservative view when making major real estate decisions	1	2	3	4	5
Our decisions tend to be reactive in nature	1	2	3	4	5
We emphasize effective coordination among different organizational units involved in real estate decisions (e.g., legal, finance, operations, marketing, personnel)	1	2	3	4	5
The corporate real estate unit has no bottom-line emphasis	1	2	3	4	5
The mission of the corporate real estate unit is solely driven by the mission of the overall corporation	1	2	3	4	5
The closing of the corporate real estate unit would quickly (within a few weeks) affect the business units' output of finished goods and services	1	2	3	4	5
We generally favor risky projects over safe ones	1	2	3	4	5
We emphasize solving existing problems over searching for potential problems	1	2	3	4	5
The management processes (e.g., planning and control functions) of the business units are well linked to those of the corporate real estate unit	1	2	3	4	5

	Strongly Disagree	Inclined to Disagree	Neutral	Inclined to Agree	Strongly Agree
Our decision processes can be characterized as comprehensive .	1	2	3	4	5
Many on the corporate real estate staff previously held positions in the company that were not related to real estate . . .	1	2	3	4	5
We strive to use our real estate assets to generate revenue for overall corporate purposes	1	2	3	4	5
The lack of our real estate services would severely hamper the ability of the business units to produce goods and services .	1	2	3	4	5
We have a tendency to support real estate projects where the expected returns are certain	1	2	3	4	5
We rarely propose real estate actions to the business units	1	2	3	4	5
When confronted with a major decision, we usually try to conduct a thorough analysis and explore alternatives	1	2	3	4	5
Real estate functions (e.g., site selection, property management) are often divided among several organizational units with different reporting lines	1	2	3	4	5
We are usually responsible for identifying new real estate needs in the company	1	2	3	4	5
Real estate services equivalent to ours are readily available outside the corporation	1	2	3	4	5
We strive to transfer risk to our suppliers (e.g., developers brokers)	1	2	3	4	5
Our real estate activities can be characterized as proactive rather than reactive	1	2	3	4	5
We analyze the performance of our real estate portfolio on both a cross-sectional and time-series basis	1	2	3	4	5
A number of the corporate real estate managers have little prior experience in real estate or construction	1	2	3	4	5
Our real estate activities tend to be profit oriented	1	2	3	4	5
A large number of the business units routinely rely on our real estate services	1	2	3	4	5
We are generally receptive to significant levels of risk	1	2	3	4	5

	Strongly Disagree	Inclined to Disagree	Neutral	Inclined to Agree	Strongly Agree
We are continually searching for opportunities that can be exploited and problems that can be solved	1	2	3	4	5
We try to facilitate our decision processes by limiting the involvement of other organizational units as much as possible . .	1	2	3	4	5
Our real estate activities are centralized under one corporate real estate executive	1	2	3	4	5
Our real estate decisions are usually based on operational factors rather than a concern with the investment potential of the property	1	2	3	4	5
The business units often seek the services of external real estate consultants (e.g., brokers) without our involvement	1	2	3	4	5
Our attention seems to be shifted from one real estate transaction to another	1	2	3	4	5
The success of the corporate real estate unit is primarily based on its profitability	1	2	3	4	5
We try to search deeper for the roots of problems in order to generate the best possible solution alternatives	1	2	3	4	5
Meeting the real estate needs of the business units is usually our sole concern	1	2	3	4	5
We have been able to attract and retain the highest caliber of real estate professionals	1	2	3	4	5
If our real estate services were not available, it would not affect the final output of the business units for several months .	1	2	3	4	5
We view decision making as a largely analytical activity	1	2	3	4	5
Our real estate objectives often conflict with the objectives of the business units	1	2	3	4	5
We often experiment with new approaches to corporate real estate rather than following the "tried and true" paths	1	2	3	4	5
We have a tendency to address the real estate needs of business units on a tactical basis rather than from a strategic perspective .	1	2	3	4	5
Our real estate returns are generally equal to or greater than overall corporate returns	1	2	3	4	5

	Strongly Disagree	Inclined to Disagree	Neutral	Inclined to Agree	Strongly Agree
Our real estate activities are not well connected to the workflows of the business units	1	2	3	4	5
We monitor and forecast key operational indicators	1	2	3	4	5
Real estate goals tend to drive our real estate decisions	1	2	3	4	5
Our search for information tends to be far-reaching and unbiased by managerial experience or functional orientation	1	2	3	4	5
We generally try to conform our real estate activities to the changing needs of the business units	1	2	3	4	5
We generally give higher priority to development activities and lower priority to operational concerns	1	2	3	4	5
We try to anticipate the real estate needs of business units through planning techniques	1	2	3	4	5
Our real estate operations can be characterized as highly efficient and service oriented	1	2	3	4	5
If our real estate activities ceased, it would have a very limited effect on the output of finished goods and services by the business units	1	2	3	4	5
We are generally passive to requests from the business units	1	2	3	4	5
Our real estate profits are often enhanced at the expense of business profitability	1	2	3	4	5
Our real estate operations can be characterized as risk averse	1	2	3	4	5
Meeting the real estate needs of the business units is only one of our objectives	1	2	3	4	5

II. Assuming the real estate market influences corporate real estate activities, which of the following is most difficult to achieve in your operations under current real estate market conditions?

    ___ Acquisition of property
    ___ Disposition of property
    ___ Both of the above
    ___ Neither of the above

III. Corporate real estate units employ a variety of management systems and techniques suited to their specific context. Please indicate the extent to which the following are used in your operations.

	Always Used	Often Used	Sometimes Used	Rarely Used	Never Used
Formal tracking of real estate market trends	5	4	3	2	1
Project management techniques (e.g., critical path method)	5	4	3	2	1
Sensitivity ("what if") analysis of critical issues	5	4	3	2	1
Real estate inventory and accounting reports	5	4	3	2	1
Formal tracking of lease renewals and options	5	4	3	2	1
Decision support systems (e.g., capital budgeting, financing)	5	4	3	2	1
Outputs of management information and control systems	5	4	3	2	1
Formal tracking of building maintenance cycles	5	4	3	2	1
Space accounting and planning systems	5	4	3	2	1

IV. Please provide the following background information.

What is your title? _____

How many years have you been with this corporate real estate unit? _____

How many years have you been with this company? _____

What is the approximate book value of your company's total assets?

___ Less than $50 million
___ $50-100 million
___ $101-250 million
___ $251-500 million
___ $501 million - 1 billion
___ $1-3 billion
___ Over $3 billion

What percentage of these total assets is represented by real estate (market value)?

___ Less than 20%
___ 20-50%
___ 51-100%
___ Market value of real estate exceeds book value of total assets

What is the approximate total square feet of building space (owned and leased) in your real estate portfolio?

_____ Less than 500,000
_____ 500,000 - 1 million
_____ 1-10 million
_____ 11-25 million
_____ Over 25 million

How many sites (owned and leased) do you have in your real estate portfolio?

_____ Less than 25
_____ 25-50
_____ 51-100
_____ 101-500
_____ 501-1000
_____ 1001-5000
_____ Over 5000

Real estate decision-making authority in your corporation can best be described as:

_____ Centralized
_____ Decentralized

Please provide your mailing address (or write separately) if you would like a copy of the Executive Summary of this study:

_____

_____

_____

Would you be willing to participate in an extension of this project?

_____ Yes
_____ No

PERFORMANCE IMPLICATIONS OF CORPORATE REAL ESTATE STRATEGIC ORIENTATION

A Research Project

Business Unit Questionnaire

Steven L. Duckworth

Ph.D. Candidate in Building Economics
Massachusetts Institute of Technology

127 College Street
South Hadley, MA 01075
(413) 533-3283

as of January 1, 1993

Assistant Professor of Building Economics
Carnegie Mellon University

PROJECT DESCRIPTION AND GENERAL INSTRUCTIONS

Rapid technological change and shifting patterns of competition have put an intense strain on the ability of corporations to keep pace. As a result of these pressures, the corporate real estate function is having to play a more strategic role in the firm. The objective of this study is to determine how the strategic orientation or profile of a corporate real estate unit (i.e., its approach to problem solving, its risk propensity, its level of proactiveness, etc.) relates to performance. Two aspects of business performance, profitability and growth, and two aspects of corporate real estate performance, service and operations, will be explored.

A short questionnaire has been developed to obtain your views as a line manager who is knowledgeable about the performance of your business unit and the ability of the corporate real estate unit to effectively support your business operations. It can be completed in about 15 minutes and will be supplemented by another questionnaire aimed at corporate real estate managers.

Most of the questions can be answered by choosing one of the alternatives provided. There are no correct or incorrect answers. Your opinion as to which item best describes your organizational context is of primary interest. When responding to each question, please do not base your opinion on any one particular decision or situation, but choose the item that best describes the general pattern of your business actions.

Your responses will be treated in the strictest confidence. They will be entered in coded form and in no instance will any person or organization be identified with a particular response or opinion.

If you would like an Executive Summary of the study, please give your mailing address in the space provided at the end of the questionnaire. It would be most helpful if you could return the completed questionnaire within two weeks. A postage-paid envelope is enclosed for your convenience.

Thank you very much for your cooperation!

I. Please indicate the extent to which your management is currently satisfied with your business unit's performance in the following areas. Circle the appropriate number for each item.

	Highly Dissatisfied	Generally Dissatisfied	Neutral	Generally Satisfied	Highly Satisfied
Sales level ($)	1	2	3	4	5
Market share	1	2	3	4	5
Cash flow	1	2	3	4	5
Sales growth rate	1	2	3	4	5
Net profits in recent years	1	2	3	4	5
Return on sales	1	2	3	4	5
Return on equity/corporate investment	1	2	3	4	5

II. The following statements deal with the relationship between your business unit and the corporate real estate unit. Please choose the alternative that best describes this relationship.

	Very Weak	Generally Weak	About Average	Generally Strong	Very Strong
The ability of the corporate real estate unit to meet the changing needs of our business unit	1	2	3	4	5
The level of influence that members of the corporate real estate unit have on our key business decisions	1	2	3	4	5
The quality of services provided to our business unit by the corporate real estate unit	1	2	3	4	5
The extent to which the management processes (e.g., planning and control functions) of our business unit are linked to those of the corporate real estate unit	1	2	3	4	5
The ability of the corporate real estate unit to meet its organizational commitments (e.g., project schedules and budgets)	1	2	3	4	5
The contribution that the corporate real estate unit has made to the accomplishment of our business unit's strategic goals	1	2	3	4	5

	Very Weak	Generally Weak	About Average	Generally Strong	Very Strong
The level of understanding that the corporate real estate unit has of our business activities	1	2	3	4	5
The responsiveness of the corporate real estate unit to our business unit	1	2	3	4	5
The extent to which corporate real estate personnel are physically present during the strategic planning activities of our business unit	1	2	3	4	5
The ability of the corporate real estate unit to meet its goals	1	2	3	4	5

III. Please indicate the position of your business unit relative to its major competitors along the following dimensions.

	Much Better than Competition	Better than Competition	Same as Competition	Worse than Competition	Much Worse than Competition
Sales growth over the last three years	5	4	3	2	1
Ability to defend your existing market position	5	4	3	2	1
Financial liquidity	5	4	3	2	1
Capacity to tackle a major unexpected threat	5	4	3	2	1
Market share gains over the last three years	5	4	3	2	1
Capacity to absorb a 20 percent drop in sales	5	4	3	2	1
Net profits	5	4	3	2	1
Frequency of introducing new products/services	5	4	3	2	1
Return on investment	5	4	3	2	1

IV. Please indicate the statement that best describes your current business conditions.

___ Downsizing and trying to dispose of excess property (i.e., facilities, plant, building space)
___ Growing and trying to acquire additional property
___ Neither of the above

V. Please rank the following seven items in terms of their importance to your business unit, with #1 indicating the most important and #7 the least.

    _____ Sales level ($)
    _____ Market share
    _____ Cash flow
    _____ Sales growth rate
    _____ Net profits in future years
    _____ Return on sales
    _____ Return on equity/corporate investment

VI. Please provide the following background information.

What is your title? _____

How many years have you been with this business unit? _____

How many years have you been with this company (i.e., including other business units)? _____

What is the range of your business unit's annual sales?

    _____ Less than $50 million
    _____ $50-100 million
    _____ $101-250 million
    _____ $251-500 million
    _____ $501 million - 1 billion
    _____ $1-3 billion
    _____ Over $3 billion

Which of the following best describes your business unit?

    _____ Consumer goods
    _____ Capital goods
    _____ Raw or semi-finished materials
    _____ Components for incorporation into finished goods
    _____ Service

How many employees are in your business unit? _____

Please describe your business briefly. _____

_____

Please provide your mailing address (or write separately) if you would like a copy of the Executive Summary of this study:

    _____

    _____

APPENDIX 3B: COVER LETTER

October 6, 1992

Mr. John Doe
Director Corporate Real Estate
XYZ Corporation
One Park Plaza, Dept. 090
Oak Brook, IL 60521

Dear Mr. Doe:

In reference to our recent phone conversation, I am very please that XYZ Corporation will
be participating in this major study on corporate real estate being conducted at the
Massachusetts Institute of Technology. It involves over 100 of the top firms in the United
States and is entitled "Performance Implications of Corporate Real Estate Strategic
Orientation."

As you well know, rapid technological change and shifting patterns of competition have put
an intense strain on the ability of corporations to keep pace. As a result of these pressures,
the corporate real estate function is having to play a more strategic role in the firm.
Although there has been considerable discussion in professional and academic circles about
the benefits of strategic corporate real estate management, little is actually known about how
a corporate real estate unit should strategically orient itself, and what the performance
implications of different strategic orientations are.

The objective of this study is to determine how the strategic orientation or profile of a
corporate real estate unit (i.e., its approach to problem solving, its risk propensity, its level
of proactiveness, etc.) relates to performance. Two aspects of corporate real estate
performance, service and operations, and two aspects of business performance, profitability
and growth, will be explored. These findings will go far beyond those of previous studies,
which have been merely descriptive in nature and limited to the corporate real estate function
itself.

