

X-INEFFICIENCY: INSIDE THE INTERORGANIZATIONAL NETWORK

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ABSTRACT

This paper proposes a comprehensive framework for analyzing the interdependencies between network members as well as the competition between networks in the context of diverse institutional settings. We extend the argument of 'X-inefficiency' (Leibenstein, 1979) beyond the firm and use the concept of 'network resources' (Gulati, 1999) to define X-inefficiency within the network. We propose that the source of 'hierarchical pressure' on networks is the competitive pressure of the market. We explore the possible interactions between market pressure and the nature of hierarchical contract (Stinchcombe, 1985) among the network members. This paper develops some propositions which bring together some recent work and at the same times it links to earlier foundational work on the nature of production.

Keywords: *Network Resources; X-inefficiency; Hierarchical Contract; Market Pressure*

1. Introduction

Network forms of organization are now *ubiquitous* (Gulati, 1998; Thorelli, 1986) and have in recent years attracted substantial interest from researchers from disciplines such as economics (Williamson, 1991; Thorelli, 1986), sociology (Powell, 1990; Podolny & Page, 1998), economic sociology (Granovetter, 1985), and strategic management (Gulati, 1998; 2007; Gulati *et al.* 2000; Khanna *et al.* 1998). This paper emphasizes the importance of studying network forms of organization. A brief review of literature is conducted through the frameworks of economics and sociology. This leads to few specific questions like: How do network members react to the institutional context in which the network located? Is the cooperative and competitive behavior of network members related to the institutional context? If so, in what way? Do inefficient networks convert to other forms of governance in the long run? These are well researched questions but questions have not been completely answered.

This paper proposes a comprehensive framework for analyzing the interdependencies between network members as well as the competition between networks based on the nature of contract between the members in the context of diverse institutional settings. Section 3 attempts to extend the argument of “X-inefficiency” (Leibenstein, 1974; 1978) from “Inside the Firm” (Leibenstein, 1987) to the social context of interorganizational networks where the firms are located. Here we use the concept of ‘network resources’ proposed by Gulati (1999, 2007) to define X-inefficiency within the network. Next in Section 4, we propose that the source of hierarchical pressure on networks is the competitive pressure of the market. This is followed by a brief discussion regarding the interaction between market pressure and the possible nature of contract among the network members (Section 5). We develop some propositions which are summarized in a framework of 2 X 2 matrix in the conclusion. It becomes evident that the arguments from different streams of research lead to a clustering in the various cells.

In brief, this paper attempts to close the theoretical gap between two dimensions: the interdependence between network members and their broader environment in which the network is located. This is done through the lens of hierarchical contract and X-inefficiency respectively.

2. Interorganizational Network: Economics and Sociology Perspectives

The traditional theoretical framework to explain the formation of network organizations or strategic alliances is transaction cost economics (Eisenhardt & Schoonhoven, 1996). Initially transaction cost economics had a dichotomous view of market and hierarchy as alternative governance structures for organizing similar kinds of activities (Coase, 1937) but recent literature considers market versus hierarchy as a continuum rather than a dichotomy. Williamson (1991) argued that the alternatives to pure market or hierarchy are intermediate or hybrid forms. Hybrid or network forms of organization represent a ‘viable pattern of economic organization’ (Powell, 1990) and it emerges when the transaction costs are higher than the market but lower than the hierarchy. Powell (1990) further argued that “it is important to recognize that the network form represents one of three alternative forms of governance, not one of two” (pg. 73). So we do not have the simple alternatives of firms and markets, which translated into organisation theory terminology, would be organisations and the external environment. Instead we have firm like (hierarchical) contracts and market like (spot market) contracts. Firm like contracts can range from a situation where the firm under question has the upper hand (it sets the terms) to where it is at the receiving end; that is the terms are dictated to it.

In recent years globalizations and rapid advances in information technology has played an important role in blurring the boundary between organizations by integrating processes across organizations, leading towards an interorganizational network. For example, if we consider Hollywood film industry, we find it has slowly transformed from integrated hierarchical organizations in 1920s to flexible network hubs during 1950s and 1960s (Chisholm 1993; Jones *et al.*, 1997; Lampel and Shamsie, 2003). Faulkner and Anderson (1987) defined the Hollywood film industry as a “system of recurrent ties among the various major participants who usually work under short-term contracts for single films” (pg. 879). In film industry independent business elements like studios, producers, directors, actors, technical personnel create a temporary network structure, which is project-based and inter-organizational; furthermore inter-personal relationships often sustain beyond particular projects (Manning, 2005). In this case the transaction cost is higher than the market due to the asset specificity of individual business elements but it is not worthwhile to get into a hierarchical structure for the production of a single

movie; since the asset specificity requirements might change for the next production. This is why the degree of flexibility in network forms is lower than market and higher than hierarchy (Powell, 1990). Mostly transaction costs economists focused on the exchange among the members whereas sociologists emphasized the relational aspects among members.

