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Organizational Forms in the Electronic Age

By

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ORGANIZATIONAL FORMS IN THE ELECTRONIC AGE

ABSTRACT

There are a lot of discussions in the academic and popular press about the types of organizational forms that have evolved (or are going to emerge) in the Electronic Age. This paper expands the fundamental framework offered by Transaction Cost Theory to understand the impact of emerging information and communication technologies on organizational forms. According to the theory, there are three dominant modes of governance, namely, market, hierarchy, and clan, each suitable for different contexts. In this paper, it is argued that the Internet has increased the efficiency of market-based transactions, thereby increasing the scope of market governance. It has also lead to the emergence of virtual (or boundary-less) organizations based on a new mode of governance, which is labeled self-governance, as a viable mode in certain contexts, that are even less structured than those conducive for clan governance. Extranets have enhanced the scope of network organizations by providing a more viable mode of governance, labeled network governance, which can be positioned between market and hierarchy. Finally, intranets have improved the efficiency of hierarchies thus expanding its applicability. But they have also made clan governance more feasible. In summary, the emerging information and communication technologies have (i) led to the emergence of new modes of governance, (ii) enhanced the opportunity to govern a greater range of exchanges than was possible without them, and (iii) altered the conditions under which the alternate modes of governance are suitable.

1. Introduction

There is a fundamental shift in economics of information in recent times due to emerging information and communication technologies. This shift has resulted in what is popularly called the 'Information Revolution'. This is predicted to lead to changes in industry structures and organizations that operate within them (Evans and Wurster, 1997). In addition to the attention it has received in academic and managerial circles, it has attracted a lot of interest in the public media. As a consequence, most people are quite familiar with arguments that suggest the death of organizations as we know them, only to be replaced by new organizational forms that will be largely dependent on information and communication technologies. While a lot of such writing is hyped, there is a definite impact of the emerging information and communication technologies on fundamental organizing principles, leading to some real changes in organizations. This paper attempts to understand and explicate some of the influences of emerging technologies on organizations by expanding the framework offered by Transaction Cost Theory, and applying it to current and emerging organizational forms.

In Section 2, the fundamental concepts of Transaction Cost Theory are discussed relying mainly on the works of Williamson and Ouchi. The implications of new information and communication technologies on organizations are presented in Section 3. Some enhancements to Transaction Cost Theory to better explain emerging organizational forms are also suggested. Finally, in Section 4, some of the limitations of the new forms of organizations, based on emerging technologies, are highlighted.

2. Transaction Cost Theory

The origin of Transaction Cost Theory is rooted in attempts to answer the questions about why organizations exist. The conceptual underpinnings of this perspective are best

illustrated in the works of Williamson (1975) and its extension by Ouchi (1980), and Williamson and Ouchi (1981). The perspective has gradually evolved to provide a framework for the analysis of a wide variety of organizational phenomena.

Two fundamental assumptions in Transaction Cost Theory, also shared by some other perspectives on organizations, are the concepts of (i) bounded rationality, and (ii) opportunism. Bounded rationality suggests that economic actors (individuals or firms) may have a desire to be rational but their attempts to be rational are bounded by their cognitive limits. They do not have the information processing capacity to process all the information about the context within which they operate in the limited time that is available to them. Also, most problem situations faced by economic actors may not be fully defined, or even if fully defined, all relevant information may not be available to have truly rational decision making. In other words, an individual (or firm) is incapable of behaving rationally even if there is an intent to be rational because (i) most decision making contexts are not fully defined, (ii) relevant information on fully defined problems may not be available and (iii) decisions are made based on the limited abilities of an individual (or firm) do formulate decision problems, and process all the available information within given time constraints.

Opportunism suggests that economic actors do not only act in self-interest, as is assumed by most economic theories, they are capable of pursuing their self-interest with guile. These behavior may include lying and stealing, but can be described for the purposes of this perspective as the incomplete or distorted disclosure of information, especially calculated to mislead, distort, disguise, obfuscate, or otherwise confuse a partner in an exchange (Williamson, 1975). In other words, although they may not always do so, economic actors can sometimes be expected to make calculated efforts to cheat other parties in a transaction, especially when it is difficult for the partners to distinguish opportunistic behavior from expected behavior. For example, a vendor may surreptitiously use inferior

components and charge for high quality components when it is difficult to detect inferior quality after the product is fully assembled.