I have enclosed two types of questionnaires for this purpose, color-coded white and blue. To
ensure response validity, it is important that each type be distributed in the following
manner:

> WHITE QUESTIONNAIRES

> > 1. Select three to five individuals, including yourself if appropriate, from the
> >   corporate real estate unit who are knowledgeable about its:
> >
> >   a. internal operations and objectives
> >   b. role and responsibilities within XYZ Corporation
> >   c. decision processes and the information systems used to support them

           d. personnel
           e. relationship with the business units
           f. internal organizational structure
           g. position within the corporate organizational structure
           h. real estate portfolio characteristics

2. Distribute a <u>white</u> questionnaire with its attached return envelop to each of these corporate real estate informants. This questionnaire should take about 20 minutes to complete. A short note or phone call from you encouraging their participation would help increase the response rate.

BLUE QUESTIONNAIRES

1. Identify three to five business units (typically divisions) within XYZ Corporation that are provided services by the corporate real estate unit. They should be as diverse as possible, varying in size, location, product/service type, etc.

2. Select an individual (<u>not</u> real estate related) from each of these business units who is knowledgeable about:

    a. the profitability (e.g., net profit, financial liquidity) of his/her business unit relative to its major competition
    b. the growth (e.g., market share gains, sales growth rate) of his/her business unit relative to its major competition
    c. the ability of the corporate real estate unit to effectively support his/her business operations

3. Distribute a <u>blue</u> questionnaire with its attached return envelop to each of these business informants. This questionnaire should take about 15 minutes to complete. Again, a short note or phone call from you encouraging their participation would help increase the response rate, especially in this case of line personnel.

It is critical that only those informants who are knowledgeable about the areas covered in the respective questionnaires be selected. It is likely that only senior corporate real estate managers will have the breadth of knowledge required to answer the white questionnaire, and only senior business managers will be qualified to answer the blue questionnaire.

As indicated in the instructions of each questionnaire, all responses will be treated in the <u>strictest confidence</u>. In no instance will any person or organization be identified with a particular response or opinion. Also, an Executive Summary of the study will be provided to each of the respondents upon request. A full research report will be available through both academic and professional publications.

If you have any questions about these procedures or about the study in general, please feel free to contact me at (413) 533-3283. It would be greatly appreciated if the questionnaires could be distributed within one week, and completed within two additional weeks.

Thank you very much for your cooperation.

Sincerely,

Steven L. Duckworth
Ph.D. Candidate in Building Economics
Massachusetts Institute of Technology

Enclosures: 5 white questionnaires
               5 blue questionnaires

CHAPTER 4. ASSESSMENT OF MEASUREMENT PROPERTIES

This chapter implements the analytical procedures for assessing the measurement properties of the CRESO construct. These procedures are based on the following components of measurement validity described in the previous chapter: unidimensionality and convergent validity, internal consistency of operationalization, and discriminant validity.

4.1 ASSESSMENT OF UNIDIMENSIONALITY AND CONVERGENT VALIDITY

As explained in Chapter 3, multiple corporate real estate informants and multiple business informants were sampled from each firm in the study. To further refine the CRESO model before evaluating the unidimensionality and convergent validity of each of its dimensions, the items that yielded the most consistent responses between informants (i.e., methods) were selected. The indicators with a correlation between methods at the 0.001 level of significance were used to assess measurement validity. The two responses for each indicator (i.e., one response from each of the two corporate real estate informants with the most different job titles per firm) were averaged and thus treated as a single method in the analysis.

When only one method of data collection is used, unidimensionality and convergent validity can be assessed simultaneously with the same model (see Venkatraman, 1985).

As described in Section 3.21, Joreskog's (1971) model for convergent validity is written as:

$$\chi - \Lambda\xi + \delta \qquad (2)$$

where χ is a vector of actual measurements, ξ is a vector of theoretical constructs (i.e., traits), δ is a vector of error terms, and Λ is a matrix of factor loadings relating χ to ξ. The observed variances and covariances, Σ, among the measures, χ, can be written as:

$$\Sigma - \Lambda\Phi\Lambda + \Psi \qquad (3)$$

where Φ is the matrix of intercorrelations among the traits, and Ψ is a diagonal matrix of error variances for the measures.

The LISREL Program by Joreskog and Sorbom (1978) enables researchers to obtain a χ^2 goodness of fit index for the null model implied by equations (2) and (3), and maximum likelihood (ML) estimates for parameters Λ, Φ, and Ψ. χ^2 values with an associated probability greater than the 0.10 level of significance generally indicate that the model provides a satisfactory fit to the data (Lawley and Maxwell, 1971).

The χ^2 statistic is sensitive to sample size and is therefore often complemented by Bentler and Bonett's (1980) incremental fit index Δ. It is an indication of the practical significance of the model in explaining the data and is represented as:

$$\Delta - (F_O - F_k) / F_O \qquad (4)$$

where F_O = chi-square value obtained from a null model specifying mutual independence among the indicators, and F_k = chi-square value for the specific model. It is generally accepted that Δ should be greater than 0.90 (Bentler and Bonett, 1980), but Bearden, Sharma, and Teel (1982) argue that it should exceed 0.95. In Sections 4.11 through 4.16, the unidimensionality and convergent validity of each of the six CRESO dimensions will be assessed by applying equations (2), (3), and (4).

4.11 Analysis Dimension

This dimension refers to the analytical orientation of CRE in its decision making processes and is thought to be captured by the five indicators shown in Figure 4A. The results of estimating this model with LISREL 7.2 are presented in Table 4A. Although the five-indicator model provides an acceptable fit to the data (χ^2 = 2.38, d.f. = 5, p = 0.794, Δ = 0.98), indicator A14 only has a magnitude of 0.241 (t=2.274). This value represents the degree of correspondence between the theoretical model and empirical observations and can be interpreted similar to factor loadings (Venkatraman, 1985).

Acceptable parameters should have both statistical and scientific significance. Cohen and Hyman (1979: 14, quoted by Ginsberg and Venkatraman, 1985: 428) argue that statistical significance "is a constricted, technical, narrow term which simply tells us the probability of finding in the universe what we found in our sample....[It] is a minor quality of

Analysis

λ_1 λ_2 λ_3 λ_4 λ_5

| A1 | A4 | A5 | A12 | A14 |

δ_1 δ_2 δ_3 δ_4 δ_5
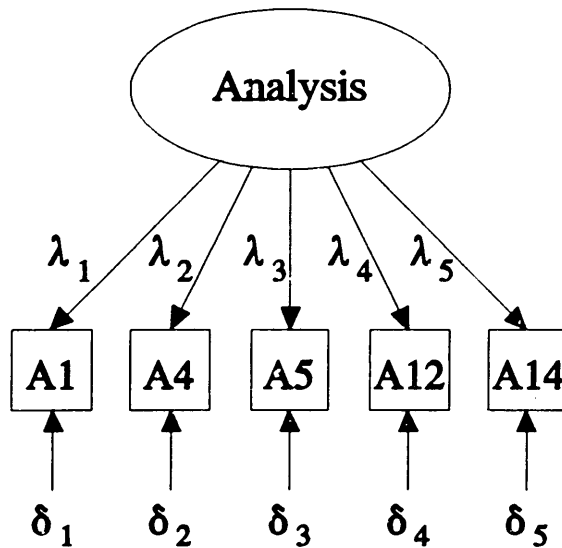
A1   Our information systems provide support for decision making.

A4   We analyze the performance of our real estate portfolio on both a cross-sectional and time-series basis.

A5   We try to search deeper for the roots of problems in order to generate the best possible solution alternatives.

A12 Use of decision support systems.

A14 Use of space accounting and planning systems.

Figure 4A: Evaluation of Unidimensionality and Convergent Validity for the Analysis Dimension

significance, on the other hand, as the magnitude of the effect that determines whether or not the research results constitute an important contribution to the relevant profession or science. The level of scientific significance is not usually reported in strategy studies and cannot be accurately calculated with the data provided in them. Nevertheless, the value of indicator A14 is less than the generally accepted threshold of 0.30 for factor loadings (Venkatraman, 1985). Thus, the model was refined by eliminating this indicator and re-estimated with the other four indicators (A1, A4, A5, A12). The revised

Table 4A: Statistical Results of Testing the Model in Figure 4A

Parameter	ML Estimate	T-Value	P-Level
A1	0.722	7.793	***
A4	0.920	11.358	***
A5	0.823	9.522	***
A12	0.905	11.051	***
A14	0.241	2.274	**

$\chi^2 = 2.38$, d.f. $= 5$, p $= 0.794$, $\Delta = 0.98$, (***) p < 0.001, (**) p < 0.05

Residuals	A1	A4	A5	A12	A14
A1	0.000				
A4	0.000	0.000			
A5	0.025	-0.008	0.000		
A12	-0.015	0.005	-0.001	0.000	
A14	0.038	-0.018	0.058	-0.019	0.000

model statistics are: $\chi^2 = 0.77$, d.f. $= 2$, p $= 0.682$, $\Delta = 0.99$. These results provide strong empirical support for the four-indicator analysis dimension.

4.12 Centrality Dimension

Five indicators are hypothesized to represent the centrality dimension, as shown in Figure 4B. These indicators measure the extent to which the activities of CRE are linke with those of the business units. As discussed in Section 3.1, centrality is composed of three constitutive concepts in this study: workflow pervasiveness, workflow immediacy, and substitutability. Fortunately, each of these concepts is represented by at least one indicator in the confirmatory factor analysis model. Indicators C2 and C3 are thought to capture CRE's workflow pervasiveness, C6 and C8 measure its workflow immediacy
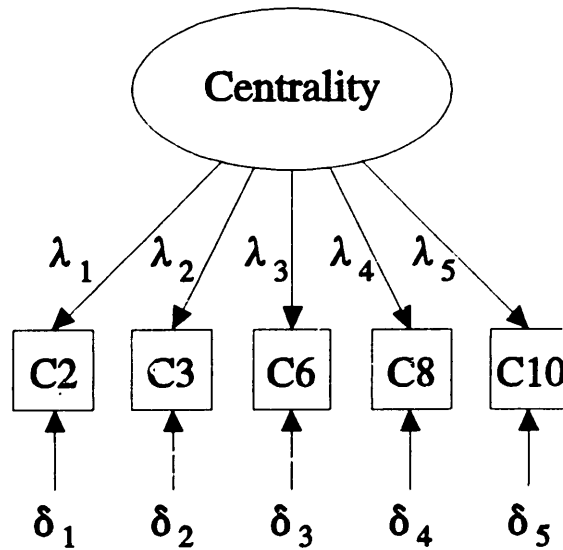
C2   A large number of the business units routinely rely on our real estate services.

C3   The management processes of the business units are well linked to those of the corporate real estate unit.

C6   If our real estate services were not available, it would not affect the final output of the business units for several months (reverse scored).

C8   If our real estate activities ceased, it would have a very limited effect on the output of finished goods and services by the business units (reverse scored).

C10 The business units often seek the services of external real estate consultants without our involvement (reverse scored).

Figure 4B: Evaluation of Unidimensionality and Convergent Validity for the Centrality Dimension

in terms of speed and severity, and C10 taps its substitutability. The results of estimating this five-indicator model with LISREL 7.2 are presented in Table 4B.

Based on the model statistics of $\chi^2 = 4.25$, d.f. $= 5$, p $= 0.514$, and $\Delta = 0.96$, the five-indicator model of the centrality dimension adequately fits the data. Moreover, the ML parameter estimates for all five indicators are statistically significant and of sufficient magnitude, and all of the residuals are within the generally accepted limit of 0.10

96

Table 4B: Statistical Results of Testing the Model in Figure 4B

Parameter	ML Estimate	T-Value	P-Level
C2	0.806	8.995	***
C3	0.841	9.573	***
C6	0.587	5.901	***
C8	0.606	6.139	***
C10	0.855	9.811	***

$\chi^2 = 4.25$, d.f. $= 5$, p $= 0.514$, $\Delta = 0.96$, (***) p < 0.001

Residuals	C2	C3	C6	C8	C10
C2	0.000				
C3	-0.016	0.000			
C6	0.019	0.024	0.000		
C8	0.062	-0.023	-0.076	0.000	
C10	-0.009	0.012	-0.012	-0.002	0.000

(Bagozzi, 1980), indicating that the covariation between indicators is not excessive. Hence, this model of the centrality dimension requires no adjustments and is accepted with strong empirical support.

4.13 Entrepreneurship Dimension

Seven indicators are hypothesized to represent the entrepreneurship dimension, as shown in Figure 4C. They focus on the entrepreneurial or profit-seeking orientation of CRE. Estimating this model with LISREL 7.2 produced the following statistics: $\chi^2 = 7.99$, d.f. $= 14$, p $= 0.890$, and $\Delta = 0.91$. It is apparent from the ML parameter estimates in Table 4C that the value of indicator E8 is close to zero and that its t-value is not

The diagram shows an oval labeled "Entrepreneurship" with paths λ_1 through λ_7 pointing to indicators E1, E3, E5, E7, E8, E9, E14, each with error terms δ_1 through δ_7.
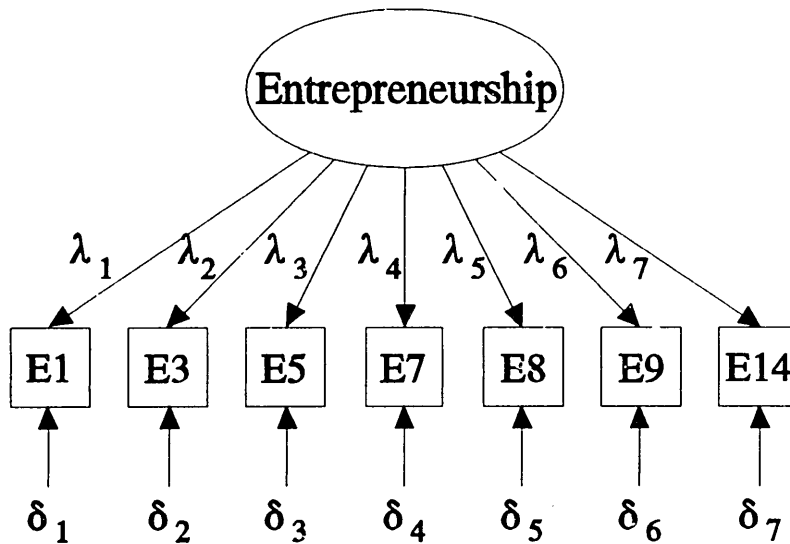
E1   We manage our real estate as a profit center.

