THE IMPACT OF CORPORATE INTERLOCKS ON POWER AND CONSTRAINT IN THE TELECOMMUNICATIONS INDUSTRY

THESIS

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requiremenst

For the Degree of

MASTER OF SCIENCE

By

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Denton, Texas
December, 1992

Hickerson, Jon D., The Impact of Corporate Interlocks on Power and Constraint in the Telecommunication Industry. Master of Science (Public Address and Communication), December, 1992, 78 pp., 88 titles.

Using the tools of structural and network analysis developed by Ronald R. Burt and others, this study investigated the communication patterns among corporate officers of American Telephone and Telegraph Corporation (A.T. & T.) and United Telecommunications Corporation (Sprint). Data on contacts, efficiency, network density, and constraint indicate that opportunities for power and constraint have remained relatively stable at United Telecommunications between 1980 and 1990. A. A.T. & T., on the other hand, was more affected by the drastic changes in the telecommunication industry. The span of A.T. & T. has grown smaller and the potential for constraining relations among A. T. & T. and financial institutions has increased during the period 1980 and 1990.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

The national economy of the United States can be seen as a network of relations among individual corporations, firms, and market sectors that comprise the total system and in turn function as both vendors and consumers of products and services. Within this system the communication industry maintains a central position by providing the media through which products, information, and services are discussed (Wigand, 1982) and in many cases developed by individual firms and market sectors. In the study of communication, the communication industry, particularly the telecommunication industry is of special interest, since it provides the media, products, and technology which link the national economy and provide the national communication infrastructure.

In addition to being the provider of the basic communication media, these communication service providers are also actors within the economy and as such have their own needs for information about the economic environment, and their relative position and power within that environment. Since the Carterfone decision of 1968, which allowed the introduction of non-A. T. & T. equipment into

the A. T. & T. network, and the subsequent court mandated divestiture by A. T. & T. of its long standing Bell System monopoly in 1984, the communication industry has changed while the demand for services has grown and prices in the market have fallen by almost 45% (Gross, 1990). While these changes have allowed more organizations the opportunity for entering the market and a wider market for the communications industry, it has also created uncertainty and a need for information within the industry. The period of this change in the telecommunications industry was characterized by traumatic structural changes that affected the competitive environment and the industry's relationship with organizations and investors throughout the economy. Research has led us to expect that as these changes occurred corporate strategies would also change in response to the shocks affecting the industry (Huff, 1982; Burt, 1983). One strategic area which would be expected to change would be the need for information about the new environment and how the organizations could best cope with these changes. A means long used by corporations to seek information about the environment has been through its board of directors and the interlocking of boards of directors (Mace, 1971; Pennings, 1980). Interlocking is described, in this case, as a relationship between business firms where an executive or board member of one firm also sits on the board of another firm. The boards on which these executives sit can

provide a venue for the communicating and verifying of needed environmental information.

Corporate boards of directors and interlocking directors have been the interest of scholars, politicians, and government officials since the beginning of the 20th century (Brandeis, 1914; Bunting, 1977; Kolz, 1978; Burt, 1983; Mace, 1971; Mizruchi, 1982). This interest and investigation has gone beyond simply investigating the required duties of the board, the control and legal representation of the organization, into how and why the individual boards and their members communicate with one another and the structure of their interactions (Levine, 1972; Pfeffer & Salancik, 1978; Norich, 1980; Gogel & Koening, 1981; Burt, 1982; Burt 1983). The boards have also been seen as a means of coopting other organizations for economic resources or for control of resources (Burt, 1983). Selznick (1949) best defined cooptation in organizations as, "the process of absorbing new elements into the leadership or policy-determining structure of an organization as a means of averting threats to its stability or existence".

In addition to the coopting dimension of interlocking boards, a structural dimension of these interlocks has also been well established and described in recent research (Lang & Lockhart, 1990; Burt, 1983; Mokken & Stokman, 1979). These interactions have also been described as an attempt by corporate executives to gain information, through their

communication, about the environment and thereby operate as boundary spanning individuals within the system (Pennings, 1980). In this instance, the boundary spanning role is occupied by an individual functioning as a link between the environment and other organizations and their primary organization. These boundary spanning individuals can be described as conduits into the organization for information from and about the environment.

If these executives see their role on boards of directors, other than their own, as a viable and worthwhile means of communicating environmental information, then the development, structure, and maintenance of these inter-organizational networks could be of interest in the study of communication.

Purpose of the Study

The purpose of this study is to investigate the structure of the communication patterns among corporate officers of American Telephone and Telegraph Corporation and United Telecommunications Corporation (Sprint) and the interlocking boards on which they serve. The interaction of the corporate officers of the interlocking organizations and the boards on which they in turn serve will then be analyzed, to examine the extent of the overall individual networks of the A. T. & T. and United Telecommunications executives. The intent is to attempt to discover if the

structure of these relations has changed over time in response to the environmental changes since the forced divestiture of the regional Bell operating companies from the A. T. & T. organization and how these changes have had the potential to provide each organization environmental information important to its operations. The exclusion of MCI, General Telephone and Electronics (GTE), and other local and long distance carriers from this study is addressed in Chapter 2.

The definition of interlocking used in this study differs from several previous definitions of corporate interlocks (Allen, 1974), but is in line with researchers such as Fennema and Schijf (1979), and Warner and Unwalla (1967). The definition used here follows that used by Galaskiewicz & Wasserman (1981), and defines an interlock as a situation where an executive of one organizations sits on the board of another organization. The direction of the interlock emphasizes the direction from which potentially useful information flows. Mace (1971) describes how outside directors are often privy to confidential corporate information during board meetings, and as Pennings (1981) points out, corporate executives often serve as agents of information flow into their own organization.

Background of Corporate Interlock Research

A variety of research has centered on the network of interlocking directorates that tie the corporate system in the U.S. Basically these orientations can be grouped into four major topic areas: management and control; environmental control; financial control; and management elitism. A summary of the four major areas is presented below.

Management and Control

The management and control concentration broadly focuses on the belief that the board is appointed by corporate management and is used by them for advice, business contacts, critiques on the business operation, and prestige, by having certain individuals on the board of directors (Mace, 1971). The management and control advocates present the case that decisions are made by corporate executives or insiders on the board not by those considered outsiders, or individuals who do not hold a management position within the organization. Galbraith, (1967) stresses the idea of control coming through the technical expertise certain individuals posses rather than by simply being an outside director. Zald (1974) examined the technical expertise of interlocking directorships and argued that the balance of resources for specific situations

and decisions required by the board determines individual power on and of the board.

Corporate management is alleged to use the power of proxies to control the board membership (Smaby, 1974) and thereby selects those individuals from outside the board that will be most agreeable to the wishes and ideas of corporate management (Palmer, 1983). Outside directors elected to the board do,y however, bring an expertise and perspective which enables them to bring to the attention of corporate directors ideas, solutions, and possible problems they may be too close to in their daily operation to notice (Dahl, Haire, and Lazersfeld, 1959; Gordon, 1961; Mace, 1971; Copeland and Towl, 1968).

Environmental Control

Research based on the environmental control of corporate boards of directors and their desire to enhance that control grounds its investigations on the belief that trade and coordination are the primary motives for corporate interlocks and the patterns of competition and trade will follow that interlock pattern (Pelz & Andres, 1964; Pfeffer, 1972). These studies stress the fact that interlocks are used by corporate management to facilitate cooperation between organizations for their mutual benefit (Allen, 1974). Corporate interlocking enables the limitation or negation of potentially disruptive influences in the

environment or interference from other organizations with whom scarce resources must be competed for or shared. Boards of directors are used when contracts provide insufficient protection, control, and information, or where overt integration or corporate coupling may be illegal of impossible. Advocates of the environmental control perspective argue that corporate interlocks provide a network of links through which agreements for the sharing of resources is possible through board coordination and as a place where the coordination of policies beneficial to the linked organizations can be decided upon (Clawson & Neustadtl, 1989; Clawson, Neustadtl, & Bearden 1986). Proponents of the environmental control description of interlocking boards point out that in spite of the federal prohibitions against anti-trust activities the Federal Trade Commission has found that over ten percent of all interlocks was with a potential competitor and that in interlocks with a third firm involved the potential raises to 80% (Vance, 1964).