Within the framework of these two assumptions, transaction cost theory views economic activity as a set of transactions, with the partners involved in the transactions utilizing different means to manage them. According to Williamson and Ouchi (1981):

> Faced with the bounded rationality on the one hand and the proclivity for some human agents to behave opportunistically on the other, the basic organizational design issue essentially reduces to this: organize transactions in such a way as to economize on bounded rationality while simultaneously safeguarding those transactions against the hazards of opportunism.

In the original work of Williamson (1975), two governance mechanisms were suggested (i) market and (ii) hierarchy. These were viewed as two mechanisms that provide low transaction costs in different contexts. Ouchi (1980) extended the arguments of transaction cost theory to suggest the clan mode of governance as a third mechanism that provides lower transaction costs in a certain context different from those suitable for markets and hierarchies.

At a very general level it can be stated that when the level of uncertainty in a transaction is low the market is an efficient mechanism. However, when uncertainty is high, modes of governance that rely on the market are inefficient, and hierarchical (or bureaucratic) modes of governance are more likely to be suited (Barney and Hesterly, 1997). Finally, under conditions of very high uncertainty even the bureaucratic mode fails, and clan governance becomes more suitable (Ouchi, 1980).

2.1 Transaction Costs

In any economic activity, economic actors (individuals or firms) in an exchange may not share common goals. Left to themselves they are capable of pursuing incompatible goals, thus resulting in loss of potentially achievable value. In order for actors to pursue a common economic goal, they need to devise means to ensure cooperation. Cooperative actions involve

transactions or exchanges among parties concerned. Transactions costs are incurred in ensuring cooperation and a fair exchange among the parties concerned (Ouchi, 1980).

Transaction costs arise principally when it is difficult to determine the value of the goods or service that is exchanged in a transaction (Ouchi, 1980), whether it is due to uncertainty or opportunism. The choice of governance mechanisms is guided by the need to minimize the cost of transactions, which essentially means the efficient management of information[i], optimizing contract development, and efficient coordination of the exchanges based on agreed contracts and available information. In other words, transaction costs consist of (i) information costs, related to the search, acquisition, storing, processing, and dissemination of information associated with the transactions, (ii) contracting costs, which refers to the cost of negotiations and contract development, and (iii) coordination costs, related to the activity concerned with satisfying each party to an exchange that the value given and received is in accordance with the formal contractual agreements and expectation. These same costs may also be divided into two categories, depending on when they are incurred. The *ex ante* costs that include the costs associated with identifying partners, and then drafting and negotiating an agreement for transaction(s), and the *ex post* costs that include monitoring costs to ensure compliance, and follow-up costs t[ii]o remedy deviations from the agreement.

2.2 Market Governance

Market transactions or exchanges can be understood as manifestations of contractual relationships. Market governance relies on prices, competition and contracts to keep all parties to an exchange informed of their rights and responsibilities (Barney and Hesterly, 1997). The simplest contract is the spot contract, with all obligations in a transaction being fulfilled at one time. A purchase of a light bulb which is functioning at the time of exchange, with no obligation for future performance may be an example of the execution of such a

contract. A contingent claim contract is a device that "specifies all the obligations of each party to an exchange, contingent upon all possible future states of nature" (Ouchi, 1980:132). Extending the example of the light bulb, a contingent claim contract could include performance warranties for a specified period of time. However, in most cases, the context of exchanges is so uncertain that it may be difficult to include contingent claims for all possible states of nature. A third type of contract is the sequential spot contracting, in which parties in a long-term exchange renew their obligations after short intervals, avoiding the need to predict all possible states of nature. However, this leads to the possibility of first movers to have unfair advantage in the market, and open scope for opportunism. In other words, there are conditions of low uncertainty for which the market mechanisms are efficient because information, contracting and coordination costs are low. They become less efficient as the level of uncertainty increases.

In a **competitive market**, the price arrived at through the market mechanism can be a legitimate estimator of value of the good or service. Also, given large number of suppliers of a good or service, the scope for opportunism may be less. In such cases, the need to acquire and process information is low, the costs of monitoring performance are low, incentives for parties in an exchange to fulfill their responsibilities are high, and simple contracts are easy to enforce. However, as the market gets less competitive, price may not be a reliable indicator of value. Also, smaller number of suppliers increases scope for opportunism. As a result, information, contracting and coordination costs of market governance become very high.

The **frequency of transactions** also has an impact on the transaction costs. Recurring transactions lead to frequent negotiations, writing contracts, monitoring and enforcement of contracts, which increase the transaction costs using the market governance. Since organizations incur costs to develop governance structures, that are amortized across transactions that are assigned to them, it may be economical to use hierarchical structures to

govern high frequency transactions. On the other hand, it may be cost effective to organize occasional transactions through the market (Williamson and Ouchi, 1981).