Powell (1990) emphasized complementary strengths and relational aspects as key features of network formation. He further argued that mechanism of conflict resolution among network members mainly depends on the reputational concerns of the network members. The sociology stream argues that networks play a crucial role especially during the emergence of economic institutions that are essentially social constructions. As a result economic rationality of a firm within a network is 'embedded' (Granovetter, 1985) within the social relationships and influenced by the social context. In his seminal work, Granovetter (1985) challenged the neoclassical assumptions of rational, self-interested behavior by individuals and argued the interaction between individuals can be predicated on the basis of social relations. Granovetter (1985) argued that "Standard economic analysis neglects the identity and past relations of individual transactors, but rational individuals know better, relying on their knowledge of these relations." This logic can be extended to the firm level interaction within the network structure. Uzzi (1996, 1997) advanced this stream of research and explored the effect of embeddedness and network structure on economic action of individual firms and how embeddedness shapes organizational and economic activities. He found that embeddedness leads to "unique opportunities relative to markets and that firms organized in networks have higher survival chances than do firms which maintain arm's-length market relationships" (Uzzi, 1996:674). Interestingly the positive effect of embeddedness reverses beyond a threshold point (Uzzi, 1996). He further explored and found that embeddedness "promotes economies of time, integrative agreements, Pareto improvements in allocative efficiency, and complex adaptation" (Uzzi, 1997:35) but beyond the threshold point "embeddedness can derail economic performance by making firms vulnerable to exogenous shocks or insulating them from information that exists beyond their network" (Uzzi, 1997:35). Jones *et al.* (1997) extended the framework of transaction cost economics and integrated with task complexity and structural embeddedness to explore network governance. Hagedoorn (2006) focused on the complex interaction effects of different levels of embeddedness like: environmental embeddedness, interorganizational

embeddedness, and dyadic embeddedness to understand the interfirm partnering sets. Thus it can be said that “Economic sociologists define a network as a form of organized economic activity that involves a set of nodes (e.g. individuals or organizations) linked by a set of relationships (e.g. contractual obligations, trade association memberships, or family ties)” (Gulati, 2007:2). In accord with Granovetter, Gulati also emphasized the embeddedness perspective and argued that network resources can reduce transaction costs when the environment is uncertain.

Other researchers (Khanna *et al.*, 1998; Powell, 1990; Uzzi, 1997; Hamel, 1991) argued that network forms of organization facilitate learning thorough cooperation among members and access to the information flow in the network. Eisenhardt & Schoonhoven (1996) have rightly pointed out that the “logic of transaction cost minimization does not capture many of the strategic advantages of alliances such as learning, creation of legitimacy, and fast market entry” (pg.137). Similarly in the context of joint ventures, Kogut (1988a) identified three main factors: traditional transaction cost argument for economic benefits, strategic behavior to strengthen the ‘competitive positioning of the firm’ and organizational knowledge or learning. These reasons can be extended to the network forms of organization. In brief “... network forms of organization foster *learning* (emphasis added), represent a mechanism for the attainment of status or *legitimacy* (emphasis added), provide a variety of *economic benefits* (emphasis added), facilitate the management of *resource dependencies* (emphasis added), and provide considerable autonomy for employees” (Podolny & Page, 1998:57).

This section is not an exhaustive survey of literature since it would be far beyond the scope of this paper nor is this our intention. Rather, we restrict our attention in order to elucidate the crucial issues from the disciplines of economics and sociology. In recent years, researchers are concerned about the “increasing point of contact between the two disciplines” (Winship & Rosen, 1988:S1) and we argue that *synthesizing these two perspectives will advance theoretical understanding*. This brief review reveals that rationale for alliance formation or emergence of network forms of organization is both the *strategic need* of economic benefit and *social opportunity* emerging from the relational aspects (Eisenhardt & Schoonhoven, 1996). Swedberg (1990) argued that “the border line between the two of the major social sciences is being redrawn, thereby providing new perspectives on a whole range of very important problems both

in the economy and society at large” (pg.5). In the similar line of argument, we also attempt to bridge the gap between the economic and sociology disciplines by using multiple theoretical frameworks like *X-inefficiency* and *hierarchical contracts* in network forms of organization.

