Conceptual Bonds

Network Analysis as a Way of Understanding Institutional Rigidity

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Past empirical research has failed to uncover the potential explanatory power of institutional theory. The restrictive nature of past studies is due in large part to the complexity associated with defining the neo-institutional environment. The purposes of this article are to discuss the reasons for the restrictive nature of past studies, to propose an alternative for future research based on the notions of network analysis and conceptual bonds, and to suggest how such research might be useful. Applying such an analysis allows us to understand the source of institutional influences better, thereby providing greater insight into the complex forces shaping individual organizational activity.

Since the late 1970s, institutional theory has seen a rebirth of significant proportion. This rebirth is often referred to as the “new” or “neoinstitutionalism,” signifying a departure from traditional or “old institutionalism.” A distinctive feature of neo-institutional theory is its focus on the cognitive aspect of institutions. Yet, most empirical studies of institutional concerns focus on formal arrangements (Baum & Oliver, 1991; Leblebici & Salancik, 1982; Scott & Meyer, 1983; Tolbert, 1985) or observable outcomes (Davis, Diekmann, & Tinsley, 1994; DiMaggio, 1991; Fligstein, 1991; Kieser, 1989; Mezias, 1990). Moreover, with few exceptions (Davis, Diekmann, & Tinsley, 1994; Fligstein, 1991; Kieser, 1989; Mezias, 1990), the majority of studies focus on not-for-profit organizations despite pleas to the contrary (Powell, 1991). In those rare cases where for-profit organizations are discussed, the focus tends to be on the collection of all organizations of a particular size with no distinction for specific institutional arrangements. As a result, the potential dynamism of neo-institutional theory is lost in most empirical analysis.

This article will discuss the reasons for the restrictive nature of past neo-institutional analyses and propose an alternative for future research. Specifically, I argue that the restrictive nature of past studies is due in large part to the complexity associated with defining the neo-institutional environment. The complexity of analyzing the neo-institutional environment emerges as a result of the cognitive nature of neo-institutional theory. I suggest conceptual bonds as a way of grappling with this inherent complexity and further propose network analysis as a way of measuring conceptual bonds.
The ability to measure conceptual bonds provides us with a mechanism for specifying the level of institutional rigidity. The level of institutional rigidity is important, since the degree of rigidity provides insight concerning the nature of organizational and institutional change. In conditions of low institutional rigidity, organizations are likely to respond to a variety of external stimuli resulting in a certain level of ongoing organizational and institutional instability (Coleman, 1999). As institutional rigidity increases, organizations within the institutional environment are increasingly constrained in behavior until, at the extreme, the ability of firms within the institutional environment to adapt is eliminated. The lack of organizational adaptability significantly decreases the resilience and robustness of individual firms (Kauffman, 1995). Environmental jolts (Meyer, 1982) to the institutional environment itself provide the only impetus for change. Thus, the ability to measure the level of institutional rigidity has important implications concerning the nature of organizational and institutional change.

SOME BASIC DEFINITIONS

According to the definitions used by various authors, institutions come in a variety of forms. Scott (1995) suggests that institutional analysis can occur at any of six levels, ranging from organizational subsystems to world systems. Add to this the regulative, normative, and cognitive “pillars” (Scott, 1995: 35) and we find institutional analysis occurring at any of 18 different descriptive domains. Scott specifically identifies eight predominant schools that have emerged from the 18 possible combinations. Zucker (1987) maintains that institutional effects can be divided into two phenomena: institutionalism as a result of environment and institutionalism as a result of organizational subsystem. As a clarification, I adopt the definition of institutionalization proposed by Davis, Diekmann, & Tinsley (1994: 550):

Organizational forms and practices are institutionalized when they are adopted because actors take them for granted, rather than because a rational choice process found them to be best suited for the technical requirements of the task.

An institutional influence is an external force causing the organization to act in some taken-for-granted way. This basic definition will be assumed throughout the article, with the individual organization serving as the primary level of analysis.