E3   We strive to use our real estate assets to generate revenue for overall corporate purposes.

E5   Our real estate activities tend to be profit oriented.

E7   The success of the corporate real estate unit is primarily based on its profitability.

E8   The mission of the corporate real estate unit is solely driven by the mission of the overall corporation (reverse scored).

E9   We have been able to attract and retain the highest caliber of real estate professionals.

E14 Meeting the real estate needs of the business units is only one of our objectives.

Figure 4C: Evaluation of Unidimensionality and Convergent Validity for Entrepreneurship Dimension

statistically significant (t = 0.832). Also, an examination of the residual matrix indicates that the value in cell 5-3, which represents the covariation between indicators E5 and E8, is greater than 0.10. This suggests that the model can be improved by eliminating indicator E8. In doing so, the model was re-estimated with indicators E1, E3, E5, E7, E9, E14, yielding the following statistics: χ^2 = 4.78, d.f. = 9, p = .853, and

Table 4C: Statistical Results of Testing the Model in Figure 4C

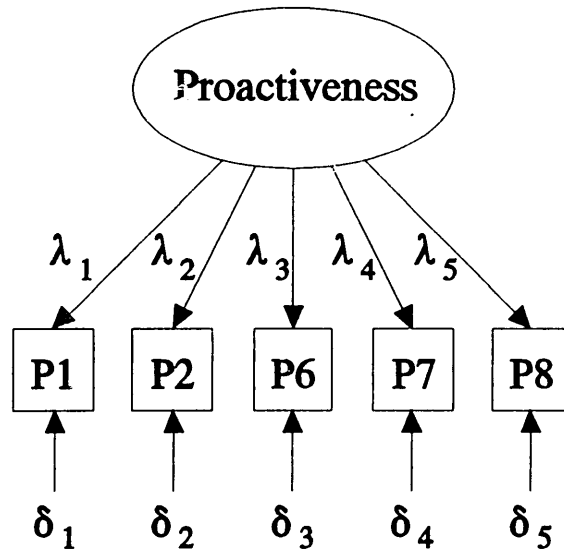| Parameter	ML Estimate	T-Value	P-Level
E1	0.898	10.934	***
E3	0.684	7.312	***
E5	0.718	7.805	***
E7	0.875	10.467	***
E8	0.089	0.832	n.s.
E9	0.858	10.150	***
E14	0.511	5.108	***

$\chi^2 = 7.99$, d.f. $= 14$, p $= 0.890$, $\Delta = 0.91$, (***) p < 0.001, (n.s.) not significant

Residuals	E1	E3	E5	E7	E8	E9	E14
E1	0.000						
E3	0.005	0.000					
E5	0.006	0.043	0.000				
E7	0.002	-0.024	0.003	0.000			
E8	0.008	-0.010	-0.114	0.009	0.000		
E9	0.000	-0.013	-0.030	0.009	0.042	0.000	
E14	-0.034	0.067	0.022	-0.017	0.034	-0.035	0.000

$\Delta = 0.95$. This revised six-indicator model of the entrepreneurship dimension is clearly an improvement and is accepted with strong empirical support.

4.14 Proactiveness Dimension

This dimension reflects the proactive behavior of CRE in relation to emerging real estate opportunities or problems within or without the firm. It is thought to be captured by the five indicators shown in Figure 4D. The estimation of this model yielded the following statistics: $\chi^2 = 8.36$, d.f. $= 5$, p $= 0.138$, and $\Delta = 0.92$. As Table 4D summarizes,

$$\text{Proactiveness}$$

$\lambda_1 \quad \lambda_2 \quad \lambda_3 \quad \lambda_4 \quad \lambda_5$

| P1 | P2 | P6 | P7 | P8 |

$\delta_1 \quad \delta_2 \quad \delta_3 \quad \delta_4 \quad \delta_5$

P1	Our decisions seem to reflect a "putting out the fires" mentality (reverse scored).
P2	Our decisions tend to be reactive in nature (reverse scored).
P6	Our real estate activities can be characterized as proactive rather than reactive.
P7	We have a tendency to address the real estate needs of business units on a tactical basis rather than from a strategic perspective (reverse scored).
P8	We try to anticipate the real estate needs of business units through planning techniques.

Figure 4D: Evaluation of Unidimensionality and Convergent Validity for the Proactiveness Dimension

all of the ML parameter estimates are statistically significant and the residual matrix contains no violations. Thus, this five-indicator model of the proactiveness dimension is accepted.

4.15 Riskiness Dimension

This dimension reflects the risk propensity of CRE in relation to its overall pattern of decision making. It encompasses aspects of both risk, the probability and variance of

100

Table 4D: Statistical Results of Testing the Model in Figure 4D

Parameter	ML Estimate	T-Value	P-Level
P1	0.855	10.145	***
P2	0.842	9.898	***
P6	0.772	8.685	***
P7	0.906	11.151	***
P8	0.881	10.652	***

$\chi^2 = 8.36$, d.f. $= 5$, p $= 0.138$, $\Delta = 0.92$, (***) p < 0.001

Residuals	P1	P2	P6	P7	P8
P1	0.000				
P2	-0.009	0.000			
P6	-0.042	0.081	0.000		
P7	-0.006	-0.013	-0.002	0.000	
P8	0.019	-0.016	-0.022	0.006	0.000

outcomes, and uncertainty, the quality of and access to information. As shown in Figure 4E, indicators R1, R5, and R7 are hypothesized to represent the concept of riskiness in this study. The statistical results of estimating this model with LISREL 7.2 are: $\chi^2 = 0.02$, d.f. $= 1$, p $= 0.912$, and $\Delta = 0.99$. An examination of Table 4E reveals that the ML estimates for all of the parameters are statistically significant and that the residual matrix contains no violations. Based on these results, the three-indicator model of the riskiness dimension is accepted.
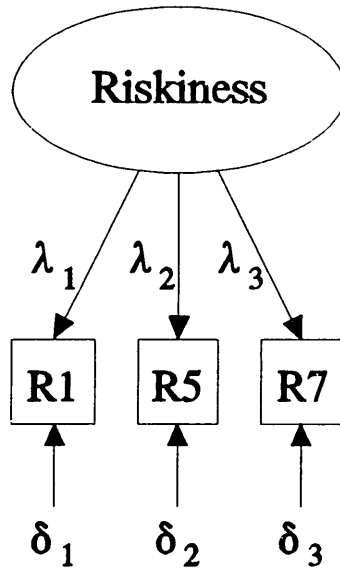
R1 We seem to adopt a rather conservative view when making major real estate
 decisions (reverse scored).

R5 We strive to transfer risk to our suppliers (reverse scored).

R7 We often experiment with new approaches to corporate real estate rather than
 following the "tried and true" paths.

Figure 4E: Evaluation of Unidimensionality and Convergent Validity for the Riskiness
Dimension

4.16 Serviceability Dimension

This dimension refers to the posture adopted by CRE in its provision of support services

to the corporation's primary businesses. It is thought to be captured by the five

indicators in Figure 4E. The estimation of this model yielded the following statistics:

$\chi^2 = 7.75$, d.f. $= 5$, $p = 0.171$, and $\Delta = 0.93$. An examination of the ML parameter

estimates in Table 4F reveals that the value of indicator S10 is almost zero and that

Table 4E: Statistical Results of Testing the Model in Figure 4E

Parameter	ML Estimate	T-Value	P-Level
R1	0.715	6.813	***
R5	0.682	6.505	***
R7	0.812	7.717	***

$\chi^2 = 0.02$, d.f. $= 1$, p $= 0.912$, $\Delta = 0.99$, (***) p < 0.001

Residuals	R1	R5	R7
R1	0.004		
R5	-0.004	0.000	
R7	0.000	0.008	0.000

its t-value is not statistically significant (t $= 0.290$). Also, the value in cell 5-4 of the residual matrix, which represents the covariation between indicators S5 and S10, exceeds 0.10. This suggests that by eliminating indicator S10 the model can be improved. When the model was re-estimated with indicators S2, S3, S4, and S5, it had the following statistical results: $\chi^2 = 1.24$, d.f. $= 2$, p $= 0.539$, and $\Delta = 0.98$. These results provide strong empirical support for this revised four-indicator model of the serviceability dimension.

4.2 ASSESSMENT OF INTERNAL CONSISTENCY OF OPERATIONALIZATION

Given that the unidimensionality and convergent validity of the six CRESO dimensions have been established, the next criterion for construct validity is the internal consistency or reliability of the measures. As discussed in Chapter 3, reliability is achieved when

Serviceability

λ_1 λ_2 λ_3 λ_4 λ_5

S2 S3 S4 S5 S10

δ_1 δ_2 δ_3 δ_4 δ_5
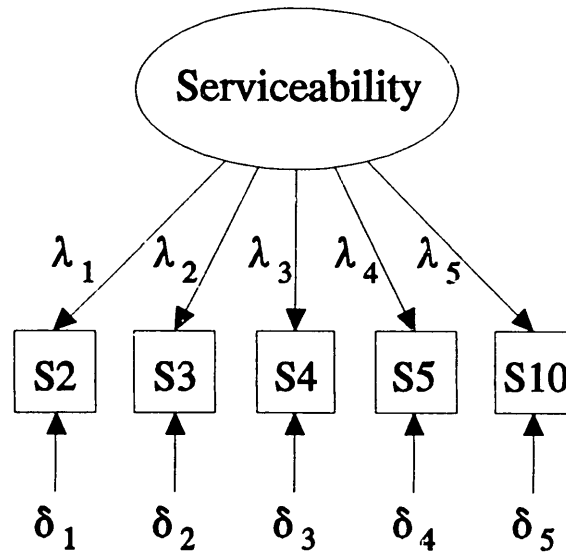
S2 The corporate real estate unit has no bottom-line emphasis.

S3 Many on the corporate real estate staff previously held positions in the company that were not related to real estate.

S4 Real estate functions are often divided among several organizational units with different reporting lines.

S5 A number of the corporate real estate managers have little prior experience in real estate or construction.

S10 We are generally passive to requests from the business units.

Figure 4F: Evaluation of Unidimensionality and Convergent Validity for the Serviceability Dimension

indicator variance is largely attributable to the underlying construct rather than to random error. The Cronbach α coefficient (Cronbach, 1951) is the typical index of reliability. Its value ranges from 0 to 1 and has the desirable property of being a lower bound of reliability (Lord and Novick, 1968). The closer the value of α is to 1, the more reliable is the measurement of the underlying construct. It is assumed that all indicators are of equal importance and that there is no measurement error. Hence, external influences

Table 4F: Statistical Results of Testing the Model in Figure 4F

Parameter	ML Estimate	T-Value	P-Level
S2	0.715	7.462	***
S3	0.830	9.100	***
S4	0.616	6.167	***
S5	0.843	9.288	***
S10	0.032	0.290	n.s.

$\chi^2 = 7.75$, d.f. $= 5$, p $= 0.171$, $\Delta = 0.93$, (***) p < 0.001, (n.s.) not significant

Residuals	S2	S3	S4	S5	S10
S2	0.000				
S3	-0.004	0.000			
S4	-0.045	0.026	0.000		
S5	0.019	-0.008	-0.002	0.000	
S10	0.017	0.086	0.059	-0.107	0.000

cannot be separated from the effects of the underlying construct (Bagozzi, 1980), making the index problematic.

These deficiencies can be overcome by using the approach suggested by Werts, Linn, and Joreskog (1974), where the reliability (ρ_c) of n indicators can be calculated as follows:

$$\rho_c - (\sum_{i-1}^{n} \lambda_i)^2 \; Variance \; (A) \; / \; ((\sum_{i-1}^{n} \lambda_i)^2 \; Variance \; (A) \; + \; \sum_{i-1}^{n} \varepsilon_i) \quad (1)$$

where ρ_c is the composite measure reliability, n is the number of indicators, and λ_i is the factor loading which relates item i to the underlying theoretical dimension (A). If the value of ρ_c is greater than 0.50, then the variance captured by the trait is more than that

by error components (Bagozzi, 1981). This method is preferred for assessing reliability (Phillips and Bagozzi, 1986) since it does not assume equal importance across indicators and provides reliability estimates for individual items as well as the composite of all items.

Table 4G presents the composite measure of reliability for each of the six dimensions of the CRESO construct. In each case, the value greatly exceeds the threshold of 0.50, indicating that the measures have a high degree of reliability and provide an internally consistent operationalization of the theoretical constructs.