3. X-inefficiency beyond the Boundary of Firm

Economists like Adam Smith, David Ricardo argued that in a joint venture the output yielded by the team should be more than the sum of the individual outputs of each of its members due to specialization and comparative advantage. In this line of argument, Alchian and Demsetz (1972) argued that “There exist production techniques in which the Z obtained is greater than if X_i and X_j had produced separable Z. Team production will be used if it yields an output larger than the sum of separable production of Z to cover the costs of organizing and disciplining team members ... (pg. 779).” They further clarified that in the case of team production the output Z involves at least two inputs, X_i and X_j , with

$$\frac{\partial^2 Z}{\partial X_i \partial X_j} \neq 0$$

i.e. the team production function is not separable into two functions involving only inputs X_i or only inputs X_j .

In the context of network governance the contribution of individual members can be monitored by the non-market observers. In the film industries, the individual effort of actors, producers, directors etc. are closely monitored by film critics as well as non-market observers like common audience. Economists have argued that comparative advantage through specialization leads to higher team output; which can be extended to the network of n players consisting of individuals as well as firms.

Social network based approach proposed that the access to ‘*network resources*’ (Gulati, 1999) for all network members “allow firms to leverage valuable information and/or resources possessed by their partners” (Gulati, 2007:8). The concept of firm’s resources in management literature was initiated by Penrose’s seminal work of 1959, where she argued that firm growth is

a dynamic process of interaction between ‘management’ with firm specific experiences and the resources available. Penrose (1959) considered the ‘firm as a collection of productive resources’ and conceptualized the business firm as organizing the use of resources for the production and sale of goods and/or services at profit. This Resource Based perspective was formally established later by Wernerfelt (1984, 1995) where he defined firm’s resources as tangible as well as intangible assets which are “tied semi permanently to the firm” and explored “Under what circumstances will a resource lead to high returns over longer periods of time?” (pg.172). Grant (1991) emphasized the intangible resource as the source of a firm’s capabilities, further leading to competitive advantage. Barney (1991) argued that value, rareness, non-limitability and non-substitutability of firm resources leads to *sustained* competitive advantage. Gulati extended this focus of mainly resources within the firm boundary to the social network based perspective in which firms are located. Gulati (1999) put forward the concept of *network resources* where firms accrue resources, mainly in terms of information, from the interfirm networks in which they are situated. He further emphasized that network resources stem from the firm’s “ties with key external constituents including - but not limited to - partners, suppliers and customers, and thus exist outside a firm’s boundaries” (Gulati, 2007:3). A series of paper by Gulati extended the resource based view from inside the firm’s boundary to not only outside the firm’s boundary but to the social network in which firm is located. Eisenhardt & Schoonhoven (1996) also used the resource-based view of the firm to explore the reasons behind alliance formation.

Economists argued about the comparative advantage thorough individual firm’s specialization, whereas Gulati’s work emphasized the access to resources, which are owned by other network members. We argue that the effort level for accessing and sharing resources of individual entities within the network is a *discretionary variable* and *it depends on the competitive pressure in the market*, hence there is a scope for improvement for individual member organizations as well as the entire network by managing the network resources in an efficient way. We define X-inefficiency as a state where the organizations within the network are underutilizing this ‘network resources’ for some reason and as a result they fail to achieve the desirable efficiency. In Leibenstein’s original version X inefficiency arises because of the *underutilization* of resources as compared to their *improper* use (the theme of allocative efficiency). Labour, machinery or raw materials are not used to their full capacity or full

effectiveness. This led him to focus on the theory of the firm and in particular the firm as an organization. Almost alone among economists he linked discussions on output and performance of the firm with psychology of workers and managers, in particular he showed that the effort supplied by the worker and thus his contribution to the firm depended upon features of the hierarchy. The hierarchy affects the motivation of workers and hence their performance. The nature of the hierarchy and the formal and informal linkages between levels and across levels determine productivity and performance. Another contribution in the same line has been made by Aoki (1984a, 1984b, 1986).