REASONS FOR PAST LIMITATIONS
The reason for the restrictive nature of past studies resides in the difficulty of observing and quantifying institutional variables as identified in the definition of institutionalism. In response to these difficulties, past researchers have confined their studies to areas where the institutional forces are well understood. Not-for-profit organizations, for example, often have well-defined institutional environments based on specific guiding principles or regulatory regimes. In DiMaggio’s (1991) study of art museums, we find a defined set of organizations based on funding criteria. Tolbert’s (1985) study uses the strict definitions of public and private universities, while Baum and Oliver (1991) describe childcare service organizations based on clearly defined regulatory linkages. As we step into the for-profit world, the institutional linkages are far less clear. Given the diverse and changing nature of for-profit organizations, defining the appropriate set of organizations inhabiting a particular institutional environment and thus identifying the forces generating institutional pressures becomes quite cumbersome.

Take the case of 3M. At one time, it was one of the largest producers of audio and video tapes in the US. Yet, in a move that occurred virtually overnight, 3M abandoned the audio and video tape business, instead focusing in two primary areas: industrial and consumer products and life science devices (Wall Street Journal, November 15, 1995). What then is 3M’s institutional environment? The answer is less than obvious. It should thus come as no surprise that the majority of institutional studies have considered not-for-profit organizations, where the institutional environment is generally more defined and where rapid domain changes are less common.

Several suggestions have been made to combat the problem of defining the institutional environment. The three approaches that seem to have attracted the greatest interest include defining the institutional environment according to organizational size; defining the institutional environment according to organizational fields; and defining the institutional environment according to industry. A summary of these approaches can be found in Table 1.
The most common approach when considering for-profit organizations appears to be to include all organizations of comparable size (see, e.g., Davis, Diekmann, & Tinsley, 1994; Fligstein, 1991; Mezias, 1990). Thus, GM is compared to IBM, which is further thought to be part of the same institutional environment as Exxon. In some sense, organizational size is a reasonable distinction when considering larger firms. The shareholder demands for most Fortune 500 firms will be similar. Certain structural changes seem to correlate well with organizational size (Davis, Diekmann, & Tinsley, 1994; Fligstein, 1991; Mezias, 1990). Yet, this sizedependent approach also has limitations. For example, Exxon and Chevron are clearly more similar than are Exxon and Wal-Mart. However, a strict size comparison would indicate a greater similarity between Exxon and Wal-Mart. Equally important may be smaller firms that have a significant impact on a larger firm’s institutional environment but do not compare in size. Size also becomes highly problematic when talking strictly of smaller organizations. Clearly, the institutional environment of nearly any small biotechnology firm will vary significantly from that of a family-owned grocery store, despite the potential for similarities in size. With large organizations, the focus on size as a determining factor of the institutional environment is limiting. With small organizations, such an approach is nonsensical.

To overcome the restrictive focus on organizational size, some researchers have focused on organizational fields. A field is defined as any set of organizations that offer similar products or services (DiMaggio, 1991; Meyer et al., 1994; Tolbert, 1985). While this approach has a certain commonsense appeal, defining an institutional environment based on product or service can be equally problematic. Problems arise since few, if any, organizations produce completely equivalent products. Substitute products also must be considered when defining an organization’s environment. The demand for video rentals, for example, is no doubt affected by the cost and availability of movie theaters. Further, the potential interaction of marginally related organizations is missed when using fields as the defining institutional domain. As such, the focus on fields presents an overly simplistic and restrictive view of the institutional environment.

To expand the concept of field, some authors have suggested an industry level of analysis (Hirsch, 1975; Hirsch, 1985; Leblebici et al., 1991). Under the definition of industry, any organization associated with the development, production, or distribution of a certain output is considered part of the industry. While the industry approach to institutional analysis improves on the more restrictive field approach, problems still exist. Again, where do we define the limits of the institutional environment? Most would agree that Microsoft is part of the computer industry, but what about Egghead? Or, even less clear, what about electronic retail shops such as Circuit City that sell computers as well as a host of other electronic merchandise?