Financial Control

Financial control and the search for and control of capital has been one of the most studied and analyzed perspectives regarding interlocking boards of directors (Galbraith, 1971; Pfeffer and Salancik, 1978; Mintz & Schwartz, 1985). This area of study supports the premise

that corporations remain dependent on large financial institutions for short-term capital (Mariolis, 1975; Gogel, & Koening, 1981). This position is founded on the economic concept that rapidly changing needs for capital cannot be met through the internal raising of capital and corporations require access to bank and insurance companies for financial support (Aaronovitch, 1961). Interlocking by corporations with financial organizations helps to stabilize the problem of access to capital required for business activities. Financial institutions take the interlocking with organizations to their advantage by arranging agreements with the interlocking organizations to arrange profitable long-term borrowing agreements and some amount of capital dependence from the interlocked organization (Kolz, 1978). Interlocking arrangements are devices for control and the manipulation of investments by financial institutions (Perrucci & Pilisuk, 1970). This point of view predicts that cliques of interlocked firms tend to have financial power at the center of the network control workings.

In their 1981 study, Mintz and Schwartz used data on interlocking directorates to test three theories of corporate organization: Managerialism, environmental control, and financial control. Their findings suggest that corporations are not autonomous operating entities as suggested by managerialism, that businesses do not form changeable alliances which pursue mutual interests, as

suggested by the elitist point of view, and that interest groups of traditional financial/capitalist theory do not characterize the modern interlock network. What they did find was that the system appears to be dominated by a few interlocked New York commercial banks and insurance companies which are at the center of an integrated national network.

Elitist Research

Research investigating boards of directors from the previous schools of thought have looked at the director's public rationale for developing interlocks. Interlocking boards are seen as basically task or professionally oriented behavior with little or no expressive of symbolic components for individuals serving on these boards. Previous theories seek to explain interlocking boards in terms of the goals and expectations of the organizations while ignoring personal goals. The elitist or class hegemony view, emphasizes the participation in business by upper classes who develop interlocking boards of directors for reasons such as class cohesion, consensus building, or for family reasons (Domhoff, 1967; Mills, 1957).

The elitist perspective sees being on a board of directors as a means of validating social and economic viewpoints by sharing common life experiences, sharing common definitions of right and wrong, and sharing a common

view of reality in general. These participants often share similar experiences in clubs, charitable organizations and educational institutions. A result of this multiple participation is the maintenance of communication channels through which business deals can be discussed and lobbied for when needed. With a common class orientation, intense competition can be discouraged and the long range position of the circle of insiders can be secured. A model of this type of position predicts that interlocking boards should be based on social ties and on class or ethnic background. Thus, small groups or cliques should follow the ties in elite social organizations and upper class consensus groups.

An analysis postulated by Useem (1979) further reduced the social class thesis into two groups. The first group was made up of individuals who were owners or top managers of several major corporations. The second group consisted of those who were connected with only a single major corporation. Useem analyzed over 2,000 directors from 797 corporations and determined that the first or inner group were more often also involved in the governance of institutions other than just business organizations than the second group. This study indicated that the higher participation rate of inner group members was at least partly a result of their capacity and influence to mobilize greater resources and their involvement in a common social network. The evidence supported the idea that the business

elite was differentiated along two groups with respect to the selection of business people assisting in other organizational governance.

This inner group, by implication, may be an important and obviously influential source of political leadership capable of promoting the more general interests of the entire capitalist/management class. Other studies concerned with the elite within the elite report similar findings although their definitions of this special elite group varied across the studies (Wagner & Abegglen, 1955; Newcomer, 1955; Bendix & Howton, 1957; Ornstein, 1984; Mizruchi, 1989).

Directional Interlocks

The direction of the interlock in this study is important in understanding the span the corporate executives wish to reach by their involvement on other boards. Interlocks are usually considered to be of two types: nondirectional and directional. Nondirectional interlocks occur when an individual who is not an executive of a firm sits on the board of another organization. Also, organizations are classified as indirectly interlocked when they share a director who is an officer of a third organization. Directional interlocks differ in that a full-time executive of one organization also sits as an outside director on the board of a second. (Bacon and Brown,

1977). Both types of interlocks fulfill integrative functions, but only the directional interlocks should be conceived to fulfill the functions of control or perhaps cooptation. Kolz (1978) and Pennings (1980) present the case that in regards to control, information, and cooptation, nondirectional interlocks can logically be considered to link organizations largely by accident. Vance (1983) noted that most research on interlocks has not considered the executive interlock. Other research has demonstrated that the number of executive interlocks in the U.S. is worthy of study (Useem, 1982) and the importance of these types of interlocks was demonstrated by Bearden, Atwood, Freitag, Hendricks, Mintz and Schwartz (1975).

The direction of the interlock flows from the executive of one firm into the board of directors of a second firm. Executives of the first firm, in this case A.T. & T. or United Telecommunications, owe their primary allegiance to the organization which employs them. While they are acting in the capacity of a board member they remain an executive of and responsible to their primary organization. By being on this second board, they are in a position to encounter more useful information for their organizations than the second organization receives from them. It is true that these executives may also gain prestige from their association with the second organization or may bestow prestige on that organization, but these aspects are

secondary to communication and information gathering.

The firm sending a directional executive interlock is sending a participant into the decision making process of the second organization's board of directors and intercorporate influence logically flows in the direction of that interlock (Norich, 1980; Mintz, and Schwartz, 1985; Stearns and Mizruchi, 1986). Mace (1971) also describes how corporate policy in most corporations dictates the need for approval from the organization when corporate executives are invited to become a board member in outside organizations. From this point of view the sending organization is the primary recipient of the power and influence relationship in this arrangement and realizes more information that the receiving board (Richardson, 1987).

Boundary Spanning Individuals

"Boards of directors are, by their very nature, boundary-spanning units; their members perform important duties in the management of the organization's interactions with its environment." (Pennings, 1980). Significant research shows that individuals acting in boundary spanning roles are an important channel for linking their organization to external sources of information (Aldrich & Herker, 1977; Coleman, Katz, & Menzel, 1966; Tushman, 1977; Rogers & Shoemaker, 1971). Boundary spanning individuals function in two roles. The first role is information

processing and gathering, the second role is that of organizational representative. Information from external sources enters an organization through boundary spanning individuals and these individuals link the organization to various outside elements (Aldrich & Herker, 1975). Organizations, especially complex and highly bureaucratic organizations, need information to judge the resources required to meet its goals (Thompson, 1967). Capable organizations require information and have the ability to learn from this information and thereby perform according to the changing uncertainties in the environment to meet their objectives (Terreberry, 1968).

Galaskiewicz and Wasserman (1989) posit that organizations, through their managers, will use the information gathered through extraorganizational networks to decide on how to relate to other organizations in their environment and to achieve organizational goals. Personal contacts across the bounds of the organization itself can be useful in overcoming the uncertainty associated with some kinds of transactions (Granovetter, 1985). Ties across organizational boundaries can be channels through which ideas and information flow into organizations within a particular field or organizational area (Adams, 1976; Allen, 1970; Allen & Cohen, 1969). Decision makers are more likely to employ and learn from those whom they know and trust and it is though the networks of these boundary spanners that

they establish knowledge and trust of certain individuals and their organizations (Galaskiewicz, Wasserman, Rauschenback, Bielefeld, & Mullaney 1985).

The individuals acting in boundary spanning roles are exposed to large amounts of environmental information. This information may be of use to the organization immediately, or it may be of use at a later time. The expertise in selecting what information is of strategic or tactical consequence is as important as the exposure to the information. This is one reason inside executive directors are the main interest in this study. Executives within the organization are better placed and more attuned to the needs of their own organization in its requirement for information and therefore have more expertise in sorting, gathering, and interpreting that type of information.

Information and Uncertainty

A challenge to any business organization is the ability to cope with high levels of uncertainty (Thompson, 1967). Building on information theory as presented by Shannon & Weaver (1949), and Rogers and Kincaid (1981), information is a means for reducing that uncertainty. This idea supports the need for an intermediary function in organizational communication between the uncertainty posed by the environment and the need for organizational effectiveness in the environment (Kapp & Barnett, 1983). Thus, some

communication activities span the boundaries of an organization and provide information that reduces the environmental uncertainty and increases organizational effectiveness (Lawrence & Lorsch, 1967).

Interorganizational integration through interlocking boards is viewed as a cooperative strategy between organizations for reducing uncertainty in their environments (Burt, 1983). Corporate interlocking provides a means of anticipating, avoiding, or controlling sources of uncertainty from the potential disruptions of other organizations. Financial corporations have been proven to maintain more interlocking relations that nonfinancial corporations due to the importance of capital (Norich, 1980; Mariolis, 1975). However, no clear relationship has been demonstrated between capital intensity and growth and the interlocking with financial corporations (Allen, 1974).