However both the approaches (Leibenstein and Aoki) have limitations in that they are based on a rather restrictive view of the firm as a single unified entity. But the modern firm is a much more complex enterprise where its boundaries are not clearly defined (as we have discussed earlier). The modern firm is a network of independent and quasi-independent enterprises and/or individuals. This development in the nature of the firm has been reflected in developments in management theory and especially in transactions costs economics. Leibenstein's X-efficiency theory has not been applied to it. In this paper we will explore how Leibenstein's and Aoki's work apply to this kind of firm.

In Leibenstein's work X-inefficiency is related to the employment relation where the employees are subjected to pressure to perform in order to reduce costs. But it can also relate to any hierarchical relation where cost efficiency as well as performance criteria are issues. Incomplete contracts can have hierarchical features. In network structures "relational contracts" which are incomplete can also have hierarchical features. Therefore *independent firms linked through an exchange relationship can be in a hierarchical relationship*.

This paper proposes to see Leibenstein's X-efficiency theory in a wider context. True exercise of pressure can lead to X-efficiency gains, but networks are not simple entities. Moreover there are different types of hierarchical pressure. Thus networks differ in their performance and structure and the setting in which they are situated.

4. Interorganizational Contracts as Hierarchical Documents

We argue that one of the principal reasons of network X-inefficiency is the incomplete nature of contracts among the member firms. We emphasize the importance of hierarchical pressure within the organizational network to increase efficiency in economic exchanges. For network this hierarchical pressure could mean “competition between networks” (Thorelli, 1986).

Stinchcombe’s argument is about hierarchical features of contracts between firms and its partners. We argue that this argument can be extended to the all the firms in a network structure. This paper classifies network forms of organization in two types: firstly, where the hierarchical contract is *low*; and secondly, where the hierarchical contract is *high*. The former is similar to *Stable Network* (Miles and Snow, 1992) and the later is similar to *Clan Structure* (Ouchi, 1980) depending upon the nature of hierarchical contracts within the network members.

Similar to Leibenstein we can argue that in stable networks the core firm itself can create the pressure on other members of network by using “Contracts as Hierarchical Documents” (Stinchcombe, 1985). Stinchcombe argues that contracts are often signed between a firm and another even though the tradition of transaction cost economics of Williamson 1975 predicts hierarchical integration. A common example is the defence contract. If the usual way of getting flexible continuous performance over time is a hierarchy then why do firms go for such contracts? The argument put forward by Stinchcombe is that the hierarchy is a general purpose structure for adjusting to an uncertain future flow of events. It is interesting to note that the degree of incompleteness is highest in clan structure and lowest in stable networks. But since we find that there are contractual functional substitutes for hierarchy because of some special circumstances. A detailed discussion follows.

5. Network Governance: Through the lens of X-inefficiency and Hierarchical Contracts

5.1 Model

Consider there are N (where $N \geq 2$) numbers of players with complementary resources (e.g. financial resources and technical know how). They can either offer their goods and/or services in

market/hierarchy structure or form network governance structure. We assume the payoff for each player is the perceived tangible (for e.g. economic rent) and intangible (for e.g. reputation effect in long term) benefits of that individual player. Each network players has *alternate* option of joining other network or continue production as an individual player. The payoff from alternate option for each individual player is P_{Xa} , where $X= 1, 2, 3 \dots N$. If the player joins the network, then the payoffs for that individual player in the network will be P_{Xn} , where $X= 1, 2, 3 \dots N$. We assume that for the survival of network structure for individual players $P_{Xn} > P_{Xa}$. There might be one or more than one focal firm/player in the network structure. We denote the alternate payoff of this central player is P_{Ca} and within the network P_{Cn} .

Similar to Nash (1950) we also define the benefits of network formation as *Network Surplus* (NS) = $\sum P_{Xn} - \sum P_{Xa}$ (Gross surplus minus Alternate Options). We further assume that the output of combined efforts will leads to more value creation than the summation of individual efforts; this assumption is in accord with the both economics and social network argument i.e. Network Surplus ≥ 0 . And finally that the Network Surplus and alternate payoff options for individual players are common knowledge to the network members.