The lines of distinction concerning the institutional environment become highly ambiguous when discussing the industrial environment.

In fact, nearly every attempt to expand the definition of the institutional environment beyond the restrictions of past empirical research is thick with complexity. It comes as no surprise, then, that the majority of research projects concerning institutional analysis have failed to uncover much of the richness promised in neo-institutional theory.

**THE SOURCE OF COMPLEXITY**
A key distinction of neo-institutional theory is the focus on the cognitive aspect of the institutional environment (Hirsch & Lounsbury, 1995; Jepperson, 1991; Powell & DiMaggio, 1991; Scott, 1995). Cognitive influences are those that transcend rational appeal. From a cognitive perspective, certain behaviors become “taken for granted” as necessary and appropriate (Zucker, 1983). As suggested by Powell and DiMaggio (1991: 11), “Institutionalized arrangements are reproduced because individuals often cannot even conceive of appropriate alternatives.” Thus, individual firms mimic the behavior of peers frequently without realizing the cognitive influences at play.

The cognition of a particular firm (or, more precisely, the cognition of its decision makers) is shaped by the firm’s institutional environment. However, cognitive influences ultimately reside within the subconscious of individual actors (Tolbert & Zucker, 1996). As such, cognitive influences are difficult to observe. This particular aspect of cognitive influences creates much of the complexity associated with defining the institutional environment. In short, there is no clear definition of the organization’s institutional environment, since such an environment is a cognitive construct of the individuals associated with a particular institutional environment.

As long as each participant’s cognitive construct is slightly different, no one institutional structure will prevail. Instead, the institutional environment is a loosely defined phenomenon depending on the level of mutual recognition among potential participants. Where no mutual recognition exists, one could argue that no institutional environment exists. Formal linkages such as the existence of an industry trade association increase the likelihood of recognition. However, mimetic imitation and recognition of normative constraints can occur without direct association. Thus, a high level of mutual recognition of “peers” can result in institutional rigidity even where formal linkages do not exist. The institutional environment, then, becomes an issue of degree, the degree of institutional rigidity being defined by the level of mutual recognition.

A high level of mutual recognition can have a significant impact in shaping the behavior of individual firms. For example, the feedback systems used by most of the top online auction sites according to Gomez.com display remarkable similarity (see, e.g., eBay, Yahoo!, eHammer, eDeal, and Haggle). Each employs a system where individual sellers are given an overall rating based on the positive and negative ratings of the seller. This similarity occurs despite the existence of a variety of competing feedback models. Moreover, this similarity occurs despite the lack of any formal relationship among competing firms in the industry. Each of the major industry participants appears to mimic the behavior of others despite the multitude of options available and the lack of formal linkages.

The notable exception to the trend concerning the auction feedback mechanism employed is Amazon, one of the larger online auction providers. It employs a scaled rating system where each seller using Amazon auctions is given a scaled rating of one to five, with one being the worst and five being the best. Thus, Amazon appears to violate the emerging institutional norm concerning the type of feedback mechanism employed. Yet, in many ways, Amazon sits on the periphery of the institutional environment shaping the behavior of online auction firms. It originated and is still best known as a seller of books (Wenske, 2000). The feedback mechanism employed in Amazon auctions is a remnant of the system used to rate books sold through the site. Thus, in many ways, the feedback system used is consistent with the dominant institutional environment in which Amazon competes.
How, then, does one define the boundary of institutional influence in the online auction industry? What are the institutional influences shaping the behaviors of an organization such as Amazon? What is required is a way of measuring the level of cognitive recognition across firms. What follows is an attempt to provide such a measurement mechanism by focusing on the use of network analysis as a way of identifying the strength of “conceptual bonds.”