Other Perspectives

While the current study is anchored in network analysis, one approach to the structural analysis of organizations, other perspectives on communication and organizations merit mention here. Morgan (1986) contends that a number of metaphors are useful when studying organizations: organization as machine, organization as brain, organization as culture, and organization as political system.

A cultural perspective on organizations, sometimes linked to a critical or interpretive view of organizations (Mumby, 1987; Putnam & Pacanowsky, 1987; Tompkins & Cheney, 1985), explores the manner in which ideology, myths, narratives, and unobtrusive control may function in an organization.

Monge and Eisenberg (1987) favor network analysis as a way of fusing the best of three approaches to the study of organizations: the positional tradition, the relational tradition, and the cultural tradition. Burt (1983) points out the usefulness of structural analysis as a means of determining the exact nature of the structure of the organization as it exists. In contrast to qualitative research where the researcher begins with certain assumptions or must structure the research based on their own criteria, structural analysis describes the organization in a quantative manner which is applicable across other organizations regardless of their size or functional requirements. Structural analysis allows the researcher to describe the organization in a mathematically based concise and consistent manner which allows for comparison to other organizations. Structural analysis establishes a format and manner of looking at organizations that is absolute in its approach and constant in its reporting.

Summary of Review

As organizational interdependencies have had greater influence on organization performance, interlocking strategies seem to have become a more import of an attempt to remain competitive (Aldrich, 1979; Astley, 1984; Bresser & Harl, 1986; Pennings, 1981). Previous research leads us to expect that firms change their interorganizational strategies in response to structural changes in the industry (Huff, 1982; Burt, 1983). Research concepts about interorganizational relationships and organizational strategy have been based on cross-sectional research with an economic sector or industry as the unit of analysis (Burt, 1983; Palmer, Friedland, & Singh, 1986). The problem of drawing individual corporate level inferences from such broad based data is well recognized and these inferences do not always conform to the understanding of strategy at an organization-specific level (Lang & Lockhart, 1990). Various researchers have called for more time-dependent, dynamic analysis of interorganizational arrangements so analysis could go beyond static restrains of cross sectional design (Granovetter, 1985; Pfeffer, 1987; Bearden 1986).

The thought that organizational uncertainty is derived from a failure to understand the environment and from interdependence with elements of the environment has been advanced by Thompson (1967). Competitive relationships and resource exchange relationships create networks of

interdependencies as well as uncertainties for organizations. Organizations often establish ties among themselves to cope with these uncertainties. One benefit of these linkages is the acquisition of information on the actions of other organizations within the environment (Pfeffer & Salancik, 1978). These authors saw the establishment of communication links as necessary but not a sufficient condition for further cooperative efforts as mergers, acquisitions, and joint ventures.

Previous research has suggested that links between boards of directors enable organizations to facilitate both resource exchange agreements and beneficial coalitions (Aldrich & Whetten, 1981; Burt, 1980; Pfeffer, 1972). This network through interlocks is thought to reduce external constraints by facilitating cooperation with customers, suppliers, and competitors (Burt, 1980; Granovetter, 1985). This research has also supported the belief that executives and board members of organizations reduce the environmental uncertainty facing them by functioning as boundary spanning individuals in search of information and support for their organizations (Mace, 1971; Pennings, 1980).

Research Questions

Based on the review of the previous research on interlocking boards of directors and the reported need by organizations for critical environmental information, and

possible constraint posed by outside organizations to each of the two networks, the following four research questions are proposed. Research questions rather than hypotheses were developed for several reasons. Previous research has focused primarily on an economic segment or an entire industry and has not investigated the process of interlocking directors at the individual firm level. This lack of firm level research makes the generalizability of hypotheses to other organizations impossible at this time. The large change in the distribution of assets of A. T.& T. following divestiture makes it difficult to analyze the exact magnitude of the changes within the telecommunications industry and their impact on that organization. Finally, the extremely large differences in structure, organization, and financial assets between A. T. & T. and the other actors in this industry makes comparisons across the industry impossible.

(RQ1) Has the opportunity for occupying a position of potential power within the network of relations changed from 1980 to 1990 across the market segments represented within the respective networks of A. T. & T. or United Telecommunications?

(RQ2) Has the structure of the networks of A. T. & T. and United Telecommunications changed in its potential for

constraining relationships relative to the financial institutions on each board from 1980 to 1990?

(RQ3) Has the span of the two specific organizations reached into a greater number of market segments during the 1980 to 1990 time frame?

(RQ4) Has the potential relative constraint or opportunity posed by the financial sector within the two target organizations' networks changed during the study period?

CHAPTER TWO

METHODOLOGY

The Data

The data for this study was compiled from Dun & Bradstreet, Reference Book of Corporate Management, 1979-1980; Dun & Bradstreet: New York 1979; Standard and Poor's Register of Corporations, Directors, and Executives; Standard and Poor's: New York, 1980 and 1990; Dun & Bradstreet's Million Dollar Directory; Dun & Bradstreet: New York for 1980 and 1990; Fortune magazine June 3, 1991.

American Telephone and Telegraph and United Telecommunications Corporation were chosen for this study because of their similarity both before and after the 1984 divestiture. MCI was not included in this study because of its relative recent entry into the telecommunications industry, its primary focus being limited to the long distance market, and its absence from the local carrier market. General Telephone (GTE), a major competitor in the local carrier market and a past majority owner of U.S. Sprint, was excluded because of its apparent shift away from the long distance market and its concentration on supplying other services in the industry. Only A.T.& T. and United Telecommunications were determined to have a similar enough structures in their corporation and business background and

their current position in the telecommunications market to make comparisons meaningful.

The time frame of 1980 to 1990 was selected because of the almost equal interval before and after divestiture. Furthermore, Richardson (1987) points out that, the average tenure on corporate boards of directors in the U.S. is 4.5 years. Both corporations before 1984 provided local telecommunications services through their local operating corporations (22 for A.T.&T., 25 for United Telecommunications) while A.T. & T. provided long distance services through its Long Lines Division. United Telecommunications entered the long distance market by gaining control of Sprint. Both corporations before 1984 were regulated at both the federal and state levels. While A.T.&T. was by far the leader in sales with $41,000M to $1,433M by United Telecommunications, the two corporations were both in the top ten telecommunications providers according to the FORTUNE 500 ratings.

Following 1984 for A. T. & T., and 1987 for United Telecommunications, both corporations began to concentrate on their Inter Exchange carrier business as the prime focus of their corporation. The Fortune 500 (1991) placed A.T.& T. first and United Telecommunications sixth in its rankings of 1990 Diversified Service Companies.

Common Symbols Used

Because there are a variety of symbols used in the analytic models discussed below, a short list of the most frequently used symbols is presented here.

- i — A general symbol used to reference a corporate actor which sends board members to other corporations (rows in the matrix).
- j — A general symbol used to reference a corporate actor whose board is the recipient of a member from corporation i.
- Z — A matrix of corporate interlocks.
- z_{ij} — A cell in matrix Z representing a relationship from corporation i to corporation j.
- k — A network of corporate interlocks constructed around some specific relational content (e.g., among telecommunications corporations).
- q — Any other corporate actor in network k whose relationship with corporate actors i and j needs to be considered in some particular structural model (e.g., see models of corporate constraint discussed below).

Analyses

Data were analyzed using STRUCTURE Version 4.2 (Burt, 1991). Joint involvement data, based on the boards of directors of the two corporations defined, were compiled for

input into the STRUCTURE program. Joint involvement data infers relations among "actors" from their involvement in similar events or their affiliations with similar groups. The joint involvement data in this study identified persons on boards of directors as individual "events" and the corporations on which they serve as board members as "corporate actors". Two corporate actors i and j are tied together to the extent they share affiliation with the same event, or board member (Burt, 1991). Networks are created by defining the events within the network and then aggregating the weight of events in which each pair of corporate actors is involved. From this data, the strength and the potential for influence or constraint of the interlocking ties among these "actors", or corporations in this case, can be calculated as a metric measuring the number of directors they have in common.