5.2 X-inefficiency: Competitive Market Pressure

This section attempted to close the theoretical gap between the interdependence between the network members and their broader environment through the lens of hierarchical contracts and X-inefficiency respectively. We argue that *the competitive pressure in the market influence both the cumulative network payoff and the distribution of the same among network members depending on the nature of contract.*

Khanna *et al.* (1998) proposed the concept of ‘private’ and ‘common’ benefits among alliances members. They defined private benefits as the benefits for an individual player which “a firm can earn unilaterally by picking up skills from its partner and applying them to its own operations in areas unrelated to the alliance activities” which is similar to our notion of P_{Xn} , i.e. the payoffs for individual player as a consequence of being part of the network by appropriating the resource of other members of the networks otherwise it will be the payoff from alternate option P_{Xa} ; and common benefits are those that “accrue to each partner in an alliance from the

collective application of the learning that both firms go through as a consequence of being part of the alliance; these are obtained from operations in areas of the firm that are related to the alliance” (pg.194) which is similar to our concept of *Network Surplus* ($NS = \sum P_{Xn} - \sum P_{Xa}$). Theoretically there can be extreme possibilities of networks/alliances with only private or common benefits but in reality all network structures will be a mix of both private and common benefits (Khanna *et al.*, 1998). They further propose the concept of ‘relative scope’ of an individual alliance member “to precisely measure the extent of activities in markets unrelated to the alliance as a proportion of all activities conducted by the firms” and they argued that “relative scope can help identify the ratio of private to common benefits” (pg.194). The balance between “the magnitude of the opportunities within the scope of the alliance (common benefits), and, on the other hand, the magnitude of the opportunities that each partner firm has to apply what it learns in the alliance to contexts not governed by the alliance (private benefits)” (Khanna *et al.*, 1998:196) is an interesting framework to explore.

Khanna *et al.* (1998) suggests “higher ratio of private to common benefits leads to greater departures from cooperative and toward competitive behavior” (pg.194). So this discussion of private versus common benefit ultimately boils down to the choice of competition or cooperation behavior between network members. Khanna *et al.* (1998) addressed this issue through the framework of *strategic learning behavior*. They argued that immediately after learning firms can apply the learning in its operation and firms can earn through private benefits whereas to enjoy the common benefits both the partners should learn to “synthesize their knowledge bases.” Theoretically it is quite possible to have situations where the chance of private benefits is extremely high for a player, if a firm can learn enough to reap the private benefits then it will have no incentive to continue the alliances. According to this argument there is an incentive to learn faster than alliance partner. In reality each and every alliance will have a mixed portfolio of private and common benefits; Khanna (1996) also noted that to enjoy a minimum level of private benefits, there is a threshold level of common benefits. Inkpen (2000) criticized this framework. Inkpen (2000) argued that the “collective learning primarily involves learning about the partner in a manner that enables more efficient cooperation” and has limited use beyond the alliance and he further argue that “defining scope in terms of product or geography, the authors have limited the potential richness and insights of the model” (pg.776).

The concept of private and common benefits to the alliance partners proposed by Khanna *et al.* (1998) provides an interesting framework but it has limited application in the context of network forms of organization. Firstly, the implicit assumption is that more the number of players (i.e. $N \geq 2$), the ratio of contribution versus gain for individual members will be low; hence the incentive to terminate the membership for an individual player is almost negligible. In fact opportunistic behavior like terminating membership can have severe adverse impact on reputational concerns beyond the present network and we consider reputational gain as intangible benefits perceived by the player. Kollock (1994) argued that with the increasing environmental uncertainty the exchange members will be more concerned about their own as well as other trading partners' reputation. Secondly, it is assumed in network forms of organization that all members act simultaneously with each individual (and/or firm) doing something for the other individual (and/or firm) and it also involves high reciprocal interdependence (Thompson, 1967) and complementary strengths (Powell, 1990) among the network members. For example, in film industry a great deal of effort is required for analyzing and formulating the problems to convert the *concept to screen* and the standard alliances mechanism will not apply. In order to produce a movie, socio-cultural and technical knowledge of the members is not enough, tacit knowledge which comes through experience in the industry and intuition is required as well; so in film industry when a creative talent joins the network for a particular project he brings lot of intangible resources with him. There is little scope of enjoying private benefits through fast learning and absolutely no benefit from terminating the membership. Moreover in a particular project a number of members, possessing different skills and practicing different techniques are brought together for a specific period and/or project to come up. The members might simultaneously involve in different networks in various capacities (Lampel and Shamsie, 2003).

Presently in the context of changing environments, organizational architecture is rapidly evolving and researchers (North, 1990; Williamson, 1991) are concerned about the effects of institutional context on the firm performance. We argue for network governance structure the market pressure can arise from the institutional environment. Institutional environmental pressure on the network can be mimetic, coercive or normative in nature (DiMaggio & Powell, 1983). Industries which have to “coordinate complex products or services in uncertain and

competitive environments” are increasingly using network governance (Jones et al. 1997:911); it is evident that even emergence of network governance structure is a mimetic isomorphism.