2.3 Hierarchical/Bureaucratic Governance

Hierarchical / bureaucratic governance bring parties in an exchange under the direct control of a third party. This third party, which may be a manager, then uses authority to inform parties of their rights and responsibilities, and resolves conflicts that might emerge in an exchange (Barney and Hesterly, 1997). The manager also places a value on the contribution of each party and compensates them for it, with an attempt to maintain equity among all parties. The hierarchical mode reduces monitoring costs by allowing a manager to plan work activities for the employees thus reducing chances of opportunism, and also using incentives to prevent economic actors from pursuing opportunistic behavior.

As levels of uncertainty and potential for opportunism increases, bureaucratic governance becomes more efficient. Parties, who could have conducted transactions using market mechanisms, find it beyond their ability, in terms of information, contacting and coordination costs, to manage the exchanges efficiently. For individuals, employment becomes a means of exchanging one's ability to produce something of value with another. Employment reduces the impact of market uncertainties and creates level of trust among parties in an exchange. For firms, it may mean being absorbed into a larger organization. Hierarchical/ bureaucratic governance is a more efficient method of ensuring cooperation among all parities in a set of transactions if the uncertainty and scope for opportunism is high.

When an organization is dependent on one or a **small number** of organizations for transactions, the potential for opportunism is high. A supplier organization, singly or in collusion with others, can influence the market and achieve abnormal margins. In such situations, it may be better for the purchasing organization to lower its transaction costs by

bringing the supplier under its hierarchical control or to produce the product/service on its own rather than rely on the market.

The level of **transaction specific investment** that is required also determines the choice of governance mechanism (Barney and Hesterly, 1997). Transaction specific investment refers to expenditure that has to be incurred that can be amortized over only a specific set of exchanges. The greater the level of transaction specific investment in an exchange, the greater the threat of opportunism. For example, a Firm A has to install specialized equipment to meet the needs of only one client, Firm B. Then, threat of opportunistic behavior from Firm B is very high, and Firm A may be subject to unfair pressures from Firm B. In order to address the issue of opportunism, it is more likely that two parties in an exchange that require transaction specific investment will be brought into the same organization. In other words, transaction specific investment increases the likelihood that a transaction will be internalized under hierarchical control.

2.4 Clan Governance

According to Ouchi (1980), there are two other factors, namely (i) **ambiguity of the measurement of individual performance**, and (ii) **the congruence of the employee's and employer's goals** that influence the choice of mode of governance. Both market and bureaucratic/hierarchical modes of governance rely on some method of measuring individual performance. The market mode relies on market forces, while the bureaucratic/hierarchical mode relies on managerial expertise and organizational monitoring and evaluation processes. Just as the market mechanisms fail when uncertainty becomes too high, bureaucratic/hierarchical mechanisms fail when performance ambiguity is too high. A manager's ability to estimate the value of contribution and maintain equitable exchange is limited, encouraging opportunism, resulting in the need for another mode of governance.

Market governance does not require goal congruence among the parties in a transaction. Market forces ensure that parties cooperate and avoid opportunism, even if their individual goals do not converge. The bureaucratic mode is able to ensure cooperative effort and limit opportunism through managerial control and incentives. However, its ability to do so is limited compared to market forces. A third kind of situation occurs when parties in a set of transactions share common goals. The clan mode of governance is based on the fact that parties that share common goals do not require explicit monitoring to ensure cooperative behavior. Clans employ a traditional type, rather than a rational–legal type of authority, that does not require explicitly auditing and monitoring and performance evaluations is based on subtle signals from intimate co-workers but which cannot be translated into explicit verifiable measures. Hence, clan governance is most suitable when performance ambiguity is very high. In other words, when the performance ambiguity is so high that neither market discipline nor external information and coordination control can ensure cooperative effort, then it is most efficient to rely on the inner drive within individuals and implicit control of clans.

Ouchi (1980) argued that clan-based governance is most suitable for organizations in technologically advanced or closely integrated industries, where teamwork is common, technologies change often, and therefore individual performance is highly ambiguous. Since performance is difficult to evaluate, these organizations obviate the need for evaluation by attempting to eliminate goal incongruence that actually leads to opportunism. Rather than rely on bureaucratic control to monitor and reward required outcomes and punish undesirable outcomes, the clan governance attempts to build organic solidarity by relying on social norms. As a result, explicit auditing and evaluation is replaced by subtle signals from co-workers indicating compliance or non-compliance.