MEASURING CONCEPTUAL BONDS

Conceptual bonds refer to the mental linkages that occur between individual firms. These linkages are formed when one firm establishes another (consciously or unconsciously) as an example of appropriate behavior. Correspondingly, conceptual bonds serve as the primary source of cognitively influenced institutional behavior. Unlike formal linkages, conceptual bonds cannot be readily observed. Instead, they reside within the perceptions of individual participants. The conceptual bonds of an institution become a function of the collective conceptual agreement among potential participants. How do we measure the degree of conceptual agreement? Recent developments in network analysis provide interesting potential (Burt, 1992; Kilduff & Krackhardt, 1994).

Through network analysis, representative participants are asked to identify critical peers. In essence, this set of peers defines the reference set for the organization of concern (Burt, 1992). From an organizational perspective, network analysis has focused predominantly on the forces leading to the development of a network, rather than on the effects of the network development (Oliver & Ebers, 1998). In those rare cases where the focus is placed on the effect of network development, it is almost exclusively on the power implications of network involvement (Oliver & Ebers, 1998; see, e.g., Burt, 1992). Network analysis has not been used to measure the level of institutional rigidity. Yet, the ability to measure institutional rigidity has significant implications for institutional researchers and, as such, investigations using network analysis to determine the level of institutional rigidity seem warranted.

Critical to applying network principles is defining the appropriate individuals from whom the organizational networks are derived. The participants of interest when discussing institutional factors primarily involve senior managers, since it is this group that generally defines the direction of the organization (Hirsch, 1985). Once individual organizational networks are defined, a collective network can be established by combining the cognitive maps of individual organizations (Kilduff & Krackhardt, 1994). The closer the agreement of individual cognitive networks, the more rigid the combined network and the more defined the institutional environment.

The challenge for the institutional researcher is to define the initial set of organizations from which to derive the tentative institutional map. Previously established categories like those prescribed by the focus on fields (DiMaggio, 1991) or SIC categories defined by the federal government provide a satisfactory starting point. The specific research question may also illuminate a potential list of initial organizations for inclusion. A more complete map can then be established by including significant others identified in the maps of participants but not included in the previously established categories. Likewise, insignificant others included in previous schemes can be eliminated. Defining the level of significance for inclusion or exclusion from the combined institutional network will depend on the research questions being pursued and rely heavily on the interpretive skills of the researcher. As such, the development of a comprehensive institutional map is an iterative process where organizations are included or deleted based on recognition by potential peers and the specific research question being pursued. The clarity and completeness of the institutional map developed define the level of institutional rigidity.

In a perfectly defined institutional environment, peer recognition will be completely complementary. Each of
the participants will include exactly the list of participants found in the list of all other participant networks. Such an extreme state represents perfect institutional rigidity. While it would be near impossible to find a perfectly rigid institutional environment, we can find situations where the level of institutional rigidity is specifically high. One would expect, for example, a high level of mutual recognition among the major automobile producers (Nohria & Garcia-Pont, 1991). This high level of recognition is facilitated by the high visibility of automobile-producing firms in general as well as by the existence of industry-oriented publications (e.g., *Car and Driver, Motor Trend*, etc.) and formal institutional arrangements (e.g., the Automobile Industry Action Group). Not surprisingly, we find a high level of mimetic behavior among automobile-producing firms, with each exhibiting a high level of similarity concerning organizational behavior and structure. This high level of mimetic behavior is indicative of an institutionally rigid environment.

At the other extreme exists an environment where no mutual recognition occurs. In this situation, no two of the same organizations are found in any of the participant maps. Under such a condition, no institutional environment exists. Stated differently, where no mutual recognition occurs, the organizations experience zero institutional rigidity. Again, it is unlikely that we would find a situation of zero institutional rigidity. Nonetheless, we can find examples where the level of institutional rigidity is specifically low. For example, we would expect to see a low level of mutual recognition among firms selling consumer electronics over the internet. The multitude of firms involved in such activity, combined with the lack of any formal linkages among firms selling consumer electronics over the internet, reduces the probability of mutual recognition. Correspondingly, the diversity of behavior concerning the selling of consumer electronics over the internet is significantly high, suggesting a lack of institutional rigidity. More likely, individual organizational networks will combine somewhere between perfect and zero recognition. The degree of agreement in recognition defines the level of institutional rigidity. The greater the agreement, the more rigid the institutional environment.