The intriguing question is: What institutional context facilitates the emergence of network forms of organization? Eisenhardt & Schoonhoven (1996) found that “alliances form when firms are in vulnerable strategic positions either because they are competing in emergent or highly competitive industries or because they are attempting pioneering technical strategies” (pg. 136). Similarly Thorelli (1986) also emphasized the importance of competition between networks and argued that “inter-network competition is vastly intensified in the modern economy by inter-product and inter-materials competition as the product, materials and alternate technology spectra increasingly get filled in” (pg. 48). In similar line, we argue that the incentives for network formation are the network surplus (or *common benefits*) which comes thorough cooperative behavior among members. Cooperative behavior emerges, under high market pressure, as each player needs to access other player’s resources, and that network members can produce network surplus by collectively using their resources. Hence we propose,

***Propositions A:** When the competitive pressure will be high network members will try to maximize the network surplus (NS) and it leads to X-efficient network structures.*

***Propositions B:** When the competitive pressure will be low network members will not have enough incentive to maximize the network surplus (NS) and it leads to X-inefficient network structures (i.e. NS will tend to zero).*

5.2 High Hierarchical Contracts: Stable Network

The governance structure in network forms of organization is well researched area (See Jones et al. 1997). In the context of alliance, Gulati (1998) summarized that “Prior research has distinguished among alliance structures in terms of the degree of hierarchical elements they embody and the extent to which they replicate the control and coordination features associated with organizations, which are considered to be at the hierarchical end of the spectrum” (pg.302) and he further argued that one extreme end is “creating a new entity in which they share equity and which most closely replicate the hierarchical control features of organizations” and “At the

other end are alliances with no sharing of equity that have few hierarchical controls built into them” (pg.302). In brief, “Network governance involves a select, persistent, and structured set of autonomous firms (as well as nonprofit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard ex-changes. These contracts are socially-not legally-binding” (Jones *et al.*, 1997:914).

Emerson (1962) explored the power-dependence relations for organization analysis and argued that the control of key resources leads to asymmetric interdependence between organizational players. This argument can be broadly applicable to network forms of organization since Pfeffer and Salancik (1978) argued that an individual firm can gain power by reducing dependence on others and increasing their dependence on the firm. Power may be embodied in the network structure since “structure of interdependence affects the distribution of power in the system” (Gargiulo, 1993:1). Resource like information provided by a member of the network can be crucial for the other members so controlling/manipulating critical information give benefits to the focal player (Burt, 1992). Burt (1992) proposed the concept of ‘structural hole’ in the context of social network, where the structural hole is the crucial link between individuals or entire network. It is not that the network members are not aware of the other networks/network members but structural hole facilitates the information flow between these networks and that why this focal player becomes indispensable, which is the source of power. So the focal player, which might be an individual or firm, emerges in the network forms of organization, is due to the asymmetric interdependence between network members. In game theoretic framework, a central player may also emerge when more than one members form a ‘union’ and engage in collective bargaining with the remaining network members. Gargiulo (1993) argued that in the context of organizational politics a dependent player might change the power relations with a more powerful player by developing a tie with a third actor through the mechanism of two step leverage and cooptation. There might be a situation when there can be more than one central player in a network. Jones *at al.* (1997) also emphasized the interaction of “power and its exercise within the network form of governance” (pg.936).

Alchian and Demsetz (1972) examined the metering problems of ‘input productivity’ and ‘metering rewards’ faced by a firm. They propose that ‘observing behavior of individual input’ can solve the metering problem of individual’s contribution in team production. But the cost of ‘monitoring each other’ has an ‘incentive to shirk’. Hence they propose firms should assign a central agent for monitoring to overcome shirking in team production. This central agent is himself discouraged to shirk by making him the ‘*residual claimant*’ of the earnings of the team and this residual claimant should have the power to revise the contract. This logic can be broadly applicable in the context of network forms of organization, especially for *stable network* where a “large core firm creates market based linkages to a limited set of upstream and/or downstream partners” (Miles & Snow, 1992:64). As a residual claimant, this core firm or the focal player has the incentive to monitor the individual input of other network members.