The arguments of Transaction Cost Theory can be summarized as in Table 1. Market governance is the most efficient (that is market based transaction costs are low) when

uncertainty is low, risk of opportunism is low, performance ambiguity is low, and there is no need for goal congruence among parties to an exchange. However, hierarchical/ bureaucratic governance is suitable when there are moderate levels of uncertainty, risk of opportunism, and ambiguity in performance evaluation. Also, all parties share broad goals. Finally, clan governance is most suitable when uncertainty is high, risk of opportunism is high, and ambiguity of performance evaluation is high, but a high level of goal congruence is available or achievable.

Table 1
Modes of Governance, and Context Parameters

Mode of Governance	Uncertainty due to unpredictable changes	Risk due to potential opportunism	Ambiguity in Performance Measurement	Goal Congruence
Market	Low	Low	Low	Low
Bureaucratic/ Hierarchical	Medium	Medium	Medium	Medium
Clan	High	High	High	High

3. Impact of Emerging Information and Communication Technologies on Organizational Forms

Information and communications technologies have affected organizational forms in a variety of ways. As Fulk and Desanctis (2000) suggest, the early information and communication technologies, such as filing systems, the interoffice memo and business meetings contributed to the increased efficiency of bureaucratic modes of governance. They facilitated the reduction of costs associated with organization-based transactions relative to

market-based transactions. This led to many activities, traditionally done in the market, to be brought within the boundary of organizations resulting the emergence of large organizations run primarily on hierarchical/bureaucratic control. Similarly, the telephone, the telegraph, and mail systems reduced the costs associated with transactions associated with geographically distributed organizations. These changes contributed to the development of multi-divisional organizations. Just in the same way, emerging information and communication technologies are affecting the costs associated with various transactions. which are leading to, and are likely to lead to, further changes in organizational forms.

There are five broad features of emerging information and communication technologies that have the ability to influence organizational forms (Fulk & Desanctis, 2000). The first is the dramatic increase in the speed of communication, particularly in terms of high volume of rich information that may be moved over large distances. The second is the reduction in technology costs that has led to a wider penetration of technologies. The third is the sharp rise in communication bandwidth, which allows multimedia communications. The fourth feature is the vastly expanded connectivity of a large number of individuals and organizations. The fifth element is the integration of multiple technologies, which is referred to as convergence. These characteristics of emerging technologies clearly suggest that there will be a greater implementation of information and communication technology in and around organizations. In the remaining part of this section, we will examine the impact of these technologies on transactions costs, and their implications for organizational forms.

Discussions on the potential impact of new technologies on organizations can be organized in a variety of ways. In this section, the arguments are organized around three broad applications of these technologies (i) the Internet, which connects everyone, but most importantly connects customers and also competitors to the organization, (ii) extranets, which connect an organization to other organizations it deals with, particularly its suppliers and

dealers, and (iii) intranets which connect individuals within an organization (Evans and Wurster, 1997). Each of these applications may have significant overlaps with each other in their actual operations, but since they can conceptually be separated, they will be discussed separately for ease of presentation.

3.1 Internet

The internet can be conceptualized as an information and communication technology system that facilitates communication among organizations, suppliers, customers and even competitors. By making information easily and cheaply available to such a wide cross section of entities, the Internet has the potential to (i) increase the scope of market governance, and lead to the (ii) emergence of self-governance as a new mode to manage transactions.

3.1.1. Increase in Scope of Market Governance. The Internet's ability to increase the scope of market governance has two dimensions. On the one hand, it can allow transactions that would otherwise not have been possible. On the other, it can reduce the transaction cost of market governance relative to bureaucratic/ hierarchical governance leading to transaction that were traditionally conducted within the organization to be conducted in the market.

How does the Internet facilitate transactions that were not possible earlier? Information has always been a part of physical products, but was never seen as separate (Evans and Wurster, 1997) as there were no tools to deal with them separately. The Internet has allowed for the separation of the two. Organizations can now pay greater attention to the information aspect of their products, thus moving from a reliance primarily on transportation systems to a greater emphasis on information systems (Fulk and Desanctis, 2000) to conduct transactions.

Prior to the Internet, there was a compromise between richness and reach of information because of the reliance on dedicated communication channels. Richness consists

of the three aspects (i) bandwidth or amount of information transferred from sender to receiver, (ii) the degree of customization of information, and (iii) the level of interactivity (Evans and Wurster, 1997). Rich information was very expensive to disseminate and hence there was a limit on the extent to which rich information was transferred. And, in order to increase reach, richness of information had to be compromised. The Internet allows organizations to overcome this compromise, by making possible transfer of rich information with tremendous reach. This has greatly reduced transaction costs, primarily the information costs, associated with transactions among geographically dispersed parties.