**THE EFFECTS OF INSTITUTIONAL RIGIDITY**

The ability to measure the level of institutional rigidity has several important implications for institutional researchers. The most obvious concerns the ability better to understand the nature of institutional forces in general. The more rigid the institutional network, the more institutional the network will act. Mimicry, coercion, and similar institutional outcomes (DiMaggio & Powell, 1983) become more prevalent where institutional rigidity exists. Institutional forces can be seen as occurring in degrees depending on the rigidity of the institutional environment. Stated briefly, increased commonality of perception leads to greater institutional rigidity, which further leads to increased mimetic and coercive isomorphism.

In addition, a better understanding of institutional rigidity can lead to increased understanding of the taken-for-granted aspect of certain institutional influences (Zucker, 1983). These taken-for-granted scripts become embedded in the organization largely based on the other organizations from which the focal organization derives its norms of behavior, consciously or unconsciously. By identifying the group of organizations an individual organization conceptually recognizes and the strength of this recognition, we should be able to develop a better understanding of the source of taken-for-granted scripts (Porac, Thomas, & Baden-Fuller, 1989).

The degree of rigidity also provides insight into the types of change expected to occur within the institutional environment. Where institutional forces are minimal, organizations are free to maneuver and experiment with various organizational forms (Leblebici *et al.*, 1991). With minimal pressures for conformity, changes are likely to emerge from within the loosely defined institutional environment. The probability of continued mutual recognition is minimal in situations where institutional rigidity is lacking. Collective agreement does not serve as a binding force and, instead, individual firms react to a variety of external stimuli. This high level of sensitivity to information external to the institutional environment creates a certain level of instability.
(Kauffman, 1995; Stacey, 1996). Correspondingly, firms operating in an environment lacking in institutional rigidity are likely to experience ongoing periods of instability and continuous change concerning the nature of prescribed behavior.

As institutional rigidity increases, experimentation or deviance within the institutional environment is discouraged (Davis, Diekmann, & Tinsley, 1994; DiMaggio & Powell, 1983). Compliance with the institutional expectations becomes the norm. As Jepperson (1991: 149) suggests, once a certain level of institutional rigidity is established, “one takes action by departing from [institutions], not by participating in them.” Perturbations from stimuli external to the institutional environment are less likely to influence individual firm behavior. Correspondingly, firms in an environment of high institutional rigidity are likely to experience extended periods of institutional stability with little or no change in prescribed behavior.

The ability of organizational participants to cause change within the institutional environment decreases with increased network recognition. This decrease in the ability to effect change occurs primarily due to increased conformity obligations until, at the extreme, no organization in the network is capable of altering the institutional arrangements. In a sense, all structural holes (Burt, 1992) of the organizational network are filled, resulting in a complete lack of mobility within the institutional environment. The ability to respond to stimuli external to the institutional environment is constrained by the need for institutional conformity. Environmental jolts (Meyer, 1982) to the institutional environment itself provide the only mechanism for change. As such, change is likely to be infrequent and episodic in nature (Coleman, 1999). Lack of experience concerning adaptation combined with the periodic need for radical change vastly reduces the resilience and robustness of individual firms operating within the rigid institutional environment (Gersick, 1991).

The transition between low and high levels of institutional rigidity is likely to be rather abrupt. Kauffman’s button experiment (1995: 54-8) is illustrative of the ability of a network to transform quickly from being sparsely to being overly connected. A multitude of buttons are randomly tossed about a bare floor. Two buttons are picked up at random and joined together by a thread. Two more buttons are chosen at random and connected. As this process continues, clusters begin to form based on the interconnection of individual buttons. The size of the largest cluster grows slowly until the number of threads is a little more than half the number of buttons. However, once a certain threshold has been reached, the size of the largest cluster grows rapidly. In an experiment containing 400 buttons, the largest cluster goes from under 50 to over 350 as the number of threads goes from just below 200 to just above 250. Kauffman likens the rapid growth in the size of the largest cluster to a phase transition similar to the transition of water to ice.