Table 4G: Composite Measure Reliability

Dimension	Number of Indicators	ρ_c
Analysis	4	0.900
Centrality	5	0.889
Entrepreneurship	6	0.894
Proactiveness	5	0.910
Riskiness	3	0.875
Serviceability	4	0.888

4.3 ASSESSMENT OF DISCRIMINANT VALIDITY

Discriminant validity is the degree to which a concept (i.e., each dimension of CRESO) is unique from others in the same theoretical system. It is achieved when measures of each dimension are unique and converge on their respective true scores. That is, when
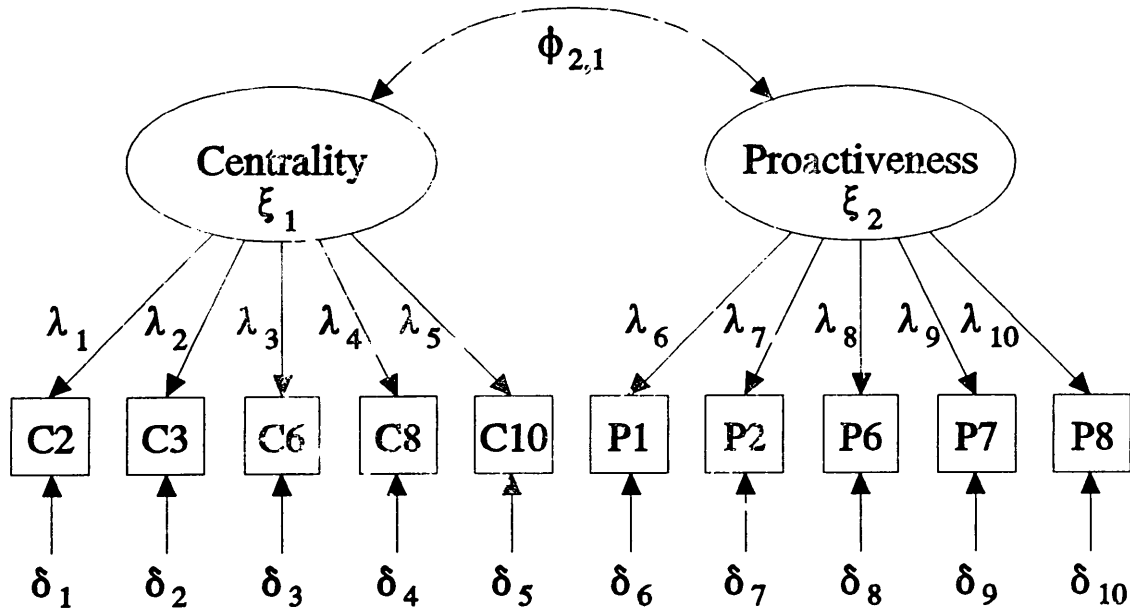
Figure 4G: Evaluation of Discriminant Validity: Comparing Constrained ($\phi_{2,1} = 1.0$) and Unconstrained ($\phi_{2,1}$) Models

the correlation between any two dimensions are significantly different from unity. Discriminant validity can be assessed by conducting pair-wise tests of the six CRESO dimensions where the correlation between dimensions is compared under constrained ($\phi_{2,1} = 1$) and unconstrained ($\phi_{2,1}$) conditions, as exemplified in Figure 4G. A significantly lower χ^2 value for the unconstrained model relative to the constrained model provides support for discriminant validity. A difference in the χ^2 values between the two models with an associated p-value of less than 0.05 meets the criterion of discriminant validity (Joreskog, 1971).

Table 4H summarizes the 15 pair-wise tests (i.e., a total of 30 model estimations) conducted for the assessment of discriminant validity. It contains the level of

Table 4H: Discriminant Validity Results

Test	Description	ML Estimate Phi (ϕ)	T-Value	$\phi = 1$ Constrained Model (d.f.)	Unconstrained Model (d.f.)	χ^2_d Difference
	Analysis with					
1	Centrality	0.573	7.148 (***)	154.64 (27)	23.24 (26)	131.40 (***)
2	Entrepreneurship	0.059	0.534	348.33 (35)	26.99 (34)	321.23 (***)
3	Proactiveness	0.694	11.270 (***)	160.14 (27)	23.95 (26)	136.19 (***)
4	Riskiness	0.046	0.380	95.43 (14)	20.86 (13)	74.57 (***)
5	Serviceability	(-) 0.282	(-) 2.622 (**)	163.02 (20)	30.01 (19)	133.01 (***)
	Centrality with					
6	Entrepreneurship	(-) 0.006	(-) 0.052	354.73 (44)	32.08 (43)	322.65 (***)
7	Proactiveness	0.480	5.331 (***)	206.60 (35)	55.54 (34)	151.06 (***)
8	Riskiness	(-) 0.163	(-) 1.358 (*)	93.11 (20)	17.71 (19)	75.40 (***)
9	Serviceability	(-) 0.417	(-) 4.152 (***)	145.38 (27)	24.89 (26)	120.49 (***)
	Entrepreneurship with					
10	Proactiveness	0.387	4.041 (***)	346.69 (44)	38.04 (43)	308.65 (***)
11	Riskiness	0.597	6.941 (***)	82.58 (27)	38.11 (26)	44.47 (***)
12	Serviceability	(-) 0.549	(-) 6.439 (***)	121.54 (35)	27.87 (34)	93.67 (***)
	Proactiveness with					
13	Riskiness	0.341	3.111 (**)	110.14 (20)	50.69 (19)	59.45 (***)
14	Serviceability	(-) 0.379	(-) 3.768 (***)	153.08 (27)	28.52 (26)	124.56 (***)
	Riskiness with					
15	Serviceability	(-) 0.392	(-) 3.537 (**)	76.83 (14)	17.05 (13)	59.78 (***)

(*) $p < 0.10$
(**) $p < 0.01$
(***) $p < 0.001$

association (ϕ) between the two dimensions whose discriminant validity is being evaluated, the model statistics for the constrained and unconstrained models, and the difference between the model statistics (χ^2_d). In all 15 cases, the value of χ^2_d is statistically significant at level 0.001. It can therefore be concluded that all six dimensions of the CRESO model satisfy the discriminant validity criterion and can be treated as unique concepts.

4.4 SUMMARY OF CHAPTER 4

This chapter assessed the measurement properties of the CRESO construct in terms of unidimensionality and convergent validity, internal consistency of operationalization, and discriminant validity. The unidimensionality and convergent validity of each of the theoretically derived CRESO dimensions were simultaneously assessed at the monomethod level of analysis by using the confirmatory factor approach as implemented within the LISREL framework (Joreskog and Sorbom, 1978). A total of 27 indicators for the six dimensions of CRESO were found to satisfy these two measurement criteria.

The internal consistency of operationalization was assessed by calculating the composite measure reliability (Werts, Linn, and Joreskog, 1974) for each dimension of CRESO. The composite measure reliability represents the ratio of trait variance to the sum of trait and error variances, and should be greater than 0.50. In each case, the value exceeded this threshold, demonstrating that the 27 indicators are reliable and provide an internally consistent operationalization of the six CRESO dimensions.

Discriminant validity was assessed by conducting pair-wise tests of the six CRESO dimensions where the correlation between dimensions was compared under constrained ($\phi = 1$) and unconstrained (ϕ) conditions. In all 15 tests, the difference between the constrained and unconstrained model statistics (χ^2_d) was statistically significant at level 0.001, which meets the discriminant validity criterion of being less than 0.05.

Thus, the 27-indicator, six-dimension model of CRESO was validated based on a series of analytical steps. The final step in this series will be examined in the following chapter. As discussed in Chapter 3, it is referred to as nomological or predictive validity and "is an important component of the construct assessment since it moves the logic of assessment from the statistical domain of intercorrelations among the multiple indicators designed to capture the underlying trait (i.e., unidimensionality, reliability, convergent and discriminant validity) towards the substantive domain focusing on relationships that are best interpreted in the light of the received theory" (Venkatraman, 1989: 954).

CHAPTER 5. ASSESSMENT OF NOMOLOGICAL VALIDITY

The final criterion for establishing the validity of the CRESO construct is nomological validity. As described in Chapter 3, it is the degree to which predictions from a formal theoretical network containing the concept under scrutiny are confirmed (Campbell, 1960). According to Bagozzi (1980: 129):

> This aspect of construct validity points out the essential incompleteness of the interpretation of theoretical terms. That is, it is not sufficient for determining construct validity to focus solely on semantic criteria of the language used to represent concepts and the relationship among concepts and operationalizations. Nor is it sufficient to examine only the empirical criteria of internal consistency of operationalization or even convergent and discriminant validity. Rather, one must also consider the relationship of the concept under investigation to other concepts in an overall context of a theoretical structure.

Since the theoretical structure in this study is composed of the six CRESO dimensions, the first step in assessing nomological validity in this chapter will be to explore the substantive relationships among these dimensions. A preliminary evaluation of these relationships will be based on the pair-wise analysis conducted for the assessment of discriminant validity in Section 4.3.

The next step that will be taken goes beyond the CRESO construct and explores the relationship between the six dimensions of CRESO and four key dimensions of performance. More specifically, two dimensions of corporate real estate performance, service and internal operations, and two dimensions of business performance, profitability and growth, will be considered. Schwab (1980: 14, quoted by Venkatraman, 1989: 954) argues for such a focus in the following statement, "[substantial] effort has been devoted

111

to psychometric issues such as dimensionality, reliability, and errors of measurement [...]

relatively little concern, however, has been shown to the relationship that performance

may have to other constructs as the basis for providing evidence on the construct validity

of performance per se."

5.1 RELATIONSHIPS AMONG THE CRESO DIMENSIONS

The results of the 15 pair-wise tests presented in Table 4H (see the ML estimates (ϕ) and

their associated t-values) are used in this section to assess the nomological validity of the

CRESO construct in terms of interdimension relationships. These relationships are

interpreted in the context of existing theory from corporate real estate and other fields.

The analysis dimension, which refers to the analytical orientation of CRE in its decision

making processes, is significantly related to three other CRESO dimensions. First, it has

a strong positive association with centrality ($\phi = 0.573$, $t = 7.148$, $p < 0.001$). If

centrality refers to the *quantity* and *intensity* of a subunit's relations with other subunits

in an organization (Hickson *et al.*, 1971), then it is logical that when the centrality of

CRE's activities is high, CRE is engaged in the management processes of the business

units and has access to the analytical data needed for these processes. Second, the strong

positive relationship between the analysis and proactiveness dimensions ($\phi = 0.694$,

$t = 11.270$, $p < 0.001$) is consistent with the analytical emphasis of the proactively

oriented asset management concept of Levy and Matz (1987), and Bon's (1989, 1990)

notion of real property portfolio management (RPPM). Similarly, Venkatraman (1985,

1989) found that the analytical orientation of business units strongly covaries with

proactiveness. Third, the analysis and serviceability dimensions negatively covary

(ϕ = -0.282, t = -2.622, p < 0.01). Given that the serviceability dimension is largely

based on Levy and Matz's (1987) facilities management concept of corporate real estate

which is reactive in nature and has no bottom-line emphasis, it is not surprising that

CREs achieving high scores on the analysis dimension tend to score low on serviceability

measures, and visa versa. Interestingly, there is no consistent relationship between the

analysis dimension and either the entrepreneurship or riskiness dimensions. This

suggests that analysis is not a dominant trait of entrepreneurial CREs which tend to

engage in risky behavior.

The centrality dimension, which reflects how much the activities of CRE are connected

with those of other subunits in the firm, is significantly related to three other CRESO

dimensions. First, it positively covaries with the proactiveness dimension (ϕ = 0.480,

t = 5.331, p < 0.001). This result is consistent with the expectation that when the

activities of CRE are highly connected with those of the business units, CRE becomes

aware of potential changes in business plans and can anticipate the real estate

requirements associated with these changes. Second, the negative association between

the centrality and riskiness dimensions (ϕ = -0.163, t = -1.358, p < 0.1) may be due

to CRE networking in an often "risk-averse corporate environment" (Levy and Matz,

1987: 20). Third, a strong negative relationship exists between the centrality and

serviceability dimensions (ϕ = -0.417, t = -4.152, p < 0.001). Since the serviceability dimension reflects the view that CRE exists "to provide support to the organization outside the operating work flow" (Mintzberg, 1979: 31), and that "it generally is not coherently linked up to the mainstream strategic planning of the corporation as a whole" (Levy and Matz, 1987: 18), it is understandable that these two dimensions are negatively associated.

The entrepreneurship dimension, which reflects the profit-seeking orientation of CRE, strongly covaries with three other CRESO dimensions: proactiveness (ϕ = 0.387, t = 4.041, p < 0.001), riskiness (ϕ = 0.597, t = 6.941, p < 0.001), and serviceability (ϕ = -0.549, t = -6.439, p < 0.001). Its positive relationships with proactiveness and riskiness support the contention that an entrepreneurial approach to corporate real estate (Levy and Matz, 1987; Nourse, 1990), as well as real estate investment activities in general (e.g., McMahan, 1989), tend to be proactive and risky in nature. Since the concepts on which the entrepreneurship and serviceability dimensions are largely based represent opposite ends of the corporate real estate spectrum (Levy and Matz, 1987), it is logical for these dimensions to have a strong negative association.

The proactiveness dimension, which reflects the proactive behavior of CRE in relation to emerging real estate opportunities and problems, is significantly related to two other CRESO dimensions. First, its positive relationship with the riskiness dimension (ϕ = 0.341, t = 3.111, p < 0.01) adheres to Baird and Thomas' (1985) argument that

114

the consequences of strategic decisions are rarely, if ever, fully known. As a result, risk and uncertainty often accompany these decisions. Second, a strong negative association exists between the proactiveness and serviceability dimensions (ϕ = -0.379, t = -3.768, p < 0.001). Again, since the serviceability dimension is largely based on Levy and Matz's facility management concept where CRE "generally is not coherently linked up to the mainstream strategic planning of the corporation as a whole and [...] is generally reactive in nature" (1987: 18), it is not surprising that these two dimensions negatively covary.

Finally, the riskiness dimension, which reflects the risk propensity of CRE in relation to its overall pattern of decision making, relates negatively with the serviceability dimension (ϕ = -0.392, t = -3.537, p < 0.01). When this result is interpreted in the context of CRESO's overall theoretical structure, it is consistent with other key results. For example, while the entrepreneurship, proactiveness, and riskiness dimensions have strong positive relationships among one another, they all negatively covary with the serviceability dimension.

Thus, a general pattern of relationships among the six dimensions of CRESO can be identified. More specific relationships should be examined within specific organizational and environmental contexts, such as employing these measures in studies that adopt a theory-testing perspective (Venkatraman, 1985, 1989).