The information costs for a potential customer have been reduced, because the easy and cheap availability of rich information on a product/service and its alternates reduces the influence of bounded rationality, thus reducing the impact of uncertainty. Full information about the product or service also reduces the scope for opportunism[1]. Finally, the ability to compare performance standards to other product with ease, and easy access to product ratings and comments by past users reduces ambiguity in measurement of performance. By reducing the uncertainty, risk of opportunism, and ambiguity of performance, the Internet permits transactions to occur at even lower levels of goal congruence than was possible earlier. In that sense, transaction that were almost impossible can now occur without too much hassles, with the help of the internet. This is indicated as A1 in the schematic shown in Figure 1.

For example, Dell Computers has 'online' enabled its order processing so that individuals/organizations can 'custom' order their needs and even track the progress of their order[iii]. Amazon.com allows persons anywhere in the world make purchases, without significant difference in transaction costs – the information, contracting and coordination costs associated with any purchase at Amazon.com is the same. Similarly, Fabmart in

[1] Contract enforcement still remains a problem, which may explain the greater acceptance of business to business transactions, and consumer to business transactions from well reputed organizations that enter the e-commerce domain.

Bangalore is an example of an organization that has placed substantive portion of its value adding activity in the domain of the electronic market. While some of the transactions at Fabmart would have occurred even without the Internet, the Internet allows a larger number of transactions that would otherwise not be able to complete because of high transaction costs. The Internet has extended the ability of the market. with active participation from the customer, to be used to conduct transactions that were not possible before.

How does the Internet reduce the cost of transactions conducted in the market, relative to those conducted within the organization? The Internet essentially increases the information processing capacity of a customer, and also provides a cheap way for an organization to provide richer information to the customer. As a result, some activities that were done within organizations, as they were too difficult to conduct in the market, can now be done outside the market with a greater participation of the customer. For example. the Indian Railways has placed its ticketing and reservation availability information on its website. A traveler can visit the site and have complete information on availability of tickets, routes, schedules, and even book the ticket online if he/she has a prepaid card. Similarly, airline tickets can be purchased and hotel rooms can be reserved using the Internet. Without the Internet, organizations would have to conduct a significant amount the information processing related to selection of item/service purchase which can now be done by the customer.

The Internet also reduces coordination costs by allowing customers to monitor the execution of the contract. Continuing with the example of Indian Railways, a customer can check his/her seat number or movement from waitlist to confirmed reservation, and even view changes in schedule without having to travel or rely on the phone system. Further, if a transaction requires future obligations, the Internet facilitates their coordination. For example, courier companies allow customers to track the progress of their package as it moves towards

its destination. Without the Internet, an entire department had the responsibility to answer queries from customers regarding the status of the packages.

The Internet has essentially improved the ability of customers as well as organizations to address the problems of uncertainty, risk and performance ambiguity by providing a means of disseminating and processing rich information. Greater participation of the customers in the transactions increases their goal congruence with the organization. This allows organizations to move some of the activities at the interface with the customer to the marker rather than retain them in the organization. This is shown as A2 in Figure 1.

3.1.2 Emergence of Self-Governance. In addition to increase the scope of markets and the impact on the interface between market and hierarchical governance, the Internet has created the scope for a new mode of governance beyond the clan mode of governance, which may be labeled 'Self-Governance'. The emerging organization form is the virtual (or boundary-less) organization. The Internet permits the coordination of activities that are quite unorganized, which made them almost impossible to govern in the past. Volunteer groups, scientific research communities, other similar informal groups are relying on the Internet to facilitate efficient transactions among themselves. For example, the Soar Group is a virtual organization engaged in research and design of a general-purpose artificial intelligence architecture. The group emerged in an unplanned manner from voluntary participants of academic and corporate researchers and has no single shared physical setting (Ahuja & Carley, 1999). There is a similar virtual organization working together with the purpose of developing Linux as an operating system, and software based on it. The organization develops open-source Linux based software through the efforts of thousands of people around the world who have never worked together or even met each other except online[iv]. These people can function in such a setup because they have tremendously high level of goal congruence – their desire to make software cheaper and accessible to a larger base of people.

Their reward is typically global recognition and the satisfaction of seeing their idea adopted by others.