Events were weighted in inverse proportion to the number of corporate actors involved in an event. The weighting was used in order to reduce the impact and any skew to the data set from its revolving around the selection of A. T. & T. or United Telecommunications as the center of the data set. In data on participants on boards of directors, this type of weighting emphasizes exclusive groupings of few individuals. The data were also transformed into a row stochastic model before the analysis. A row stochastic matrix is one in which the measure of

relations is calculated so every row totals 1.0 and therefore becomes a proportional measure of the relations within the matrix. This type of modeling is relevant in stressing the possible contact flows through a particular data set and eliminating differences between corporate actors in any aggregate tendency to respectively send, receive, or send and receive relations (Burt, 1991). A (0.1) level of tolerance on all transformations was used throughout the analysis.

Joint Involvement Relations

Measuring Relations through Joint Involvement

The measurement of relations using joint involvement data concerns determining the relations that individual corporate actors within the data set share and thereby form a communication network. The first step in the analysis is to sum across all events in which corporation i and corporation j are both involved, thus (f_{im}) is the frequency of corporation i's affiliation in event (m) and where the smaller of (f_{im}) and (f_{jm}) is determined as the frequency of their joint affiliation:

$$z_{ij} = z_{ji} = \sum_{m} \min(f_{im}, f_{jm}) \qquad (1)$$

Since all involvements in events (m) are binary, (f_{im}) either equals 0 where a corporate actor is not involved in

the event, or equals 1 when corporation i is involved in the event. When using this type of data set, element (z_{ii}) is the number of events where corporate actor i is involved and (z_{ij}) is the number of events in which both corporation i and corporation j are involved.

Measuring Power from Joint Involvement Data

Power concerns the ability of a corporation to dominate a system of contacts within its own network. A corporation which is the object of relations has something demanded by, or of value to, all others in the network who send relations. This focus by other corporations makes the corporation prominent and thereby provides some measure of power. In this study, power is discussed through four principal measures.

Extensive Relations. The first indicator of corporate power is a measure of extensive relations in the network to corporation i. This is accomplished by weighting relations in the network by their strength.

$$\text{Extensive relations: corporation } i = \sum_j \left[z_{ji} / \max(z_{jk}) \right] / (N-1) \qquad (2)$$

Extensive relations can vary from 0, where corporation i receives no relations, to 1 where corporation i is the object of a maximum strength relation from all other

corporate actors in the network. In the above equation, the section within the parenthesis is a measure of the j to i relations divided by the greatest relation j has to any other corporation within the network. In large networks having a number of cliques, measures of extensive relations may be misleading when a particular member of a clique has a high score of extensive relations but all other members of that particular clique also have a high score.

The term, extensive relations, is used to describe a measure of the breadth of relations a corporation receives as compared to all other corporations within the network. Extensive relations are concerned only with the number of relations a corporation is the object of and not with the relative strength or weakness of those relations. In the study of corporate interlocks, a corporation may have an extensive number of relations with other corporations, but those other corporations may also have extensive relations. In such a case, the corporation would, in fact, not realize a high degree of power within the network through simply being the object of similarly connected corporations.

Exclusive Relations. The next measure of power is that of exclusive relations to corporation i.

$$\text{Exclusive relations: corporation } i = \sum_j \left[z_{ji} \,/\, \sum_k z_{jk} \right] \,/\, (N-1) \quad (3)$$

In this measure the proportion of corporation j's time and energy invested in interacting with other corporations across the network is compared to that of j's time and energy allocated to interacting with corporation i. The extent to which corporate actor i is the object of exclusive relations from all others in the network is determined. The measure varies from 0, where i receives no relations, to 1, where i is the only contact for all other corporate actors in the network. In this equation, the measure within the brackets contains the proportion of j's network time and energy allotted to its interaction with corporation i. A problem with this measure is that weak corporate actors and powerful corporate actors contacting corporation i within the network are not differentiated. The real power of corporations comes more from having exclusive relations with other powerful corporations rather from relations with weak corporations within their network of contacts.

Power. If a discussion of corporate power were to look only at exclusive relations of a corporation the power of that corporation could be misinterpreted. A. T. & T. could have a high derived measure of exclusive relations, but these relations are with corporations of relatively little power and therefore A. T. & T. could, in fact, be very limited in its ability to exercise any real power within the network.

This problem can be overcome by weighting exclusive relations by the power of their originating point or corporation such that a corporation is powerful to the extent that it is the object of exclusive relations from other powerful corporations. Thus, the real power of a corporation, such as A. T. & T. or United Telecommunications comes from the extent that the corporation is the object of exclusive relations from other corporations with power.

$$\text{Power: corporation } i = p_i = \sum_j \left[z_{ji} / \sum_k z_{jk} \right] p_j \qquad (4)$$

where the sum is across all corporate actors within the network including the corporation i. In this equation, the relation within the brackets is a proportion strength relation from corporation j to corporation i. This measure is an indicator of the extent to which corporation i has an exclusive relation from corporation j. Corporation i receives its power from its extensive relations with another powerful corporate actor, corporation j.

Reflected Power. One final measure of power that needs to be presented for an understanding of the measures used in this study is that of reflected power. Following the distinction between derived and reflected power developed by Mizruchi, Maroilis, Schwartz, and Mintz (1986), power is derived from two parts. The first part is the result of

corporation i receiving relations that corporation i does not reciprocate. The second part comes from mutual relations, or corporations that i contacts and who in turn contact corporation i. The second part is reflected power, meaning that the mutual relation between the two corporation reflects power on one another. The equation below is the percentage of corporations i's power that is reflected:

$$100 * \sum_j z_{ij} z_{ji}, \; j \neq i \tag{5}$$

where z_{ij} is the same row stochastic relation from corporation i to corporation j used to compute power in the previous power equation.

The product is the portion of corporations i's total interaction that is allocated to corporation j and comes back through the strong relation of j to i. One hundred minus the derived amount is the percentage of corporation i's power that is derived from relations the corporation receives but does not reciprocate. This is the percentage or corporation i's power that is reflected, not the level of reflected power. The level of reflected power is equal to (p_i) times the percentage reflected, divided by 100.

Measuring Constraint from Joint Involvement Data

Constraint is concerned with the relations among corporations and is defined through ratio measures based on the ties between individual corporate actors. A corporation is constrained in its relations with a second corporation by the time and energy it devotes to their relationship to the detriment of the time and energy available for relations with other corporations in its network of contacts. Any corporation which has a limited number of contacts in its network and concentrates more time and energy on a specific corporation in that network is said to be constrained by that particular relationship.

Constraint varies from a maximum of 1, where the corporation has only one contact to a minimum of 0 where the corporation has many, disconnected, easily replaceable contacts. In order to understand the analysis of constraint posed by some corporations on other corporations within the network, a number of types of relationships and measures must be defined.

Number of Contacts. The first and easiest measure of constraint to understand is the total number of contacts a corporation has within the network. Total contacts are simply the total number of individual contacts within the network with which the corporation i has some type of tie.

Nonredundant Contacts. The second measure is that of nonredundant contacts. Nonredundant contacts are the number of independent contacts with other corporations within each corporation's network. If the corporation has contacts, this varies from 1 where each of the contacts is strongly tied to each other, to N when each contact does not have a connection with any other corporation.

$$\text{Nonredundant Contacts} = \sum_j \left[1 - \sum_q p_{ij}\, m_{jq} \right], \quad q \neq i,j \tag{6}$$

When all contacts are summed across all of corporation i's N contacts, p_{iq} is the proportion of i's network time and energy invested in the association with (q), or the interaction time with (q) divided by the sum of all of i's relations.

$$p_{iq} = (z_{iq} + z_{qi}) \; / \left[\sum_j (z_{ij} + z_{ji}) \right], \quad i \neq j \tag{7}$$

In Equation 6, m_{jq} is defined as the marginal strength of the relation from corporation j to q or the interaction with q divided by the strongest relationship of j to anyone in the network:

$$m_{jq} = (z_{jq} + z_{qj}) / \max\, (z_{jk} + z_{kj}) \tag{8}$$

where $\max(z_{jk} + z_{kj})$ is the largest of the relations corporation j has with anyone in the network ($0 \leq m_{jq} \leq 1$).

Contact Efficiency. Contact efficiency is another measure of involvement within a network or relations. Contact efficiency is simply the number of nonredundant contacts, as discussed above, divided by the total contacts:

$$CE = (NC) \; / \; C \tag{9}$$

where CE equals contact efficiency, NC is the number of nonredundant contacts, and C is the total number of contacts.