The institutional networks that emerge as a result of cognitive bonds are likely to evolve in a similar way. The interconnection between individual firms is likely to be of little consequence until a certain threshold number of firms is engaging in mutual recognition. However, once a certain number of firms are engaging in mutual recognition, the transition from a sparsely connected to an overly connected network is likely to be rather abrupt. This phase transition represents a point where the level of interconnection transforms quickly from being a source of potential stability to becoming a constraining force on the ability of individual firms to adapt.

As the level of mutual recognition increases, the possibility of establishing formal institutional linkages also increases. The establishment of formal institutional linkages such as an industry trade association further facilitates the process of mutual recognition. Increased recognition occurs as a result of the readily observable relationships that stem from the newly developed alliance. The probability of AlliedSignal and Eastman Chemical Company mutually recognizing one another as peers, for example, is significantly increased by their shared membership of the Chemical Manufacturer’s Association (www.cmahq.com). Heightened recognition leads to greater institutional rigidity. Thus, the point at which cognitive recognition is converted to formal linkages (i.e., the point at which mutual recognition is sufficiently high to make the formation of formal linkages possible) represents a point at which the level of institutional rigidity and the corresponding constraint...
on the ability of individual firms to adapt increase substantially.

In summary, institutions emerge as cognitively constructed networks based on mutual recognition. Where mutual recognition is low, the institutional environment lacks rigidity. Changes to the institutional arrangement are mainly endogenous, resulting in high levels of institutional instability and continuous change concerning norms of appropriate behavior. Institutions remain primarily cognitive entities until a certain level of mutual recognition occurs. Once that occurs, formal linkages can be established. The establishment of formal linkages further facilitates the process of mutual recognition, thereby substantially increasing the level of institutional rigidity. At high levels of institutional rigidity, changes to the institutional arrangement are mainly exogenous, resulting in extended periods of institutional stability followed by brief periods of episodic change. Lack of experience concerning adaptation combined with the periodic need for radical change vastly reduces the resilience and robustness of individual firms operating within the rigid institutional environment.

CONCLUSION

Concerning the ability to measure the level of institutionalization, Jepperson (1991: 151) proclaims: “This topic represents a persistent weak point in institutional discussion.” Most notably lacking in prior analysis is an attempt to measure the level of cognitive institutional influence. The noticeable lack of empirical research concerning the cognitive nature of institutions is no doubt related to the difficulty in measuring cognitive institutional effects. Cognitive institutional influences reside within the subconscious of the individual actor and, as such, are difficult to identify (Tolbert & Zucker, 1996).

In this analysis, I suggest conceptual bonds as a way of measuring the level of cognitive institutional influence. Conceptual bonds refer to the mental linkages that occur between individual firms. These linkages are established when one firm establishes another (consciously or unconsciously) as an example of appropriate firm behavior. I suggest network analysis as a way of measuring conceptual bonds. Through network analysis, representative participants are asked to identify critical peers. The level of institutional rigidity can then be measured as the level of mutual recognition among peers.

I should highlight that the purpose of this article is not to suggest that institutions be studied solely as cognitive entities. As Scott (1995: 144) proclaims: “Concrete institutional arrangements will be found to combine regulative, normative, and cognitive processes together in varying amounts.” Yet as Scott (1995: 89) also suggests: “In asking how institutions themselves arise and persist, it matters whether they are conceived to be regulative, normative, or cognitive systems.” Given the highly cognitive nature of institutions in general, failure to include conceptual bonds in our study of institutions will lead to conclusions that are incorrect. The use of conceptual bonds as suggested in this analysis proves a format for measuring cognitive institutional influences, thereby illuminating a topic that has, to date, been elusive to institutional researchers.

References