5.2 SPECIFYING THE DIMENSIONALITY OF PERFORMANCE

The next step in assessing nomological validity shifts the focus from exploring relationships among the CRESO dimensions to examining the relationship between the CRESO dimensions and four key dimensions of performance. In this section, two dimensions of corporate real estate performance, service and operations, and two dimensions of business performance, profitability and growth, will be specified.

5.21 CRE Performance

There has been scant attention given to the conceptualization and measurement of CRE performance. Of those few researchers in the real estate field who have even focused on corporate real estate, most have been preoccupied with the performance of the real estate asset itself rather than that of the organizational function responsible for managing that asset. Studies in other literatures, however, have developed theoretical frameworks for evaluating the performance of organizational units similar to CRE.

Cooprider (1990: 94-101) developed a model for measuring the performance of the information systems (I/S) organization in firms. The first step in his approach, based on Berger (1988), classifies the types of I/S activity into categories. These categories are for determining the appropriate performance measures to use. He categorized I/S activity and conceptualized the performance of the I/S organization along two dimensions:

operational performance and service performance. These dimensions distinguish between internal (inward-looking) and external (outward-looking) activities of the I/S organization, respectively. This distinction is apparent in the conceptualizations of performance found in organizational studies research, using the different perspectives of task (McGrath, 1984; Goodman, 1986) and organizational measures (Van de Ven and Ferry, 1980). The operational dimension is based on a task perspective of performance, viewing the I/S organization as a production function. In contrast, the service dimension is based on an organizational perspective of performance, viewing the I/S organization as a service provider to the business units.

Within the operational and service dimensions are two types of indicators: process and product. Both are widely used in organizational control theory. For example, Ouchi (1979) and Eisenhardt (1985) categorized control measures as either behavior (process) based or output (product) based. The value of using both types of measures for I/S performance has been emphasized by many researchers (Cooprider and Henderson, 1989). From an industrial engineering perspective, Agresti (1981) proposed the use of separate performance measures for a software product and its development process. According to Case (1985), it is important to use both process and product based measures due to the potential conflict between the efficiency of the I/S process and the quality of the I/S product.

Given the conceptual similarities between the I/S and CRE roles in a firm, it is feasible to apply Cooprider's (1990) model to the measurement of CRE performance. For example, from an operational standpoint, performance can be measured in terms of the quality of work produced for a business unit by CRE (product), and the ability of CRE to meet its organizational commitments such as project schedules and budgets (process). From a service standpoint, performance can be measured in terms of the contribution that CRE makes to the accomplishment of a business unit's strategic goals (product), and CRE's ability to react quickly to the changing needs of a business unit (process).

In summary, two major dimensions of CRE performance will be used in this study: operations and service. Within each of these dimensions will be two types of performance indicators: product and process.

5.22 Business Performance

In light of the great impact that real estate decisions have on the balance sheet, income statement, and credit rating of a business (Bell, 1987; Nourse, 1990; Zeckhauser and Silverman, 1983), it is likely that the strategic orientation of CRE will not only affect the performance of CRE itself, but will also affect the overall economic performance of the business units served by CRE. Thus, it is important to relate the dimensions of CRESO to a construct of business performance.

118

Due to the multiple perspectives underlying the conceptualization and measurement of business performance (or its broader notion of organizational effectiveness), it is and area of concern in strategic management (Venkatraman and Ramanujam, 1986, 1987) as well as organizational sciences (Steers, 1977) in general. In spite of this ambiguity, two dimensions of performance are consistently considered important in strategy research: growth and profitability (Venkatraman, 1985). The growth dimension reflects the performance trend of a business in terms of sales gains and market share gains, while the profitability dimension reflects an efficiency view of current performance such as net profit position relative to competition. Both of these dimensions will be used to measure business performance in this study.

5.3 ASSESSMENT OF PERFORMANCE MEASUREMENT PROPERTIES

This section evaluates the measurement properties of the two dimensions of CRE performance (operations and service) and the two dimensions of business performance (growth and profitability) by using the same analytical procedures that were outlined in Chapter 3 and applied to the CRESO construct in Chapter 4. These procedures are based on the following components of measurement validity: unidimensionality and convergent validity, internal consistency of operationalization, and discriminant validity.

The operations and service dimensions of CRE performance are each composed of three indicators, as shown in Figures 5A and 5B, respectively. These indicators capture both

119
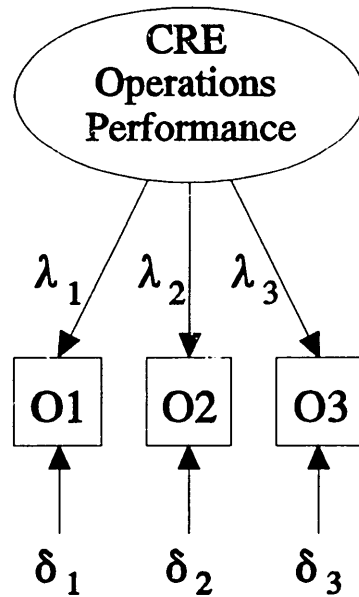
O1 The quality of services provided to our business unit by the corporate
    real estate unit. (PRODUCT)
O2 The ability of the corporate real estate unit to meet its goals. (PROCESS)
O3 The ability of the corporate real estate unit to meet its organizational
    commitments (e.g., project schedules and budgets). (PROCESS)

Figure 5A: Evaluation of Unidimensionality and Convergent Validity for the Operations
Dimension of CRE Performance

the process and product aspects of CRE activities. The estimation of these two models

together yielded the following statistics: $\chi^2 = 3.78$, d.f. $= 8$, p $= 0.811$, and

$\Delta = 0.98$. These results provide strong empirical support for the two dimensions of

CRE performance. Furthermore, Table 5A shows that the ML parameter estimates for

all of the indicators are statistically significant and that all of the residuals are less than

0.10. Thus, the operations and service dimensions of CRE performance can be accepted

as modeled.
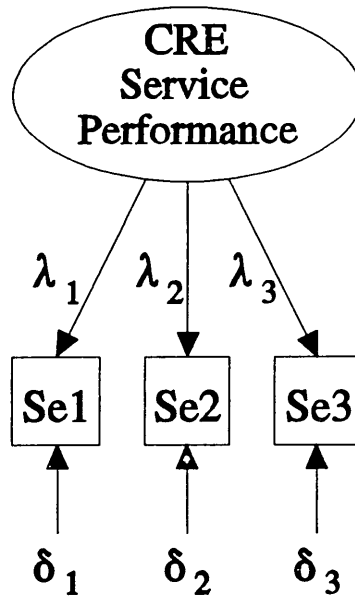
Se1   The ability of the corporate real estate unit to meet the changing needs of
       our business unit. (PROCESS)
Se2   The responsiveness of the corporate real estate unit to our business unit.
       (PROCESS)
Se3   The contribution that the corporate real estate unit has made to the
       accomplishment of our business unit's strategic goals. (PRODUCT)

Figure 5B: Evaluation of Unidimensionality and Convergent Validity for the Service Dimension of CRE Performance

The other two performance dimensions deal with business growth and profitability. The former is composed of three indicators which reflect the performance trend of a business unit in terms of sales and market share gains, as shown in Figure 5C. The latter has five measures which capture an efficiency view of current performance, as shown in Figure 5D. The model statistics from jointly estimating the growth and profitability dimensions are presented in Table 5B. Based on these results, both dimensions of business performance adequately fit the data and can be accepted.

121

Table 5A: Statistical Results of Testing the Models in Figures 5A and 5B

Parameter	ML Estimate	T-Value	P-Level
O1	0.724	7.960	***
O2	0.843	9.081	***
O3	0.810	8.805	***
Se1	0.698	7.193	***
Se2	0.897	10.253	***
Se3	0.829	8.991	***

$\chi^2 = 3.78$, d.f. $= 8$, p $= 0.811$, $\Delta = 0.98$, (***) p < 0.001

Residuals	O1	O2	O3	Se1	Se2	Se3
O1	0.000					
O2	0.003	0.000				
O3	0.011	0.000	0.000			
Se1	-0.023	0.017	-0.001	0.000		
Se2	0.036	0.008	0.001	0.000	0.000	
Se3	-0.009	-0.013	-0.010	0.000	-0.005	0.000

Given that all four performance dimensions satisfy the criteria for unidimensionality and convergent validity, the internal consistency of operationalization (i.e., reliability) can now be assessed. As described in Chapter 3, reliability is achieved when indicator variance is largely attributable to the underlying construct rather than to random error. It is generally tested through the composite measure reliability (ρ_c) (Werts, Linn, and Joreskog, 1974). When ρ_c exceeds 0.50, the variance captured by the trait is more than that by error components (Bagozzi, 1981). The values of ρ_c for the operations, service, growth, and profitability dimensions of performance are 0.852, 0.890, 0.914, and 0.877, respectively. In each case, more than 50% of the variance is captured by the trait,
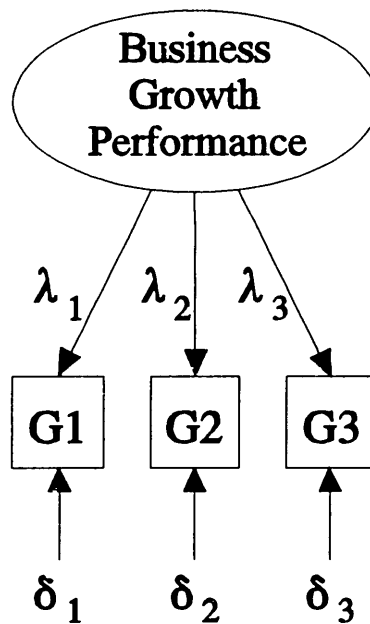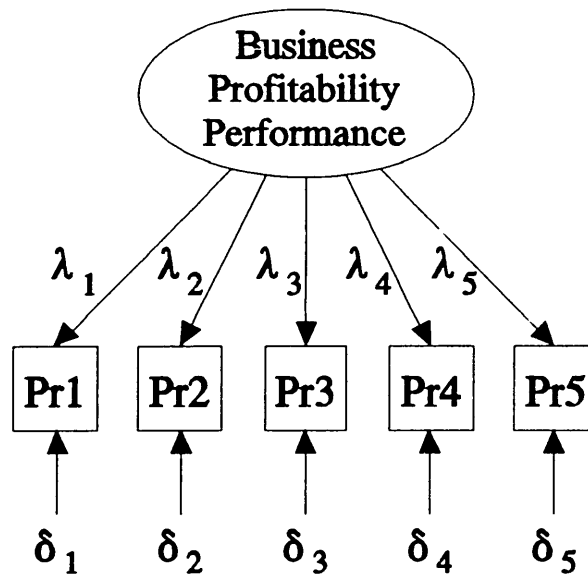
G1   Sales growth position relative to competition.
G2   Satisfaction with sales growth rate.
G3   Market share gains relative to competition.

Figure 5C: Evaluation of Unidimensionality and Convergent Validity for the Growth Dimension of Business Performance

indicating that the measures provide an internally consistent operationalization of the constructs.

The final criterion is discriminant validity, which is the degree to which each performance dimension is unique. As completed in Section 4.3, it can be assessed by conducting pair-wise tests of the performance dimensions where the correlation between dimensions is compared under constrained ($\phi = 1$) and unconstrained (ϕ) conditions. In this case, one comparison will involve the operations and service dimensions since

Pr1	Satisfaction with return on corporate investment.
Pr2	Net profit position relative to competition.
Pr3	ROI position relative to competition.
Pr4	Satisfaction with return on sales.
Pr5	Financial liquidity position relative to competition.

Figure 5D: Evaluation of Unidimensionality and Convergent Validity for the Profitability Dimension of Business Performance

they represent CRE performance, while the other will involve the growth and profitability dimensions since they represent business performance. Discriminant validity is achieved when the value of χ^2_d has a p-value of less than 0.05 (Joreskog, 1971).

The χ^2 values for the constrained and unconstrained models of CRE performance are 34.61 (d.f. = 9) and 3.78 (d.f. = 8), respectively. Consequently, the value of χ^2_d is 30.83 (d.f. = 1), which is significant at level 0.001. The χ^2 values for the constrained and unconstrained models of business performance are 77.92 (d.f. = 20) and 15.62

Table 5B: Statistical Results of Testing the Models in Figures 5C and 5D

Parameter	ML Estimate	T-Value	P-Level
G1	0.815	9.246	***
G2	0.733	7.100	***
G3	0.862	10.002	***
Pr1	0.631	6.298	***
Pr2	0.857	9.939	***
Pr3	0.889	13.064	***
Pr4	0.856	9.787	***
Pr5	0.792	9.096	***

$\chi^2 = 15.62$, d.f. $= 19$, p $= 0.723$, $\Delta = 0.97$, (***) p < 0.001

Residuals	G1	G2	G3	Pr1	Pr2	Pr3	Pr4	Pr5
G1	0.000							
G2	0.007	0.000						
G3	-0.012	0.038	0.000					
Pr1	0.023	0.018	0.002	0.000				
Pr2	-0.009	-0.016	0.031	-0.064	0.000			
Pr3	0.039	0.057	0.010	0.049	0.003	0.000		
Pr4	0.021	-0.029	0.008	0.006	0.000	-0.022	0.000	
Pr5	0.002	-0.002	-0.006	-0.011	0.018	0.001	-0.017	0.000

(d.f. $= 19$), respectively. This comparison results in a χ^2_d value of 62.30 (d.f. $= 1$), which is also significant at level 0.001. Based on these pair-wise tests, the performance dimensions satisfy the discriminant validity criterion, indicating that operations and service represent unique concepts of CRE performance, and that growth and profitability are distinct concepts of business performance.