Network Density. Next, the measure of network density should be discussed. Network density is the average marginal strength of relations between contacts:

$$\text{network density} = \left[\sum_j \sum_q z_{jq}/\max(z_{jk}) \right] / \left[N(N-1) \right], j \neq q \tag{10}$$

where $\max(z_{jk})$ represents the maximum of j's relations to anyone, so density will vary from 0, where no relations between contacts exist, to 1, where the maximum strength relations between all contacts exist.

Proportional Density. Akin to the measure of network density, is the measure of proportional density. Proportional density is the proportion of contact pairs in the network that have some kind of connection with one another.

$$\text{proportional density} = \sum_j \sum_q \delta_{jq}) \; / \; N(N-1) \quad j \neq q \tag{11}$$

where δ_{jq} is 1 if z_{jq} is nonzero, or 0 if z_{jq} is 0. This proportional measure varies from 0, where no relations exist between contacts, to 1, where every pair of contacts is connected. Proportional density will be high in a network of contacts connected by weak relations, while having low network density.

Constraint. In these computations, constraint varies from a maximum of 1, where the corporation has only one contact to a minimum of 0, where the corporations has many, disconnected, easily replaced contacts. A high measure of constraint indicates that corporation i is highly constrained by a dyadic relationship with corporation j.

$$\text{dyadic constraint} = c_{ij} = (p_{ij} + \left[\sum_q p_{iq} p_{jq} \right])^2 o_j \tag{12}$$

where p_{ij}, p_{iq}, and p_{jq} equal the proportion of network time and energy invested in i's relation with j, i's relation

with q, and j's relation with q (see power models, above), and O equals "oligopoly" and in the type of data used in this study, defaults to 1. Dyadic constraint varies from a maximum of 1 when corporation j has exclusive relations with corporation i's other contacts and j is unique (has no substitutes) in the system, to a minimum of 0 when corporation i is the sole contact with other corporations.

The sum of dyadic constraints across corporation i's contacts is the aggregate (network) constraint on corporation i.

$$\text{aggregate constraint} = C = \sum_j c_{ij} \qquad (13)$$

where aggregate constraint varies from a maximum of 1 when i has only one contact, to a minimum of 0 when i has many disconnected, easily replaced contacts.

Opportunity for influence is the area, or difference, between c_{ij} and p_{ij}. The larger the difference between c_{ij} and p_{ij}, the greater opportunity for influence exists between two corporations. The implications of the above measures in relation to A. T. & T. and United Telecommunications and their place in the national telecommunications industry raise some interesting questions as to how the influence on that industry has changed during the past ten years. In particular, has the power and constraint posed by the

telecommunications industry been lessened by the increase in mandated competition or has the span of the industry changed across a broader spectrum of the national corporate network? Also, have the two corporations in this study changed the structure of the corporate executive interlocks in their network in a manner expected by the literature reviewed in Chapter 1? While the power and constraint posed by the entire telecommunications industry cannot be addressed in this study, the results from an analyses of the research questions may indicate if there has been a change within the industry and show a possible inclination toward a change in the structure of their interlocks by two of the industry leaders.

Tests of Research Questions

All of these measures will be used to examine the structure of the relationships in the two corporations which are the focus of this study. In particular, the power of the corporations defined within the study and the constraint posed by each corporation within the network will be analyzed in order to address the four research questions.

Research Question 1 will be examined with the STRUCTURE algorithms to determine which corporations have the most potential power within the respective networks of A.T.& T. and United Telecommunications. All corporations will be

rated on their positional power within each network and a positional ranking developed. Changes in the relative positions of both corporations from 1980 to 1990 will be determined.

Research Question 2 will be analyzed by determining the corporations within each network which pose the potential for constraint on A.T.& T. and United Telecommunications and the amount of change realized from 1980 to 1990. Changes in the types of corporations posing the most constraint on each corporation as well as the types presenting the greatest opportunity will also be analyzed.

Research question 3 will be investigated by analyzing which types of corporations comprise A.T.& T.'s and United Telecommunication's networks. Classification of corporations will be based on their primary assigned Standard Industrial Classification (SIC) codes. Corporations with multiple SIC identifiers will be assigned to a market segment by their primary function and ranking, as determined by their Fortune 500 classification.

Research question 4 will be addressed by analyzing the potential for power and constraint posed by each of the financial corporations in each network. The overall

influence posed by all of the financial institutions will then be analyzed within each of the respective networks.

CHAPTER 3

RESULTS

For the sake of clarity and ease of comparison, in this chapter the results of the study will be reported in sixteen tables. The first eight tables report data on A.T. & T. in 1980 and in 1990. The second set of tables report comparable data on United Telecommunications in 1980 and in 1990.

For each year, 1980 and 1990, four types of network data are reported for each corporation: (1) officers on other boards of directors, (2) corporate interlocks, (3) power rankings, (4) and constraint relations. The results will be discussed in greater depth in chapter four.

1980 A.T.& T. Results

In 1980 American Telephone & Telegraph had four corporate executive officers serving on the A.T.& T. board who also served on the boards of directors of other corporations. Table 2 shows the other corporations for which these four officers also served as board members.

Table 1

Corporations with A.T.& T. Officers on the Board of Directors, 1980.

Bankers Trust Corporation	E.I. duPont de Neumours
Borg-Warner Corporation	Hart, Schaffner & Marx
Bristol-Myers Corporation	International Paper
Campbell Soup	J.C. Penney Corporation
Chase Manhattan Corporation	Jewel Cos., Inc.
Chemical New York Corp.	Manufacturers Hanover Corp.

Note: Corporations owned by A. T. & T. are not included.

The corporate executive officers of the corporations in Table 1 established corporate interlocks by also serving on the boards of the corporations listed in Table 2.

Table 2

Corporations interlocked with A.T.& T. through their executive officers serving on the board of directors, 1980.

American Home Products Corp.	Associated Dry Goods
AMF, Incorporated	Abbott Laboratories
Allied Stores, Inc.	Alliance Holdings Ltd.
American Products, Inc.	ASARCO
Barnes Group, Inc.	Bank of Delaware
Bethlehem Steel	CPC International, Inc.
Corning Glass Works	Cummins Engine, Inc.
Chase Manhattan Corporation	Continental Group, Inc.
Continental American Life	Citibank Corporation
Carter Hawley Hale Stores	Collins & Aikman
Continental Corporation	Cities Service Corp.
Cabot Corporation	Continental Illinois Bank
Consumers Power Company	Charter Corporation
Cluett, Peabody & Co.	Diamond State Telephone
Discount Corp. of New York	Dry Dock Savings Bank
Eastman-Kodak, Inc.	EXXON Corporation

Table 2 cont.

Firestone	Freeport Minerals Company
Fidelity Union Trust	GATX Corporation
General Motors Corporation	General Crude Oil Company
Grumman Corporation	Hughes Tool Supply Co.
Hartz Mountain Corporation	Illinois Tool Works, Inc.
IBM, Inc.	Illinois Bell Telephone
Inland Steel	John Wanamaker Co.
Kraft, Inc.	Morgan Guaranty Trust
Macmillian, Inc.	National Reinsurance
New Jersey Bell Telephone	Northwest Industries
Penn Mutual Life Insurance	Phillip Morris Corp.
Sperry Corporation	Scott Paper Company
Sperry & Hutchinson Co.	SCM Corporation
TRW, Incorporated	Texas Commerce Bank
Thomson Newspapers, Inc.	Technicon Corporation
Time, Incorporated	The Home Life Insurance
The New York Times	The Raymond Corporation
Uniroyal Corporation	Westinghouse Electric
Wilmington Trust	

The corporate power rankings derived from the matrix of the corporations in A.T.& T.'s interlocking network is listed in Table 3.

Table 3

Power Analysis from 1980 A.T.& T. Network of Executive Interlocks in Descending Order

Corporation	Power	Corporation	Power
Borg-Warner	1.0000	Illinois Tool	0.2191
TIME, Inc.	0.8747	Hart Schaffner Marx	0.2024
Illinois Bell	0.8148	Wilmington Trust	0.1872
Jewel Cos.Inc.	0.6763	Thomson Newspapers	0.1501
Bankers Trust	0.6653	Uniroyal	0.1501
Dupont	0.6625	Assoc.Dry Goods	0.1501
Firestone	0.6393	CPC International	0.1501
A.T.& T.	0.6022	Hartz Mountain	0.1501
J.C.Penney	0.5932	Freeport Minerals	0.1501
Northwest Ind.	0.5598	Bethlehem Steel	0.1498
Cont. Ill.	0.5598	TRW Inc.	0.1498
Abbott Labs	0.5598	Continental Corp.	0.1492
Hughes Tool	0.5598	Sperry Corp.	0.1492
Manuf. Hanover	0.5575	Grumman Corp.	0.1488
Chemical Bank	0.5419	Discount Corp.(N.Y).	0.1488
Bristol-Myers	0.5079	Dry Dock Savings	0.1488
Intntl. Paper	0.4678	New Jersey Bell	0.1469
Campbell Soup	0.4583	Scott Paper	0.1469

Table 3 cont.