When the competitive pressure will be high, this core firm has very high incentive towards the survival of network governance structure. As a consequence the core firm will share a minimum threshold level of network surplus (i.e. $\Delta\partial_X$) with all other network members to maximize her individual payoff as a residual claimant. In other words, the core firm compromises its immediate self-interest of opportunistic behavior considering overall benefits from the network. Hence we propose,

Propositions A1: *Under high competitive pressure when the hierarchical contract is high the payoff for all players will be $(P_{Xa} + \Delta\partial_X)$; and the central player will be the residual claimant and her payoff will be: $P_{Cn} + (NS - \sum\Delta\partial_X)$*

Earlier we argued that when the competitive pressure will be low, there is a high probability of negligible network surplus (i.e. $NS \approx 0$). Perrow (1986) discussed how social structures facilitate or constrain the exploitation of power. Jones *et al.* (1997) argued that in network governance power “... may be abused where a few parties control resources” and “abuses of power could generate retaliation” (pg.937). Similarly, Park & Ungson (2001) argued “that strategic alliances fail because of the opportunistic hazards as each partner tries to maximize its own individual interests instead of collaborative interests” (pg.37). Hence we argue that when $NS \approx 0$; and the focal player as a residual claimant try to maximize her own payoff (i.e. P_{Cn}) at the

cost of others. As a consequence for other network members the payoff as a member of the network will tend to less than alternative payoff option (*i.e.* $P_{Xn} \leq P_{Xa}$). The network member will terminate their membership according to our initial assumption of network governance model. We propose market governance structure as a solution to this situation.

Propositions B1: *Under low competitive pressure when the hierarchical contract is high the network structure will dissolve towards a market governance structure.*

Low competitive pressure does not in any way negate the desire for profit maximization either for the core firm or the non-core firm. A situation of power asymmetry leads to a high hierarchical contract. In such a situation the core firm will be motivated to extracting the most from the situation and appropriating it. The firm will bargain hard with suppliers and distributors and have an *arms length relation* with them. An example of this would be the US auto industry till the early 1980s which was dominated by three giant firms (GM, Ford, and Chrysler) each with a very stable market share. Thus there was little competition between the three core firms as well as the three associated networks. The non core firm network members could be associated with different core firms at same point of time.

5.2 Low Hierarchical Contracts: Clan Structure

Ouchi (1980) extended the transaction cost economics framework to explain alternative ways of coordinating activities within firms and argued that firms rely on three basic forms of control: markets, bureaucracies, and clans. He argued that “markets, which are efficient when performance ambiguity is low and goal incongruence is high; bureaucracies, which are efficient when both goal incongruence and performance ambiguity are moderately high; and clans, which are efficient when goal incongruence is low and performance ambiguity is high” (pg.129). Ouchi (1980) further proposed that interdependent technology, which requires teamwork and yield a single outcome, requires a complex contracting process. He proposed ‘clan control’ by analyzing the cultural differences between traditional western firm and Keiretsu structure of Japanese firms. Ouchi (1980) emphasized that ‘all members of the transactional network must share’ information for efficient functioning. Both market and bureaucracy are deviation from reality and most organizations use some elements of the ‘clan control’ which provides a set of ideal

types. In the line of Ouchi, we argue that under institutional context of high competitive pressure (similar to cultural control) set the behavioral norms among the network members, which can serve as an effective control mechanism rather than formal controls originating from power and hierarchy of the residual claimant. In our model, the normative requirements of clan structure are the institutional context of high competitive pressure. The basis of this governance structure will be the attachment to the network to maximize the *network surplus*, which is the ‘Common values and beliefs’ rather than incentives of individual payoff. And the benefits of the *Network Surplus* will be equally shared by all network members. Hence we propose,

Propositions A2: *Under high competitive pressure when the hierarchical contract is low the payoff for all network members will be i.e. $P_{Xa} + NS/N$*

Interestingly the outcome of previous proposition is in the line with the seminal work of Nash (1950), who conceptualizes the bargaining problem as a bilateral monopoly which is a nonzero-sum two-person game but he considered “a theory of n-person games” as a special case of “the two-person bargaining problem” (pg.157). Nash Model was considered under competitive simultaneous as well as sequential moves between parties rather than cooperation. But it seems high competitive market pressure leads to the socially optimal outcome irrespective of hierarchical contract (i.e. *Proposition A1 and Proposition A2*). But if the nature of hierarchical contract is low then it leads to optimal outcome for all individual players (i.e. *Proposition A2*); which is not the case in high hierarchical contract. In case of high hierarchical contracts the residual claimants will enjoy the benefits of socially optimal outcome (i.e. *Proposition A1*).