Within the framework of transaction cost theory, the exchanges in these virtual organizations may be seen as occurring in highly uncertain environments, with very high risks of opportunism, tremendous ambiguity in measure of performance. The environment is very uncertain because the outcome of these long-term projects may be subject to tremendous external changes; they may have to be abandoned. The risk of opportunism is high because individual participants may utilize learning from the participation and quit or use information in their favor, jeopardizing the existence of such organizations. Since these projects do not have clearly defined operative goals, they are very difficult to evaluate in terms of progress. The only reason that these virtual organizations can function is that the participants have a very high degree of goal congruence. This is shown as E in Figure 1.

3.2 Extranet.

Extranets are asset specific investments, which leads to virtual vertical integration. Extranets allow companies to create a shared information space with their suppliers, business partners, and consultants. The extranet can be used to integrate some of the business process directly in their customer's or suppliers' value chain so there is a seamless functioning (Gerstein, 1992). It provides a tool for just-in-time supplier relationships and a medium for collaboration with business partners. Unlike the Internet, an extranet does not provide access to everyone. It is a secure, password-protected area on an organization Web site that contains customized business information accessible only to certain organizations/individuals with whom the organization has exchanges. It is a fast, convenient, and relatively low-cost way to provide rapid, seamless communications among all parties concerned (Schwarzwalder, 1999).

Extranets are leading to resizing and rescoping of organizations (Fulk & Desanctis, 2000). By making transactions based on the market more efficient, extranets are leading to

organizations deciding to focus on the core business activity, and outsourcing other activity. Outsourcing uses a network mode of governance that is positioned somewhere between the market and hierarchical/bureaucratic mode of governance. The levels of uncertainty, risk of opportunism, and performance ambiguity are high enough to prevent organizations from going to the market, and organizational extranets enhance the ability of bureaucratic/ hierarchical control to deal with arms length partner organizations. Outsourcing results in smaller core organizations and a proliferation of supplier organizations that may be part of networks of several organizations.

Monge and Fulk (2000), following Powell (1990), suggest the network structure is an intermediate organization form between market and hierarchy. While the term network structure has been used to describe a wide variety of organizations forms, including geographical distributed units of a single organization, the term is used here to refer to the semi-hierarchical mode that allows multiple economic actors to work together sheltered from the market influences. If an organization establishes an extranet and includes certain suppliers, it increases the efficiency of market-based transactions. Since the amount of information to be processed is much smaller information cost of the extranet is much lower than the information cost of a general Internet access. This tends to encourage supplier or outsourcing relationships, without the need bring the manufacture of the component in-house. These lead to the development of network organizations. The scope for opportunism may increase because of the asset specific investment, but greater scope for monitoring prevents the negative effects.

A distributor can place contract pricing and real-time bonded inventory information its extranet allowing buyers to purchase parts online at prices based on their contracts with suppliers. The systems also enable buyers to monitor the status of POs and track shipments of parts. For example, retailers supplied by Nestle USA can place orders and check order

status on line via the candy maker's new website, www.NestleEZorder.com. Nestle USA hopes 2,500 retail customers will be using the site. Cisco Systems posts it requirements for components on its extranet. Cisco's suppliers, about 30 in number and only 2 owned by the company, post their quotes within hours, which amounts to a sort of real-time bidding[v]. This helps the organization keep its stock low. The suppliers also post their quarterly forecasts, so that CISCO can also benefit from the information input about trends in the market. Similarly, Dell Computer has used the extranet to improve its supply chain. The company's supply chain is supported by 2 Web tools that constitute an extended extranet that enables customers to order customized products and track their pre-delivery status, and gives suppliers immediate access to Dell's present and forecast future buying needs.

If an organization links both distributors and customers to its extranet, then the organization can focus on only the core activities. Even the supplies arrive just in time. without explicit effort. For example, Adolph Coors Co. in Golden, Colorado, has used the extranet to integrate its distributors with suppliers. As orders flow in, the back end of the extranet places orders to some 60 vendors, each responsible for providing specific products. such as T-shirts or hats. (Cope, 2000). Similarly, an extranet links Walmart to its suppliers Proctor and Gamble, which in turn is connected to its supplier 3M. If Walmart decides to stock more nappies, the information flows to Proctor and Gamble and 3M, thus integrating the processes in three different organizations. General Electric expects to cut 15% of its cost base of $ 100 billion in both 2001 and 2002 by using the electronic auction on its extranet.[vi] In India, Maruti Udyog has implemented its extranet that allows it to manage its suppliers with greater efficiency than was possible without it. Mysore Paper Mills also uses the extranet to get its registered suppliers to bid for tenders.

In summary, the extranet has led to the emergence of a new mode of governance called network governance, which provide an efficient mean of managing exchanges at the interface of the market and the hierarchy.