Chase	0.4546	EXXON	0.1469
Cont. Group	0.4319	Allied Stores	0.1425
Westinghouse	0.4319	Alliance Holdings	0.1425
S. & H. Corp.	0.4319	National Reinsure	0.1425
Kraft, Inc.	0.4319	Barnes Group, Inc.	0.0843
Cities Service	0.4319	Home Life Insurance	0.0843
AMF Corp.	0.4319	Macmillian, Inc.	0.0833
Citibank	0.3831	Phillip Morris	0.0833
Corning Glass	0.3149	Cabot Corp.	0.0833
Inland Steel	0.3149	Collins & Aikman	0.0833
Cummins Eng.	0.3149	General Motors	0.0814
Eastman Kodak	0.3149	ASARCO	0.0795
Morgan	0.2670	SCM, Incorporated	0.0788
Cont. American	0.2340	The Raymond Corp.	0.0788
Bank of Del.	0.2340	General Crude Oil	0.0735
IBM, Inc.	0.2340	Diamond State Tele.	0.0374
Cluett,Peabody	0.2313	Fidelity Union	0.0371
Charter Corp.	0.2313	Technicon Corp.	0.0370
N.Y. Times	0.2313	Consumers Power Co.	0.0370
Penn Mutual	0.2299	Texas Commerce Bank	0.0367
J. Wannamaker	0.2299	American Products	0.0367
C.H.H. Stores	0.2299	American Home	0.0354
GATX, Inc.	0.2191		

A.T.& T. ranked eighth in power within the network, with Borg-Warner being the most powerful corporate player within the network. The top ten positions within the network were not dominated by any particular industry or economic sector.

Table 4

A.T.& T. 1980 Constraint Relations

12 Contacts

10.033 Nonredundant contacts

.836 Contact efficiency

.168 Network Density

.212 Proportional Density

.151 Total Network Constraint

Corporation	C_{ij}	P_{ij}
Bankers Trust	.0223	.1000
Bristol-Myers	.0208	.1000
International Paper Inc.	.0192	.1000
J.C.Penney	.0185	.1000
Dupont	.0122	.0800
Chemical Bank	.0119	.0800

Table 4 cont.

Borg-Warner	.0101	.0800
Chase Manhattan Bank	.0095	.0800
Jewel Cos., Inc.	.0092	.0800
Hart Schaffner & Marx	.0088	.0800
Manuf. Hanover	.0042	.0600
Campbell Soup	.0040	.0600

No corporation provides either constraint or a higher degree of opportunity upon A. T. & T. within A. T. & T.'s network of interlocking directors. These low indicators of constraint and opportunity within this network can be anticipated from the low overall network density.

A.T.& T. 1990 Results

In 1990 American Telephone & Telegraph had three corporate executive officers serving on the A.T.& T. board who also served on the boards of directors of other corporations. Table 5 shows the other corporations for which these officers also served as board members.

Table 5

Corporations with A.T.& T. Officers on the Board of Directors, 1990.

American Cyanamid	Eli Lilly Corporation
Bristol-Myers	Manufacturers Hanover
Cabot Corporation	State Street Boston Corp.
Chemical Bank Corp.	

Note: Corporations owned by A. T. & T. are not included.

Table 6

Corporations interlocked with A.T.& T. through their executive officers serving on the board of directors, 1990.

ARA Group, Inc.	Hollingsworth & Vose
Amoco Corp.	New York Life Ins.
Atlas Corp.	New York Times
Champion International	NYNEX, Inc.
Charter Corporation	Pan-Atlantic, Inc.
CityFed Financial Corp.	Paul Harris Stores
Continental Cablevision	Pillsbury
Continental Corporation	Texas Commerce Bancshares
Dow Jones, Inc	UAL Corp.
Eastern States Bankcard	USX, Incorporated
Eaton Vance Corp.	Union Camp Corp.
Equitable Life Assurance	Welltech, Inc.
First National Bank	

Table 7

Power Analysis from 1990 A.T.& T. Network of Executive Interlocks in Descending Order

Corporation	Power	Corporation	Power
Chemical Bank	1.0000	Dow Jones, Inc.	0.2666
Cabot Corp.	0.8033	Amoco Corp.	0.2666
Eli Lilly	0.8008	New York Life Ins.	0.2065
Manuf. Hanover	0.7577	New York Times	0.2065
A.T.& T.	0.6742	Eaton Vance Corp.	0.2006
Amer. Cyanamid	0.6700	Hollingsworth Vose	0.2006
Bristol-Myers	0.6177	Pan-Atlantic, Inc.	0.1997
State St. Bank	0.4026	Texas Commerce Banc	0.1997
Cont. Corp.	0.2766	NYNEX, Inc.	0.1997
UAL Corp.	0.2766	Champion Int.	0.1997
USX, Inc.	0.2766	Atlas Corp.	0.1380
Pillsbury	0.2676	E. States Bankcard	0.1380
Union Camp	0.2676	Charter Corp.	0.1375
Equitable Life	0.2676	CityFed Financial	0.1339
1st National	0.2674	Paul Harris Stores	0.1334
Cont. Cable	0.2674	ARA Group, Inc.	0.1332
Welltech, Inc.	0.2674		

Table 8

A.T.& T. 1990 Constraint Relations

7 Contacts

5.571 Nonredundant Contacts

.796 Contact efficiency

.238 Network Density

.238 Proportional Density

.242 Total Network Constraint

Corporation	C_{ij}	P_{ij}
Cabot Corp.	.0445	.1429
American Cyanamid	.0434	.1429
Chemical Bank	.0363	.1429
State Street Bank Corp.	.0328	.1429
Manuf. Hanover	.0294	.1429
Eli Lilly	.0294	.1429
Bristol-Myers	.0267	.1429

No actor in this network of interlocks presents A. T. & T. with a significant potential for influence or appears to have a constraining effect on A. T. & T.

1980 United Telecommunications Results

In 1980 United Telecommunications Corporation had three corporate executive officers serving on the United Telecommunications board who also served on the boards of directors of other corporations. Table 9 shows the other corporations for which these officers also served as board members.

Table 9

Corporations with United Telecommunications Officers on the Board of Directors, 1980.

Armco Steel
C. J. Patterson Company
Conchemco, Incorporated
Duke Power Company
Kansas City Southern Industries, Inc.

Note: Corporations owned by United Telecommunications are not included.

Table 10

Corporations interlocked with United Telecommunications through their executive officers serving on the board of directors, 1980.

American Bank and Trust	Liberty Corp.
Boston Corporation	Mapco
Business International Corp.	Mead Corporation
Chase Manhattan Bank	McNally Pittsburg Manuf.
Cincinnati Gas & Electric	NCR Corporation
Commerce Bank of Kansas City	Ore Metallurgical Corp.
Crystal Tissue Co.	Phillips Industries
Employers Reinsurance	Reserve Mining Co.
Fifth 3rd Bank of Cincinnati.	Taft Broadcasting Co.
First American Finance	The Integon Corp.
Hallmark Cards	United Missouri Bank
J. A. Jones Construction Co.	Winters Bank & Trust
J. B. Ivey & Co.	
1st National Bank of Middletown	

Table 11

Power Analysis from 1980 United Telecommunications Network of Executive Interlocks in Descending Order

Corporation	Power	Corporation	Power
Armco Steel	1.0000	Reserve Mining	0.2037
1st Bank	0.7344	NCR Corporation	0.2037
K.C.Southern	0.5713	Cincinnati Gas	0.2037
United Telecom	0.4600	Winters Bank	0.1308
United MI Bank	0.4280	Phillips Inds.	0.1308
Boston Corp.	0.4000	Crystal Tissue	0.1308
Taft	0.4000	Ore Metallurgical	0.1306
Chase Bank	0.4000	5th 3rd Bank	0.1306
Business Intl.	0.4000	Conchemco, Inc.	0.0941
Mead Corp.	0.4000	C.J. Patterson Co.	0.0776
Duke Power	0.3129	American Bank	0.0771
McNally Manuf.	0.2140	J. B. Ivey & Co.	0.0764
1st American	0.2140	J.A.Jones Const.	0.0764
Hallmark Cards	0.2140	The Integon Corp.	0.0764
Employers Rein.	0.2135	Liberty Corp.	0.0764
Mapco	0.2135	Commerce Bank,K.C.	0.0348

While United Telecommunications is ranked fourth in the amount of power in its network of board relations, it has

less than half of the power of the most powerful actor, Armco Steel.