5.4 RELATIONSHIPS BETWEEN CRESO AND PERFORMANCE DIMENSIONS

Having established the measurement validity of the performance constructs, key relationships between the six CRESO dimensions and four performance dimensions will be explored in this section, as exemplified in Figure 5E. These relationships can be tested by applying the following structural equation:

$$\eta - \Gamma\xi + \zeta \qquad (5)$$

where η is an endogenous theoretical construct, Γ is a matrix of structural coefficients which relates exogenous to endogenous theoretical constructs, and ζ is the residual of an endogenous theoretical construct. The gamma value (γ) shown in Figure 5E indicates the level of influence that a given CRESO dimension has on a given performance dimension. A total of 24 models were estimated with LISREL 7.2, each of the six CRESO dimensions relating to each of the four performance dimensions. The results of these analyses are presented in Tables 5C and 5D.

Table 5C: Relationships Between CRESO and CRE Performance

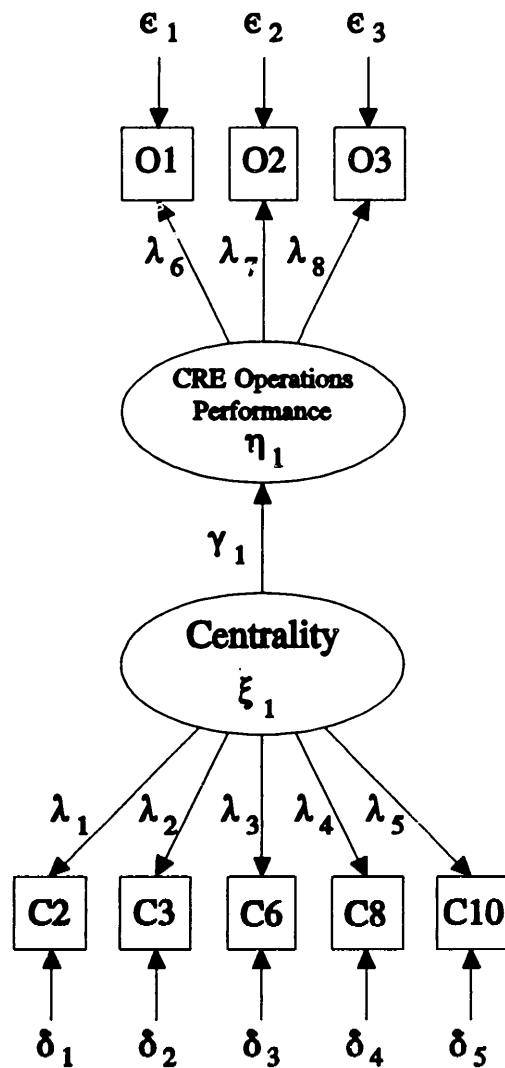| CRESO Dimensions	CRE Performance Dimensions			
	Gamma (γ)	Operations T-Value	Gamma (γ)	Service T-Value
Analysis	0.440	4.633 (***)	0.447	4.011 (***)
Centrality	0.394	3.697 (***)	0.402	4.454 (***)
Entrepreneurship	0.225	2.482 (**)	(-) 0.156	(-) 1.693 (*)
Proactiveness	0.378	3.950 (***)	0.462	4.782 (***)
Riskiness	0.047	0.479	(-) 0.016	(-) 0.159
Serviceability	(-) 0.296	(-) 2.763 (*)	(-) 0.363	(-) 0.314

Figure 5E: Evaluation of Relationships Between CRESO and Performance Dimensions

Several results in Table 5C warrant further discussion. CRE has three traits that have

positive and significant effects ($p < 0.001$) on both its internal operations and provision

of services to the business units: analysis, centrality, and proactiveness. These traits

reflect a balanced approach to corporate real estate, such as Levy and Matz's (1987) asset

management concept. Interestingly, the entrepreneurship and serviceability dimensions,

which reflect more extreme approaches, have less pronounced effects. More specifically,

127

Table 5D: Relationships Between CRESO and Business Performance

CRESO Dimensions	Business Performance Dimensions			
	Gamma (γ)	Growth T-Value	Gamma (γ)	Profitability T-Value
Analysis	0.072	0.748	0.138	1.467 (*)
Centrality	0.109	0.941	0.273	2.699 (**)
Entrepreneurship	(-) 0.049	(-) 0.523	(-) 0.030	(-) 0.327
Proactiveness	0.118	1.161	0.322	2.883 (**)
Riskiness	(-) 0.021	(-) 0.190	(-) 0.126	(-) 1.304
Serviceability	(-) 0.046	(-) 0.467	(-) 0.077	(-) 0.851

(*) p < 0.10
(**) p < 0.01
(***) p < 0.001

entrepreneurial real estate activities have a significant positive effect (t = 2.482, p < 0.001) on the internal operations of CRE, but a significant negative effect (t = -1.693, p < 0.10) on CRE service. This tends to support the argument that "satisfying the parent corporation's space requirements for its primary non-real-estate businesses is only one objective, and it often comes into conflict with the entrepreneurial entity's drive for profit maximization" (Levy and Matz, 1987: 19). The serviceability dimension has a significant negative effect on the operational performance of CRE (t = -2.763, p < 0.10), and an insignificant negative effect on CRE service (t = -0.314, n.s.). This result is consistent with Nourse's (1990: 2) assumption that "real estate asset management in the non-real-estate firm should be active rather than passive," and Bon's (1989: 117) argument that "we should address the management of facilities management, while facilities management itself should be of secondary importance."

A few results in Table 5D are also interesting and significant. None of the CRESO dimensions relate significantly to business growth. Perhaps this is due to the growth construct being too aggregate for the effects of CRESO to be apparent. However, three relationships between dimensions of CRESO and business profitability are significant. The fact that there are significant relationships between dimensions of CRESO and business profitability but not business growth suggests that the business performance implications of corporate real estate strategic orientation can best be assessed from an efficiency perspective. Similar to the results in Table 5C, the analysis (t = 1.467, p < 0.1), centrality (t = 2.699, p < 0.01), and proactiveness (t = 2.883, p < 0.01) dimensions have significant positive effects on business profitability, while the entrepreneurship (t = -0.327, n.s.), riskiness (t = -1.304, n.s.), and serviceability (t = -0.851, n.s.) dimensions have insignificant negative effects on it. These results further support a balanced approach to corporate real estate rather than more extreme approaches.

5.5 SUMMARY OF CHAPTER 5

This chapter established the nomological (i.e., predictive) validity of the CRESO construct. The relationships among the CRESO dimensions were initially explored and interpreted in the context of existing theory. These relationships were found to be consistent with the general pattern of results found in various literatures, such as corporate real estate, strategic management, and organizational power.

The focus was then shifted from interdimension relationships within the CRESO construct to relationships between dimensions of CRESO and performance. Two dimensions of CRE performance, operations and service, and two dimensions of business performance, growth and profitability, were specified from existing theory. The measurement properties of these performance dimensions were assessed based on key validity components. The analysis, centrality, and proactiveness dimensions were found to have positive and significant effects on three of the four performance dimensions, while the entrepreneurship, riskiness, and serviceability dimensions generally had negative effects. These results suggest that a balanced approach to corporate real estate, which is neither too entrepreneurial and risky nor too passive in nature, is generally preferable.

CHAPTER 6. SUMMARY AND CONCLUSIONS

This study began by arguing that while the relationship between organizational resources and environmental conditions is widely recognized by strategy researchers as being critical to performance, scant attention has been given to a resource that can greatly affect the level of congruence in this relationship, namely real estate. Real estate is an organizational resource which is intrinsically difficult to adapt to changing environmental conditions on both a physical and financial basis. Thus, as environmental conditions change at an ever increasing pace, CRE must play a more strategic role in the firm. Due to the lack of strategy research in this area, however, very little is known about this emerging role.

The goal of this study was to identify what the key dimensions of strategic orientation are for CRE, and to determine how these dimensions relate to the performance of both CRE and the business units to which CRE provides services. A six dimension model of corporate real estate strategic orientation (CRESO) was developed from various literatures and practitioner experiences, validated based on important measurement criteria, and employed to examine key relationships with two dimensions of CRE performance, operations and service, and two dimensions of business performance, growth and profitability. The contributions of this research lie in the development of statistically valid measures of corporate real estate strategic orientation which can be

used in future empirical research, and in the practical insight into the performance implications of different strategic orientations.

The second chapter focused on the theoretical aspects of the CRESO construct. Three levels of organizational strategy were discussed in the context of a systems model which delineated the role of CRE in maintaining congruence between organizational resources and environmental conditions. The model consisted of four contingency relationships: business unit to primary environment, business unit to corporate staff, corporate staff to secondary environment, and primary to secondary environment. These relationships collectively addressed key issues regarding how CRE may strategically orient itself in fulfilling its emerging role. Based on this framework, six dimensions of corporate real estate strategic orientation were identified: centrality, analysis, entrepreneurship, proactiveness, riskiness, and serviceability.

The third chapter covered several important aspects concerning the measurement validity and research design of the study. The holistic construal (Bagozzi and Phillips, 1982) approach for representing organizational research was initially discussed and applied to the CRESO construct. Various threats to achieving construct validity in the theory construction and empirical inquiry phases of research were then described. In light of these threats, a suitable survey instrument and data collection scheme for testing the CRESO model were developed and implemented. Specifically, the process used to generate and refine a set of indicators for measuring each dimension of CRESO was

outlined, then a description was provided of the two types of questionnaires employed in the field survey, followed by an explanation of the organizational and key informant sampling procedures. The countermeasures inherent in these procedures to protect against validity threats were also summarized, as were the sample characteristics for the companies and key informants in the study.

The fourth chapter established the measurement validity of the CRESO model in terms of unidimensionality and convergent validity, internal consistency of operationalization, and discriminant validity. Using a confirmatory factor approach, a total of 27 indicators were found to satisfy the unidimensionality and convergent validity criteria. The internal consistency of these indicators was then confirmed by calculating the composite measure reliability. Finally, discriminant validity was achieved through a series of pair-wise tests where the correlation between dimensions was compared under constrained and unconstrained conditions.

The fifth chapter focused on nomological validity, which is the final criterion in establishing the overall validity of the CRESO construct. The relationships among the CRESO dimensions were first explored and interpreted in the context of existing theory. These relationships were found to be consistent with the general pattern of results from corporate real estate and related fields. The next step involved the investigation of relationships between the CRESO and performance dimensions. Two dimensions of CRE performance, operations and service, and two dimensions of business performance,

growth and profitability, were specified and subsequently validated. The analysis, centrality, and proactiveness dimensions of CRESO were found to have positive and significant effects on three of the four performance dimensions, while the entrepreneurship, riskiness, and serviceability dimensions generally had negative effects. These findings suggest that a balanced approach to corporate real estate, which is neither too entrepreneurial and risky nor too passive in nature, is generally preferable.

6.1 LIMITATIONS OF THE STUDY

Although numerous steps were taken to counteract threats to the validity of this study, it is important to consider two of the study's potential limitations. First, since strategy research in the corporate real estate field is virtually nonexistent, it is unreasonable to think that these results can be generalized immediately. Venkatraman (1989: 958) notes that "a single study does not provide 'valid measures' in the true spirit." Moreover, the primary focus of the study was to establish the internal validity of the CRESO construct rather than to draw conclusions for the entire population. This study will hopefully serve as an impetus for systematic replications, refinements, and extensions in various research contexts.

Second, the relationships between the dimensions of CRESO and performance should be considered cautiously. The conceptualization and measurement of CRE performance were based on Cooprider's (1990) measurement model of I/S performance. While this

application was justified due to the lack of existing measurement models for CRE performance, and the conceptual similarities between the I/S and CRE roles in the firm, it has long been recognized that the measurement of I/S performance itself is problematic. In an attempt to avoid potential biases in measuring CRE performance in this study, the responses from two different business informants per firm were averaged, rather than using only a single informant. Although such perceptual assessments of performance have a high level of convergence with more objective performance measures (Venkatraman and Ramanujam, 1987), the correspondence between these two methods has yet to be demonstrated in a corporate real estate context.

Also, the conceptualization and measurement of business performance were based on a scheme often used in strategic management (e.g., Venkatraman 1989, 1990; Venkatraman and Ramanujam, 1987). The concepts of growth and profitability in this scheme are broadly defined and operationalized because there are many factors contributing to them. Unfortunately, they may be too broad to appropriately measure CRESO's effect (or lack of) on them. The absence of any significant relationships between the dimensions of CRESO and business growth is indicative of this possible mismatch. In any case, a more finely calibrated measurement scheme of business performance is likely to produce more significant and useful results.

6.2 CONTRIBUTIONS OF THE STUDY

This study has made at least two major theoretical contributions to the field of corporate real estate. First, it empirically validated a model of corporate real estate strategic orientation composed of six unique dimensions. This model provides a theoretical basis for corporate real estate managers to adjust the strategic profile of CRE, and for researchers to more rigorously study it. Second, this study demonstrated that the strategic orientation of CRE has statistically significant effects on the performance of both CRE and the business units it supports. These results provide strong justification for increased attention in this area by practitioners and researcher alike.

Several methodological contributions have also been made by this study. Virtually all of the previous studies in the corporate real estate field have given inadequate attention to measurement issues, and even their potentially invalid substantive findings have been merely descriptive in nature. This point can be illustrated by Veale's (1989) attempt to measure the effectiveness of CRE with the following seven indicators:

1. The presence of a formal, organized real estate unit
2. The use of management information systems for real estate operations
3. The use of property-by-property accounting methods
4. The frequencies of reporting real estate information to senior management
5. The exposure of real estate executives to overall corporate strategy
6. The reported availability of information and methods for evaluating real estate performance and use
7. The performance of real estate assets relative to overall corporate assets

These indicators are used to explore substantive relationships with real estate evaluation methods (i.e., CRE as a profit or cost center) and management attitudes. The validity

136

of these relationships can be seriously questioned for at least two reasons. First, other than a definition adapted from Webster's Ninth New Collegiate Dictionary, Veale provides no theoretical basis for the concept of effectiveness. Second, even if the theoretical meaningfulness of effectiveness was established, Veale provides no evidence that the seven indicators with which he purports to measure effectiveness satisfy standard measurement criteria.