3.3 Intranet.

The Intranet affects the transaction costs associated with bureaucratic/hierarchical modes of governance. The bureaucratic mode of governance is relies on a third parties' ability to coordinate transactions between two parties better than the market. The greater the uncertainty, risk of opportunism, and performance ambiguity associated with the transaction the more likely the manager is expected to have a control. This is likely to lead to narrow span of control and tall hierarchical structures. Information technology affects the information processing capacity in ways that can increase or decrease centralization, depending on the choice of the adopters (Fulk & Desanctis. 2000). It has the capacity to rationalize tasks and electronically monitor process and output. thus increasing centralization. At Ford, its 170,000 staff receive a weekly note from the CEO every week which tells them where they want the business to go, and there is a website which is upgraded several time a day that is accessible to all its employees. William Nuti, President of Eurpoe, Mid-East and Africa for Cisco Systems, goes further to monitor whether his emails are read or not and then calls those who have not to remind them. This can lead to extreme centralized control.

Alternatively it has the capacity to make global information available to local operators thus encouraging decentralization. For example, Xerox has designed its intranet, which provides employees with the ability to find and share corporate knowledge quickly and easily. A big part of Xerox's portal is that it is always changing to better adapt to the needs of its users.

The Intranet also has the capacity to improve horizontal coordination. Traditionally coordination of complex tasks required co-location to permit rich communication. Parties

were often located close to each other leading to large organization, or they relied on the market to provide that output. Now communications technology improves the choices available to organizational designed – fine grain design. Make inside if essential (rely on Intranet, move out if not (rely on Internet or extranet). For example, Verifone is a firm that relies 100% on the intranet to coordinate its geographically distributed organization units. The intranet can be used by all employees to contribute without time and distance limitations. It can be used to disseminate information and expertise, particularly to people located remotely. It can be used to create ad hoc groups and enhance collaboration at a distance while maintaining a bureaucratic mode (Gerstein, 1992).

While as suggested above, new information technology can be used to improve the efficiently of bureaucratic control, it can also be used to improve the function of the clan from of governance. Applegate (2000) in her study found that

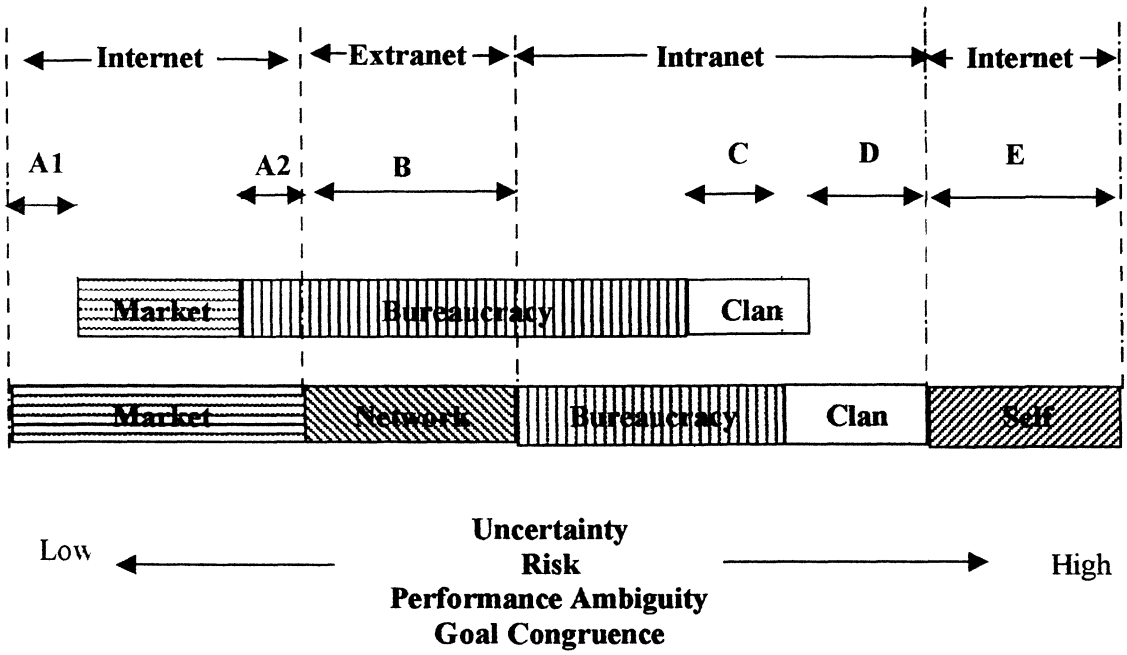
> "through the design of (a) team-based structure, (b) shared authority and incentive systems, (c) networked coordinating mechanism, and (d) interactive, real-time, information-enable operating and management processes, the study firms were able to develop a shared understanding of the business and shared purpose that mediated the development of collaboration and became the foundation of defining a new approach to managing both autonomy and control.