If the institutional context of high competitive pressure does not exist, the benefits of network formation will be negligible. We argued this condition will lead to inefficient network structure in *Proposition B* and network surplus will also tend to zero (i.e. $NS \approx 0$). In this context the ‘Common values and beliefs’ among network members to share information for efficient functioning will not emerge. No member has the incentive to monitor for achieving coordination, since the benefits of monitoring will be less than the coordinating cost for an individual player. Similarly Park & Ungson (2001) argued that “strategic alliances fail because of the difficulties in coordinating two independent firms (i.e., coordination costs)” (pg.37). As a consequence the

network structure will exist, in an in-efficient way, because of the task interdependence and complementary resource of network members, but it will fail to gain the benefits of network governance due to lack of *conscious coordination* (Barnard, 1938) within the network . Hence we propose,

Propositions B2: *Under low competitive pressure when the hierarchical contract is low then $P_{Xn} \approx P_{Xa}$*

Researchers (Kogut, 1988b; Miles & Snow, 1992; Park & Russo, 1996; Park & Ungson, 2001) argued that a significant portion of network organizations or alliances fails. Researchers used multiple theoretical lenses for better understanding of alliances failures (See Park & Ungson, 2001). This paper earlier argued that when the competitive pressure is low due to the institutional context the network governance structure fails. Park & Ungson (2001) identified the two primary sources of alliance failure: interfirm rivalry and managerial complexity. Similarly we argue, if the nature of hierarchical contract is high due to the resource interdependence and power asymmetry then the network structure fails due to the *interfirm rivalry* as a result of opportunistic behavior by the core firm (i.e. *Proposition B1*) and moves toward an *arms length relation*. But if the nature of hierarchical contract is low then the network structure fails due to *managerial complexity* (i.e. *Proposition B2*) and survives as an in-efficient network structure.

6. Conclusion:

There is plethora of research on different aspects of network governance but very few studies have explored economic performance in the context of network governance structure (Robins, 1993). Firm performance is one of the most important constructs in organization theory (March & Sutton, 1977). Studying the performance of overall network is extremely crucial to take the network research further. We have explored performance of network structures in different institutional contexts (competitive market pressure) and provided a tentative framework for studying the distribution of surplus generated by the network. Our basic propositions may be summarized by means of this 2 X 2 box.

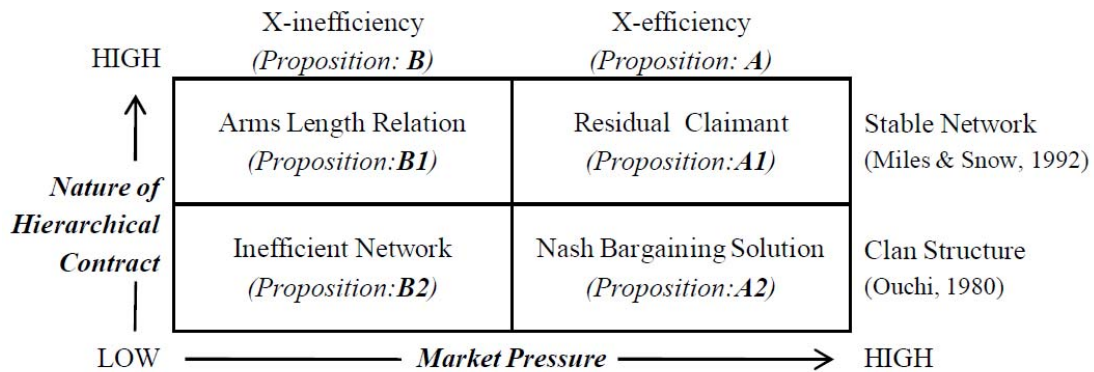


Table1: 2 X 2 Framework of Hierarchical Contract & Market Pressure

We have presented a framework which brings together some recent work and at the same times it links to earlier foundational work on the nature of production. It may be recalled that in team production the task of monitoring and individual agent's performance left to the residual claimant (Alchian & Demsetz, 1972). In a Stable Network this role can be seen to be held by the core firm, which exercises power and imposes hierarchical contract. Interestingly the impact of this is linked to the institutional context of competitive market pressure. In the case of Clan Structure, where there is no power asymmetry, competitive pressure increases network efficiency the benefits of which are equally shared however the lack of competitive market pressure results in classic case of X-inefficiency where network resources are underutilized. This paper considers only competitive market pressure as a proxy for institutional context but there are many other institutional factors which are beyond the scope of this paper.

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