In contrast, the primary focus of this study was to establish the validity of the CRESO construct in terms of unidimensionality and convergent validity, internal consistency of operationalization, discriminant validity, and nomological validity. The danger of not addressing measurement issues is emphasized by Jocoby's (1978: 91) following observation about marketing constructs:

> More stupefying than the sheer number of our measures is the ease with which they are proposed and the uncritical manner in which they are accepted. In point of fact, most of our measures are only measures because someone says that they are, not because they have been shown to satisfy standard measurement criteria [...].

Moreover, Peter (1979: 6) argues:

> Valid measurement is the *sine qua non* of science. In a general sense, validity refers to the degree to which instruments truly measure the constructs which they are intended to measure. If the measures used in a discipline have not been demonstrated to have a high degree of validity, that discipline is not a science.

Thus, it is critical that researchers in the field of corporate real estate give at least as much attention to measurement issues as they have given to substantive issues. For if the former are not rigorously addressed, then the latter will be of little value.

137

6.3 EXTENSIONS TO THE STUDY

Three possible extensions to this study are proposed in this section. First, construct validity was not tested at the multimethod level of analysis. Although the responses from two different informants were averaged (see Sections 3.23, 3.34, and 3.37 on key informants), which is a step beyond using only a single informant, construct validity was not tested with methods factors controls. That is, variance attributable to methods factors such as key informant positional biases or knowledge deficiencies was not accounted for. Fortunately, this extension can be easily addressed within the current scope of the study. Additional survey responses have been received since the initial data analysis for this thesis, providing a sufficient number to accommodate this other factor in future analysis.

Second, while it is often assumed that multiple informants from the same organizational unit represent multiple methods of operationalization, it is possible that they share the same method bias and will respond similarly. Denzin (1978: 301-302, quoted by Venkatraman, 1985: 94) notes the limitations of this type of research design:

> Observers delude themselves into believing that [...] different variations of the same method generate [...] distinct varieties of triangulated data. But the flaws that arise from using one method remain.

Thus, in addition to sampling multiple corporate real estate and business informants, supplemental data should be collected through objective or other means.

Finally, although relationships between the dimensions of CRESO and performance were to be examined under the symmetrical and asymmetrical environmental conditions discussed in Section 2.24, at the time of the confirmatory factor analysis there were insufficient survey data to do so. Fortunately, this extension can also be addressed within the scope of the current study if additional responses are received, or by means of regression analysis.

6.4 PRACTICAL IMPLICATIONS OF THE STUDY

The corporate real estate field is in a critical period of transition. The most valuable research during this period will be that which helps practitioners understand the specific nature of change and determine the appropriate direction for it. Both of these criteria hinge on the relationship between CRE and the primary businesses of the firm, which this study addressed explicitly.

As discussed in Chapter 5, one of the major substantive findings that will help elucidate this relationship for practitioners is the notion of a balanced approach to corporate real estate. More specifically, it was found that the analysis, centrality, and proactiveness dimensions of CRESO have positive and significant effects on three of the four performance dimensions, while the entrepreneurship, riskiness, and serviceability dimensions generally have negative effects. The following discussion will focus on

why such a finding is important to practitioners, and how it can help them develop appropriate plans of action.

The importance and relevance of this study to the concerns of leading practitioners are clearly reflected in a statement by Bruce Russell, Director of Corporate Real Estate for the Eastman Kodak Company:

> The meaning of "value-added" depends on what customers you are serving at the time. Business units measure transactions; they need to acquire or dispose of space, renegotiate a lease, etc.. The CEO and CFO measure performance; they need to decide whether their company's physical assets are being put to effective and efficient use.[6]

This statement addresses two issues, the first of which is that CRE must provide value-added services to its customers. Kanter (1989: 89) reinforces this viewpoint, observing that "[n]ow [corporate] staffs must prove to the satisfaction of their internal customers that their services add value." What are value-added services, and what type of CRE can best provide them? In short, CRE provides value-added services when it has a stake in the success of its customers, and, according to this study, can best provide them through a balanced approach to corporate real estate. As noted in Section 5.4, a balanced approach to corporate real estate is characterized by analysis, centrality and proactiveness. What are these traits, and how are they measured? Analysis refers to the analytical orientation of CRE in its decision making processes (see Section 2.32), and is

---

[6] H. Bruce Russell, Based on minutes from the Industrial Development Research Foundation's Research Committee meeting, White Plains, New York, September 12, 1991.

measured with four indicators (see Section 4.11):

1. Our information systems provide support for decision making.
2. We analyze the performance of our real estate portfolio on both a cross-sectional and time-series basis.
3. We try to search deeper for the roots of problems in order to generate the best possible solution alternatives.
4. Use of decision support systems.

Centrality is the degree to which the activities of CRE are linked to those of the business units (see Section 2.31). It is measured with five indicators (see Section 4.12):

1. A large number of the business units routinely rely on our real estate services.
2. The management processes of the business units are well linked to those of the corporate real estate unit.
3. If our real estate services were not available, it would not affect the final output of the business units for several months (reverse scored).
4. If our real estate activities ceased, it would have a very limited effect on the output of finished goods and services by the business units (reverse scored).
5. The business units often seek the services of external real estate consultants without our involvement (reverse scored).

Proactiveness reflects the proactive behavior of CRE in relation to emerging real estate opportunities and problems within and without the firm (see Section 2.34). It is also measured with five indicators (see Section 4.15):

1. Our decisions seem to reflect a "putting out the fires" mentality (reverse scored).
2. Our decisions tend to be reactive in nature (reverse scored).
3. Our real estate activities can be characterized as proactive rather than reactive.
4. We have a tendency to address the real estate needs of business units on a tactical basis rather than from a strategic perspective (reverse scored).
5. We try to anticipate the real estate needs of business units through planning techniques.

These indicators provide insight into the steps necessary for CRE to become more balanced in its management approach, and thereby better able to provide value-added

141

services to its customers. For example, the analytical indicators suggest that CRE should have information systems that provide support for decision making, and that the functionality of these systems should enable the performance of real estate assets to be analyzed on both a cross-sectional and time-series basis (see Duckworth, forthcoming, for a detailed discussion on the development of such systems).

How does a balanced approach to corporate real estate differ from other approaches? As noted in Section 5.4, more extreme approaches are characterized by entrepreneurship, riskiness, and serviceability. Entrepreneurship refers to the profit-seeking orientation of CRE (see Section 2.33), riskiness reflects the risk propensity of CRE in relation to its overall pattern of decision making (see Section 2.35), and serviceability refers to the posture adopted by CRE in its provision of support services to the corporation's primary businesses (see Section 2.36). Since this study found that these traits are generally not conducive to the provision of value-added services, they should be deemphasized in CRE. The indicators used to measure entrepreneurship (see Section 4.13), riskiness (see Section 4.15), and serviceability (see Section 4.16) provide insight into how extreme approaches to corporate real estate can be avoided.

The second issue addressed in Bruce Russell's statement is that value-added services are measured differently by business units and top management. CRE must meet the transactional needs of the former, and the informational needs of the latter. Not only did this study demonstrate that CRE can best meet the needs of business units through a

balanced approach to corporate real estate, but it also established that such an approach

has a positive and significant effect on the profitability of business units, which is highly

useful performance information to top management. Since the information flow between

CRE and top management is generally poor (Bon, 1989, 1990), this study represents an

important step toward closing the communication gap, which has become a liability

in these volatile times.

REFERENCES

Agresti, W., "Applying Industrial Engineering to the Software Development Process," in *Proceedings: IEEE Fall COMPCON*, Washington, D.C.: IEEE Computer Society Press, 1981, 264-270.

Andrews, K.R., *The Concept of Corporate Strategy*, New York: Dow Jones-Irwin, 1971.

Ansoff, H.I., *The New Corporate Strategy*, New York: John Wiley & Sons, 1988.

Ashar, H., and J.Z. Shapiro, "Measuring Centrality: A Note on Hackman's Resource-Allocation Theory," *Administrative Science Quarterly*, Vol. 33, 1988, 275-283.

Bagozzi, R.P., *Causal Models in Marketing*, New York: John Wiley & Sons, 1980.

Bagozzi, R.P., "An Examination of the Validity of Two Models of Attitude," *Multivariate Behavioral Research*, Vol. 16, 1981, 323-359.

Bagozzi, R.P., "A Holistic Methodology for Modeling Consumer Response to Innovation," *Operations Research*, Vol. 31, 1983, 128-176.

Bagozzi, R.P., and L.W. Phillips, "Representing and Testing Organizational Theories: A Holistic Construal," *Administrative Science Quarterly*, Vol. 27, 1982, 459-489.

Baird, I.S., and H. Thomas, "Toward a Contingency Model of Strategic Risk Taking," *Academy of Management Review*, Vol. 10, 1985, 230-243.

Beard, D.W., "The Structure of Organizational Environments: A Factor Analytical Approach," *Organization and Administrative Sciences*, Vol. 8, 1978, 85-105.

Bearden, W.O., S. Sharma, and J.H. Teel, "Sample Size Effects on Chi-Square and Other Statistics Used in Evaluating Causal Models," *Journal of Marketing Research*, Vol. 19, 1982, 425-430.

Bell, M.A., "The Importance of Sound Fixed Asset Management," *Industrial Development*, Vol. 156, 1987, 11-13.

Bentler, P.M., and D.G. Bonett, "Significance Tests and Goodness of Fit in the Analysis of Covariance Structures," *Psychological Bulletin*, Vol. 88, 1980, 588-606.

Berger, P., "Selecting Enterprise-Level Measures of IT Value," in ICIT Research Study Team #2, *Measuring Business Value of Information Technologies*, Washington, D.C.: ICIT Press, 1988.

144

Bidwell, C.E., and J.D. Kasarda, "School District Organization and Student Achievement," *American Sociological Review*, Vol. 40, 1975, 55-70.

Blau, P., and W.R. Scott, *Formal Organizations: A Comparative Approach*, London: Routledge and Kegan Paul, 1962.

Bon, R., *Building as an Economic Process: An Introduction to Building Economics*, Englewood Cliffs, NJ: Prentice-Hall, 1989.

Bon, R., *Real Property Portfolio Management (RPPM): A Case in Decision-Support System Development*, Unpublished Manuscript, Massachusetts Institute of Technology, Cambridge, MA, 1990.

Bourgeois, L.J., "Strategy and Environment: A Conceptual Integration," *Academy of Management Review*, Vol. 5, 1980, 25-39.

Bourgeois, L.J., "Strategic Goals, Perceived Uncertainty, and Economic Performance in Volatile Environments," *Academy of Management Journal*, Vol. 28, 1985, 548-573.

Burns, T., and G.M. Stalker, *The Management of Innovation*, London: Tavistock, 1961.

Campbell, D.T., "The Informant is Quantitative Research," *American Journal of Sociology*, Vol. 60, 1955, 339-342.

Campbell, D.T., "Recommendations for APA Test Standards Regarding Construct, Trait, or Discriminant Validity," *American Psychology*, Vol. 15, 1960, 546-553.

Campbell, D.T., and D.W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," *Psychological Bulletin*, Vol. 56, 1959, 81-105.

Carnap, R., *An Introduction to the Philosophy of Science*, New York: Basic Books, 1966.

Case, A., "Computer-Aided Software Engineering," *Database*, Vol. 17, 1986, 35-43.

Chandler, A.D., *Strategy and Structure*, Cambridge, MA: MIT Press, 1962.

Child, J., "What Determines Organizational Performance? The Universals vs. the It-All-Depends," *Organizational Dynamics*, Vol. 1, 1974, 2-18.

Child, J., "Managerial and Organizational Factors Associated with Company Performance--Part II. A Contingency Analysis," *Journal of Management Studies*, Vol. 12, 1975, 12-27.

Chronley, J.A., "Clarifying Responsibilities with Other Departments," in R.A. Silverman (ed.), *Corporate Real Estate Handbook: Strategies for Improving Bottom-Line Performance*, New York: McGraw-Hill, 1987, 81-88.

Churchill, G.A., "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research*, Vol. 16, 1979, 64-73.

Cohen, S.A., and J.S. Hyman, "How Come So Many Hypotheses in Educational Research are Supported? (A Modest Proposal)," *Educational Research*, Vol. 8, 1979, 12-16.

Collins, O., and D.G. Moore, *The Organization Makers*, New York: Appleton, Century, Crofts, 1970.

Cook, T.D., and D.T. Campbell, *Quasi-Experimentation--Design and Analysis Issues for Field Settings*, Boston, MA: Houghton Mifflin, 1979.

Cooprider, J.G., *Partnership Between Line and I/S Managers: A Management Model*, Unpublished Doctoral Dissertation, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA, 1990.

Cooprider, J., and J. Henderson, *A Multi-Dimensional Approach to Performance Evaluation for I/S Development*, Center for Information Systems Research Working Paper No. 197, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA, 1989.

Cronbach, L.J., "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, Vol. 16, 1951, 297-334.

Drucker, P.F., "The Coming of The New Organization," *Harvard Business Review*, January-February 1988, 45-53.

Duckworth, S.L., "Realizing the Strategic Dimension of Corporate Real Property Through Improved Planning and Control Systems," *The Journal of Real Estate Research*, Forthcoming 1993.

Egelhoff, W.G., "Strategy and Structure in Multinational Corporations: An Information Processing Approach," *Administrative Science Quarterly*, Vol. 27, 1982, 435-458.

Eisenhardt, K., "Control: Organizational and Economic Approaches," *Management Science*, Vol. 31, 1985, 134-149.

Emerson, R.E., "Power Dependence Relations," *American Sociological Review*, Vol. 27, 1962, 31-41.