Table 12

United Telecommunications 1980 Constraint Relations

9 contacts

6.817 Nonredundant contacts

.757 Contact efficiency

.212 Network Density

.278 Proportional Density

.304 Total Network Constraint

Corporation	C_{ij}	P_{ij}
K.C. Southern Industries	.1151	.2248
United Missouri Bank	.0531	.1248
Employers Reinsurance	.0373	.1248
Mapco	.0373	.1248
Armco Steel	.0179	.1000
Duke Power Co.	.0147	.1000
American Bank & Trust	.0127	.0752
Conchemco, Inc.	.0127	.0752
J. Patterson	.0025	.0504

C.

While Kansas City Southern Industries is ranks considerably higher in both constraint and opportunity in

United's network of interlocks, it should be noted that three of the other network members are either banks or insurance companies and represent a potential for a convenient access to funds.

1990 United Telecommunications Results

In 1990 United Telecommunications Corporation had two corporate executive officers serving on the United Telecommunications board who also served on the boards of directors of other corporations. Table 13 shows the other corporations for which these officers also served as board members.

Table 13

Corporations with United Telecommunications Officers on the Board of Directors, 1990.

Armco	General Mills Corporation
Duke Power Company	Hallmark Cards, Inc.
Equitable Life Assurance	Panhandle Eastern Corp.

Note: Corporations owned by United Telecommunications are not included.

Table 14

Corporations interlocked with United Telecommunications through their executive officers serving on the board of directors, 1990.

Advanced Micro Devices	Medtronic Co.
Alexander & Alexander Co.	Merck & Co.
Arkwright-Boston Corp.	J. P. Morgan
Colgate-Palmolive	NEOAX, Inc.
Continental Corp.	New York Steak
Dayton Hudson Stores	Northwestern Life
Diversified Engines, Inc.	Norwest Bank
Ford Motor Co.	Tennant Co.
Genesco, Inc.	Toro Corporation
Hatteras Securities	Warner Communications
Hughes Supply Co.	Westinghouse Electric
InterRegional Financial	Yellow Freight Lines
Liberty Corp.	

Table 15

Power Analysis from 1990 United Telecommunications Network of Executive Interlocks in Descending Order

Corporation	Power	Corporation	Power
General Mills	1.0000	Dayton Hudson	0.1626
Hallmark Cards	0.7555	Ford Motor Co.	0.1615
Equitable Life	0.7214	Hughes Supply Co.	0.1615
Duke Power Co.	0.6458	Continental Corp.	0.1615
United Telecom	0.5995	Yellow Freight Lines	0.1615
Armco Steel	0.4852	J. P. Morgan	0.1610
Panhandle East.	0.3315	Liberty Corp.	0.1610
N.W. Life	0.2227	Toro Corp.	0.1112
Medtronic Co.	0.2227	New York Steak	0.1112
Diversified Eng.	0.2227	Advanced Micro	0.1112
Norwest Bank	0.1670	Genesco, Inc.	0.1112
Merck & Co.	0.1670	Warner Comm.	0.1112
Westinghouse	0.1670	Arkwright-Boston	0.1106
Tennant Co.	0.1670	NEOAX, Inc.	0.1077
Colgate	0.1670	Alexander&Alexander	0.1077
InterReg. Fina.	0.1670	Hatteras Securities	0.1074

General Mills is obviously the most powerful actor in the network by far. The next most powerful actor, Hallmark Cards, only has 75% of the power of General Mills.

Unfortunately for United Telecommunications, it is far down in the power scale in its network of interlocking directors with only 60% of the power of General Mills.

Table 16

United Telecommunications 1990 Constraint Relations

7 Contacts

5.063 Nonredundant contacts

.723 Contact efficiency

.298 Network Density

.333 Proportional Density

.294 Total Network Constraint

Corporation	C_{ij}	P_{ij}
Hallmark Cards	.1284	.2500
Duke Power	.0316	.1250
Armco	.0301	.1250
General Mills	.0295	.1250
Equitable Life	.0278	.1250
Dayton Hudson Stores	.0233	.1250
Panhandle Eastern	.0228	.1250

Hallmark Cards presents the most constraint on United Telecommunications, however it also provides the most opportunity. United Telecommunications spends twice of its communication time and effort in the relationship with Hallmark compared to the other actors in the network. The remaining contacts impose a limited amount of constraint on United while also providing limited opportunity.

In the next chapter, the results presented above in tabular form will be discussed in greater detail. In addition, some evaluations and suggestions for further research will be offered.

CHAPTER FOUR

DISCUSSION

Before the results of the research questions are discussed, one finding from the research raises an interesting question. That finding was the enormous downsizing of the network of interlocking directors experienced by American Telephone and Telegraph during the ten year span of this study. In 1980 the interlocking network of A. T. & T. executives and the boards of other corporations included 80 corporations. In 1990 the interlocking network was comprised of only 32 other corporations, for a decrease of 60%. The reason for this dramatic decrease could well be a study in itself, but a few observations from prior research come to mind.

Was the downsizing due to an impetus from within A. T. & T., or did the downsizing occur because of perceptions about A. T. & T. from potential outside directors? Mace (1971) presents the idea that the prestige of an organization is an important part of why individuals choose to serve as outside directors for corporations. Did the prestige of being associated with A. T. & T. decrease after divestiture? That would hardly appear to be a plausible answer. A. T. & T. still maintains its position as the

dominant service organization in the United States according to the 1991 Fortune 500 rankings. A. T. & T. also continues to have directors from the largest corporations in the United States on its board of directors.

Perhaps, the reason is the general decrease in outside board memberships at some of the largest U. S. corporations and a greater level of involvement in the day to day operations of those corporations by their directors. The simplest explanation is that downsizing reduced the absolute number of executives or downsizing reduced the number of corporate officers serving on the boards of directors. Another explanation is offered by Treece (1992), who reports on the changes brought on by the economic turmoil of the 1980s and the increased involvement in the operation of corporations by their board members as well as less time and opportunity for serving on other boards. Lang and Lockhart (1990) allude to the same type of occurrences in their recent research. If this is the case, future research on the communication structures of organizations through interlocking directors, similar to this study, may become more important or useful in understanding organizational communication patterns and their value in understanding how organizations seek environmental information.

Research Question 1

Has the opportunity for occupying a position of potential power within the network of relations changed from 1980 to 1990 across the market segments represented within the respective networks of A. T. & T. or United Telecommunications?

American Telephone and Telegraph

The opportunity for occupying a position of potential power within the A. T. & T. network of director interlocks seems to have swung toward that of banks and financial institutions. In the 1980 data, Borg-Warner, a major manufacturing corporation, was the most powerful actor in the network while the nearest banking institution, Bankers Trust Corporation, ranked fifth in the network with 66% of the power of Borg-Warner. The next bank in the data was Continental Illinois Bank, eleventh in the network but having only 56% of the power of the first actor. No individual market segment had a dominant position within the network. A. T. & T. ranked eighth in the overall network with 60% of the power of Borg-Warner.

In the 1990 data, A. T. & T. moved from the eighth to the fifth position in the network, but its power in relation to the most powerful actor, in this case Chemical Bank Corporation, virtually had not changed (67%). Other banks had however, made moves in the rankings that, as a group,

appear to be significant. Manufacturers Hanover Corporation was number four in the network with a 76% level of relative power and State Street Corporation of Boston had also moved into the top 10 rankings, though it had only 40% of the relative power.

The network density of the network also increased overall. This increase in density indicates that even though the number of contacts has been reduced drastically, the density of the relations among members in the network has increased and has become stronger.