Feigl, H., "The 'Orthodox' View of Theories: Remarks in Defense as Well as Critique," In *Minnesota Studies in the Philosophy of Science 4*, edited by M. Radnor and S. Winokur, Minneapolis: University of Minnesota Press, 1970, 3-16.

Fong, C.O., and V. Srinivasan, "The Multiregion Dynamic Capacity Expansion Problems, Parts 1, 2," *Operations Research*, Vol. 29, 1981, 787-816.

Fornell, C., "Issues in the Application of Covariance Structure Analysis: A Comment," *Journal of Consumer Research*, Vol. 9, 1982, 443-448.

Fox, H.W., "A Framework for Functional Coordination," *Atlanta Economic Review*, Vol. 23, 1973, 8-11.

Fredrickson, J., "The Comprehensiveness of Strategic Decision Process: Extension, Observations, and Future Directions," *Academy of Management Journal*, Vol. 27, 1984, 445-466.

Ginsberg, A., and N. Venkatraman, "Contingency Perspectives of Organizational Strategy: A Critical Review of the Empirical Research," *Academy of Management Review*, Vol. 10, 1985, 421-434.

Goodhue, D.L., *Supporting Users of Corporate Data: The Effect of I/S Policy Choices*, Unpublished Doctoral Dissertation, Sloan School of Management, Massachusetts Institute of Technology, 1988.

Goodman, P.S., ed., *Designing Effective Work Groups*, San Francisco: Jossey Bass, 1986.

Grant, J.H., and W.R. King, *The Logic of Strategic Planning*, Boston, MA: Little, Brown and Co., 1982.

Gupta, A.K., "Contingency Linkages Between Strategy and General Manager Characteristics: A Conceptual Examination," *Academy of Management Review*, Vol. 9, 1984, 399-412.

Gupta, A.K., and V. Govindarajan, "Business Unit Strategy, Managerial Characteristics, and Business Unit Effectiveness at Strategy Implementation," *Academy of Management Journal*, Vol. 27, 1984, 25-41.

Hambrick, D.C., I.G. MacMillan, and D.L. Day, "Strategic Attributes and Performance in the BDG Matrix--A PIMS-based Analysis of Industrial product Businesses," *Academy of Management Journal*, Vol. 25, 1982, 510-531.

Hatten, K.J., D.E. Schendel, and A.C. Cooper, "A Strategic Model of the U.S. Brewing Industry: 1952-1971," *Academy of Management Journal*, Vol. 21, 1978, 592-610.

Hempel, C.G., "Fundamentals of Concept Formation in Empirical Science," In *International Encyclopedia of Unified Science 11*, Chicago: University of Chicago Press, 1952.

Hempel, C.G., *Aspects of Scientific Explanation*, New York: Free Press, 1965.

Hesse, M., "Is There an Independent Observation Language?" In *The Nature and Function of Scientific Theories*, Edited by D.G. Colodny, Pittsburgh: University of Pittsburgh Press, 1970.

Hickson, D.J., C.R. Hinings, C.A. Lee, R.E. Schneck, and J.M. Pennings, "A Strategic Contingencies Theory of Interorganizational Power," *Administrative Science Quarterly*, Vol. 16, 1971, 216-229.

Hinings, C.R., D.J. Hickson, J.M. Pennings, and R.E. Schneck, "Structural Conditions of Interorganizational Power," *Administrative Science Quarterly*, Vol. 19, 1974, 22-44.

Hofer, C.W., "Toward a Contingency Theory of Business Strategy," *Academy of Management Journal*, Vol. 18, 1975, 784-810.

Hofer, C.W., and D. Schendel, *Strategy Formulation: Analytical Concepts*, New York: West Publishing Co., 1978.

Holst, N.D., "Finance and Budget Analysis," in R.A. Silverman, ed., *Corporate Real Estate Handbook: Strategies for Improving Bottom-Line Performance*, New York: McGraw-Hill, 1987, 115-137.

Huber, G., and D.J. Power, "Retrospective Reports of Strategic-Level Managers: Guidelines for Increasing Their Accuracy," *Strategic Management Journal*, Vol. 6, 1985, 171-180.

Jacoby, J., "Consumer Research: A State of Art Review," *Journal of Marketing*, Vol. 42, 1978, 87-96.

Joreskog, K., "A General Approach to Confirmatory Maximum Likelihood Factor Analysis," *Psychometrika*, Vol. 34, 1969, 183-202.

Joreskog, K., "Statistical Analysis of Congeneric Tests," *Psychometrika*, Vol. 36, 1971, 109-133.

Joreskog, K., "Analyzing Psychological Data by Structural Analysis of Covariance Matrices," in R.C. Atkinson et al. (eds.), *Contemporary Developments in Mathematical Psychology*, Vol. 11, San Francisco: Freeman, 1974, 1-56.

Joreskog, K., and D. Sorbom, *Analysis of Linear Structural Relationships by Method of Maximum Likelihood*, Chicago: National Educational Resources, 1978.

Joreskog, K., and D. Sorbom (eds.), *Advances in Factor Analysis and Structural Equation Models*, Cambridge, MA: Abt Books, 1979.

Kanter, R.M., "The New Managerial Work," *Harvard Business Review*, November-December 1989, 85-92.

Keat, R., and J. Urry, *Social Theory as Science*, London: Routledge and Kegan Paul, 1975.

Klincewicz, J.G., "Solving a Freight Transport Problem Using Facility Location Techniques," *Operations Research*, Vol. 38, 1990, 99-114.

Knight, F.H., *Risk, Uncertainty and Profit*, New York: Harper and Row, 1921.

Lachenmeyer, C.W., *The Language of Sociology*, New York: Columbia University Press, 1971.

Lawley, D.N., and A.E. Maxwell, *Factor Analysis as a Statistical Method*, London: Butterworth, 1971.

Lawrence, P., and J. Lorsch, *Organization and Environment*, Boston: Harvard University Press, 1967.

Lee, S., *Managing I/S Planning and Design: A Control Theory Perspective*, Unpublished Doctoral Dissertation, Sloan School of Management, MIT, 1989.

Lee, S.B., and H. Luss, "Multifacility Type Capacity Expansion Planning: Algorithms and Complexities," *Operations Research*, Vol. 35, 1987, 249-253.

Levy, G.M., and E.S. Matz, "Choosing Strategic Objectives," in R.A. Silverman, ed., *Corporate Real Estate Handbook: Strategies for Improving Bottom-Line Performance*, New York: McGraw-Hill, 1987, 17-32.

Lofland, J., *Analyzing Social Settings*, New York: John Wiley & Sons, 1971.

Lord, F.C., and M.R. Novick, *Statistical Theories of Mental Test Scores*, Reading, Mass.: Addison-Wesley, 1968.

Luss, H., "Capacity-Expansion Model for Two Facility Types," *Naval Research Logistics Quarterly*, Vol. 26, 1979, 291-303.

Mason, L., and J.P. Combot, "Optimal Modernization Policies for Telecommunications Facilities," *IEEE Trans. Commun.*, COM-28, 1980, 317-324.

Mason, L.G., A. Girard, and X.D. Gu, "Multilocation Facility Modernization: Models and Heuristics," *Operations Research*, Vol. 38, 1990, 412-426.

McGrath, J.E., *Groups: Interaction and Performance*, Englewood Cliffs, NJ: Prentice-Hall, 1984.

McMahan, J., *Property Development*, New York: McGraw-Hill, 1989.

Miles, R.E., and C.C. Snow, *Organizational Strategy, Structure, and Process*, New York: McGraw-Hill, 1978.

Miller, D., and P.H. Friesen, "Archetypes of Strategy Formulation," *Management Science*, Vol. 24, 1978, 921-933.

Miller, D., and P.H. Friesen, "Innovation in Conservative and Entrepreneurial Firms: Two Models of Strategic Momentum," *Strategic Management Journal*, Vol. 3, 1982, 1-25.

Mintzberg, H., "Strategy making in three modes," *California Management Review*, Vol. 16, 1973, 44-53.

Mintzberg, H., *The Structuring of Organizations*, Englewood Cliffs, NJ: Prentice-Hall, 1979.

Nourse, H.O., *Managerial Real Estate: Corporate Real Estate Asset Management*, Englewood Cliffs, NJ: Prentice-Hall, 1990.

Ouchi, W.G., "A Conceptual Framework For The Design of Organizational Control Mechanisms," *Management Science*, Vol. 25, 1979, 833-848.

Peter, J.P., "Reliability: A review of psychometric basics and recent marketing practices," *Journal of Marketing Research*, Vol. 16, 1979, 6-17.

Petrie, H.G., "A Dogma of Operationalism in the Social Sciences," *Philosophy of the Social Sciences*, Vol. 1, 1971, 145-160.

Phillips, L.W., "Assessing Measurement Error in Key Informant Reports: A Methodological Note on Organizational Analysis in Marketing," *Journal of Marketing Research*, Vol. 18, 1981, 395-415.

Phillips, L.W., and R.P. Bagozzi, "On Measuring Organizational Properties of Distribution Channels: Methodological Issues in the Use of Key Informants," in *Research in Marketing*, Vol. 8, JAI Press, 1986, 313-369.

Popper, K.R., *Conjectures and Refutations*, New York: Harper Torchbooks, 1963.

Porter, M.E., *Competitive Strategy*, New York: The Free Press, 1980.

Porter, M.E., "The Contributions of Industrial Organization to Strategic Management," *Academy of Management Review*, Vol. 6, 1981, 609-620.

Pyhrr, S.A., and J.R. Cooper, *Real Estate Investment: Strategy, Analysis, Decisions*, New York: Warren, Gorham and Lamont, 1982.

Redman, A.L., and J.R. Tanner, "The Financing of Corporate Real Estate: A Survey," *The Journal of Real Estate Research*, Vol. 6, 1991, 217-240.

Rumelt, R.P., *Strategy, Structure and Economic Performance*, Cambridge, MA: Harvard University Press, 1974.

Salancik, G.R., and J. Pfeffer, "The bases and Use of Power in Organizational Decision Making: The Case of a University," *Administrative Science Quarterly*, Vol. 19, 1974, 453-473.

Schendel, D.E., and C.W. Hofer (eds.), *Strategic Management: A New View of Business Policy and Planning*, Boston: Little, Brown, and Co., 1979.

Schoonhoven, C.B., *Organizational Effectiveness: A Contingency Analysis of Surgical Technology and Hospital Structure*, Unpublished Doctoral Dissertation, Stanford University, 1976.

Schoonhoven, C.B, "Problems with Contingency Theory: Testing Assumptions Hidden Within the Language of Contingency," *Administrative Science Quarterly*, Vol. 26, 1981, 349-377.

Schwab, D.P., "Construct Validity in Organizational Behavior," In B.M. Staw and L.L. Cummings (eds.), *Research in Organizational Behavior*, Vol. 11, Greenwich, CT: JAI Press, 1980.

Seidler, J., "On Using Informants: A Technique for Collecting Quantitative Data and Controlling for Measurement Error in Organizational Analysis," *American Sociological Review*, Vol. 38, 1974, 816-831.

Shulman, A., "An Algorithm for Solving Dynamic Capacitated Plant Location Problems With Discrete Expansion Sizes," *Operations Research*, Vol. 39, 1991, 423-436.

Silk, A., and M. Kalwani, "Measuring Influence in Organizational Purchase Decisions," *Journal of Marketing Research*, Vol. 19, 1982, 165-181.

Silverman, R.A., ed., *Corporate Real Estate Handbook: Strategies For Improving Bottom-Line Performance*, New York: McGraw-Hill, 1987.

Soland, R.M., "Optimal Plant Location With Concave Costs," *Operations Research*, Vol. 22, 1974, 373-385.

Steers, R.M., *Organizational Effectiveness: A Behavioral View*, The Goodyear Series in Management and Organizations, Santa Monica, CA: Goodyear, 1977.

Thompson, J.D., *Organizations in Action*, New York: McGraw-Hill, 1967.

Tosi, H., R. Aldag, and R. Storey, "On the Measurement of the Environment: An Assessment of the Lawrence and Lorsch Environmental Uncertainty Subscale," *Administrative Science Quarterly*, Vol. 1, 1973, 27-36.

Veale, P.R., "Managing Corporate Real Estate Assets: Current Executive Attitudes and Prospects for an Emerging Discipline," *Journal of Real Estate Research*, Vol. 4, 1989, 1-22.

Venkatraman, N., *Strategic Orientation of Business Enterprises: The Construct and Its Measurement*, Unpublished Doctoral Dissertation, School of Business, University of Pittsburgh, 1985.

Venkatraman, N., "Strategic Orientation of Business Enterprises: The Construct, Dimensionality, and Measurement," *Management Science*, Vol. 35, 1989, 942-962.

Venkatraman, N., "Performance Implications of Strategic Coalignment: A Methodological Perspective," *Journal of Management Studies*, Vol. 27, 1990, 19-41.

Venkatraman, N., and J.H. Grant, "Construct Measurement in Strategy Research: A Critique and Proposal," *Academy of Management Review*, Vol. 11, 1986, 71-86.

152

Venkatraman, N., and V. Ramanujam, "Measurement of Business Performance in Strategy Research: A Comparison of Approaches," *Academy of Management Review*, Vol. 11, 1986, 801-814.

Venkatraman, N., and V. Ramanujam, "Measurement of Business Economic Performance: An Examination of Method Convergence," *Journal of Management*, Vol. 13, 1987, 109-122.

Van de Ven, A.H., and D.L. Ferry, *Measuring and Assessing Organizations*, New York: Wiley, 1980.

Werts, C.E., R.L. Linn, and K. Joreskog, "Quantifying Unmeasured Variables," In *Measurement in the Social Sciences: Theories and Strategies*, edited by H.M. Blalock, Chicago: Aldine, 1974, 270-292.

Woodward, J., *Industrial Organization: Theory and Practice*, London: Oxford University Press, 1965.

Zeckhauser, S., and R.A. Silverman, "Rediscover Your Company's Real Estate," *Harvard Business Review*, January-February 1983, 111-117.