United Telecommunications

The opportunity for occupying a position of potential power within United Telecommunications' network of interlocks has changed relatively little during the study period. The overall network size has remained the same with no one corporation maintaining either a high level of power or constraint. Unlike the A. T. & T. network, the United Telecommunications network has not experienced a dramatic reduction in its size or a surge in the representation of banks or financial institutions. United Telecommunications has slipped from number four to number five in the ranking of power but its percentage of power in relation to the most powerful actor has increased from 46% to 60%. Similar to A. T. & T., the network density has increased, but by less than 30% and the proportional density has increased slightly. An

interesting result in the United Telecommunications network is the slight reduction in overall network constraint not realized in the A. T. & T. analyses. In the network power structure Armco Steel showed a drastic change of position from first in 1980 to having only 48% of the power relative to the 1990 network leader, General Mills, a new actor in the network of interlocks. All other actors in the network showed relatively little significant changes in the structure. This network of interlocking directors did not experience the amount of changes the A. T. & T. network experienced during the same time frame.

Research Question 2

Has the structure of the networks of A. T. & T. and United Telecommunications changed in its potential for constraining relationships relative to the financial institutions on each board from 1980 to 1990?

American Telephone and Telegraph

The potential for constraining relations among A.T. & T. and financial institutions has increased during the ten years addressed in this study. Research Question 1 discussed in increase in power from the banking sector and the same discussion can be directed toward this question. Additionally, the overall constraint by all organizations in the A. T. & T. network of interlocks has increased from

1980 to 1990. Constraint in the network increased by 60% from a total of .151 in 1980 to .242 in 1990. Fewer contacts may indicate that each actor in the network is constraining all other players to a greater degree than with more contacts in a network.

United Telecommunications

Financial institutions do not play a significant role within the United Telecommunications network of interlocking directors. This absence may be due to the apparent regional nature of the makeup of the United Telecommunications board or it may be due to the board of directors not feeling the need to incorporate financial institutions into the board as has A. T. & T. Additional qualitative research into the strategic planning of the board of directors of United Telecommunications would be appropriate to address this question. No bank or financial corporation altered the makeup of the network during the study period. Between 1980 and 1990 one bank, 1st National Bank of Middletown, moved out of a position of relatively high power and one financial institution, Equitable Life Assurance, moved in, with essentially the same percentage of power. No other banks or financial institutions changed significantly in the overall rankings of power or constraint within the interlocks. The indicators of constraint within the network stayed at the same level and, as was reported in the discussion of

Question 1, the overall level of constraint actually declined slightly.

Research Question 3

Has the span of the two specific organizations reached into a greater number of market segments during the 1980 to 1990 time frame?

American Telephone and Telegraph

The research shows that the span of A. T. & T. has actually grown smaller during the time investigated. In 1980 the direct connects of A. T. & T. included four financial institutions, three retail organizations two chemical producers and one food processing corporation. The previous research supports the theory that as the environment becomes more uncertain organizations will attempt to span a larger segment of the economy. This tendency is not apparent in the 1990 data for A. T. & T. due perhaps to a general downsizing of boards of directors and the number of interlocks across all major U. S. corporations.

In the 1990 data A. T. & T.'s span of immediate contacts included four chemical processing corporations and three banking organizations. Two of the chemical corporations had considerably more power than did A. T. & T. and the other two were ranked immediately behind A. T. & T.

As a group however, the banking institutions were slightly higher than the chemical group.

United Telecommunications

The span of United Telecommunications in the network of corporate board interlocks had one Fortune 500 metals producer, one Fortune 500 utility company, one large railroad and industrial corporation, and two relatively small non-Fortune 500 companies in 1980. In 1990 the span of the network had the same Fortune 500 metals producer, the same utility, and had added a major financial institution, a Fortune 500 food processing corporation, one of the largest producers of greeting cards in the U. S., and a oil and gas pipeline corporation. The overall net change was only one additional contact in the interlocking network of direct contacts. The descriptions above were used in lieu of the corporate names to demonstrate the diversity of the direct contacts within the United Telecommunications network both in 1980 and 1990.

Here again, as contrasted with the A. T. & T. changes, the changes in the United Telecommunications network were insignificant. During the study time frame, United Telecommunications seems to have maintained both the size and the cross segment integration that is missing in the A. T. & T. network. The stability of the United Telecommunications network seems to support both the elitist

view of interlocking directors (Perrucci and Pilisuk, 1970) that a similar set of actors share and maintain trust through a network, as well as the view developed by Palmer (1983) and Sterns and Mizruchi (1986) that corporations do not always replace ties with specific organizations once that tie is broken. Pfeffer's 1987 research on the resource dependence dimension of intercorporate relations also is supported by the results of the current study.

Research Question 4

Has the potential relative constraint or opportunity posed by the financial sector within the two target organizations' networks changed during the study period?

American Telephone and Telegraph

In this study, the relative constraint and opportunity posed by the financial sector on A. T. & T. indeed has changed during the ten year time frame. This transformation was not anticipated prior to the study, but the results do support the general conclusions drawn by Mintz & Schwartz (1985) in their research on American corporations. These results are also in line with the findings of Clawson & Neustadtl (1989) and Mizruchi (1989). Faced with the drastic changes forced upon it by divestiture and the fragmenting of its previous corporate structure and sources of income, A. T. & T. seems to have responded by changing

the structure of its network of director interlocks in an attempt to deal with those environmental changes.

United Telecommunications

The discussion in the analyses of the previous questions has suggested that financial and banking organizations do not hold a significant position of either power or constraint in the United Telecommunications network of interlocking directors. The data seem to indicate that within this network, stability, representation by major corporations across many segments, and connections to corporations in the local vicinity have more importance than a ready access to funds through interlocking relations. While the network of interlocking directors was not static during the study period, with individual corporate actors entering and leaving the network, it has not undergone the drastic and major restructuring reflected in the A. T. & T. network. The corporation did undergo major changes in its operation and faced the environmental uncertainty affecting the entire industry, but it did not alter its basic interlocking structure between 1980 and 1990.

Conclusions

The results of this study reflect how two organizations appear to have responded to major changes within the same industry. These changes and responses support a number of

previous research studies on how organizations respond to changes in their environment (Adams, 1976; Aldrich, 1979;Pfeffer, 1978; Tushman, 1977). These responses also suggest several areas of possible future research in organizational communication and corporate business operation.

A. T. & T. was the corporation most affected by the drastic changes in the communication industry during the study time frame. Because of its loss in a long running anti-monopoly suit A. T. & T. was radically restructured, became the focus of increased governmental scrutiny, and entered a market segment characterized by more uncertainty and competition than it had ever experienced. United Telecommunications also became a major force in an uncertain and highly competitive market segment but was not forced to alter its basic business structure and relations as was A. T. & T.

Previous research on information theory developed by Rogers and Kincaid (1981) and even as far back as Shannon and Weaver (1949) has indicated that accumulation of information is a means of reducing uncertainty. A. T. & T's drastic change to its network supports this idea even though the change was to a smaller number of contacts. The types of contacts and information, however, suggest that A. T. & T. may have sought financial information it believed would reduce its uncertainty. The increase in the involvement of

financial organizations on A.T. & T.'s board of directors also supports the findings of Mintz and Schwartz (1985) and Mariolis (1975) on the importance and influence of banks and financial institutions on corporations especially in difficult times for organizations.

On the other hand, the United Telecommunications network of interlocks supports the findings of Glaskiewicz and Wasserman (1989) and their research on how organizations change in a region. The changes toward or away from any market segment occur on a local level rather than on a national level. United Telecommunications did not feel the need for such sweeping changes in the structure of its corporate interlocking directors as did A. T. & T.

Finally, a need for future research at the individual corporate level is suggested by the findings of this study. The Treece (1992) article presented earlier suggests that not only has the structure of corporate interlocks changed, but that the reason for those changes may also have changed, especially in the acquisition of capital. Future research employing both quantitive methods such as those used in this study and qualitative methods (Morgan, 1986; Mumby, 1988, 1987; Putnam and Pacanowsky, 1983; Tompkins & Cheney, 1985) might be of value in investigating both how and why corporate interlocks are changed and what types of impetus is behind those specific changes at the corporate level. Another potentially fruitful line of inquiry might be to

explore how power and constraint are functions of the narratives and ideologies that give rise to structure.

Generalizations about interlocks based on the memberships or activities of an individual may be more fully grounded by developing other perspectives. For example, future research might link network analysis with a comparison of the cultures and ideologies of individuals and boards of directors.

Future research also might attempt to explain the interconnections among various theories of influence in organizations. Some analyses seem to consider communication as a product of organizations. Other analyses take the viewpoint that communication is the means of creating and sustaining organizations. In much the same way, influence within and among organizations may be seen in terms of contacts, relations, scarce resources, ideology, or power.

This study has examined power rankings and constraint relations as a function of structural relationships.

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