In other words, the intranet can be used to develop the clan governance from managing small groups to managing large numbers of people who may be remotely located. In that sense, the intranet expands the scope of using clan governance to a larger range of transactions. For example, CISCO uses the intranet to build organic solidarity among members of geographically distributed development teams. Similarly, Nortel uses its intranet to increase commitment of employees of its suppliers working on its project, allowing it to rely on less bureaucratic modes to monitor their progress.

In summary, the intranet improves the functioning of the hierarchical/bureaucratic mode of governance, and expands the scope of the use of clan mode of governance.

The effects of the Internet, extranets, and intranets can be shown as in Figure 1.

Figure 1
The impact of Information and Communication Technologies on Organizational Forms



A1 and A2: The increase in use of market based governance because of the Internet.
B: The emergence of the network forms of governance because of extranets
C: The increase in use of hierarchical forms of governance because of intranets.
D. The increase in use of clan governance because of intranets.
E: The emergence of self governance because of the Internet.

4.0 Limitation of emerging IT

4.1 Internet

While ease and access to information is increasing, there is a problem of information overload. The Internet has had a greater impact on facilitating the availability of information without necessarily improving the ability of the user to intelligently use all the information.

As a result, problems due to bounded rationality may continue despite the availability of information.

Similarly for organizations. initial installation suggested an improvement in information processing capacity. However, the volume of information available, and the inability to separate good from bad information eliminates the ability of improved information processing capacity to improve decisions. Finally, managers seem to use information that is provided by people who they can also physically interact (Scoot Poole. 2000).

The Internet exposes organizations to disturbances from the environment. Its internal systems that were normally insulated from the outside world are exposed to the problems from viruses posted on the internet and from hackers who can destroy very valuable internal information. The tighter the organization is integrated to the outside world the more likely it is to be susceptible to disturbances. Firewalls and computer security systems are attempts to address this situation.

2.2 Extranets

External disturbances in the extranet are less than the Internet because access is protected and control. However, tight integration due to extranets, quickly transfer disturbance in one part of the network to other parts of the organization The new organization forms that build connections to customers and suppliers as so tightly coupled the even relatively small perturbations can lead to major disruptions (Scott Poole, 2000).

While the extranet is great in connection functionally all that needs to be connects, the lack of a common organizational (and even national) culture can effect the ability to build a sense of mission and community in the multiple units that require to function in coordination. Further fluid assignments, remote working and lack of formal interactions can also make it difficult to build trust which is essential to function of organization (Scoot Poole, 2000)

The extranet provides a loss of control relative to the hierarchy. This could lead to greater levels conflicts and inter-unit power rivalries because there is not one who can control them (Scott Poole, 2000)

4.3 Intranets

The Intranet is helping reduce layers in organization and making redundant certain jobs that were essential. Since many of the information processing tasks are being taken over by information technology, there will be a loss of jobs during the transitions. Also, just like the industrial revolution created large organizations that led to de-skilling of a lot of blue-collar jobs, the information technology revolution is also capable of doing that with a different layer of white collar jobs (Victor & Stephens, 2000). Information technology has taken away so much from the lay operator that often they do not understand the processes. As a result, the entire system becomes very unstable. The operators don't understand the technology, and the technologies don't understand the operations. This can exaggerate minor problems in complex operations (Scoot Poole, 2000). For example, cashiers at grocery tills cannot correct a mistake they have made because the technology will not all them. They have to wait for the supervisor who has the code to override mistakes. Finally, even as people talk of empowerment, the technology can be used to undermine empowerment, and reinforce traditional hierarchal values and increase power in the hands of a powerful few just as the industrial revolution concentrated of power in the hands of a few (Scott Poole, 2000).

Intranets may be insulated from the Internet, but it sometime so tightly couples the parts of an organization that a minor disruption reverberates throughout the entire organization. A server breakdown because of one user can freeze activities in an entire organization (Scoot Poole, 2000)

The Intranet may be used to develop flat structure with clan modes of governance. But in societies where movement up the hierarchy is a source of motivation, the clan-based

modes may lead to reduced motivation (Scoot Poole, 2000). Also, the lack of formal roles, the group's pressures and the need to be available around the clock leads to stressful work environment. Coping with the instability of jobs in such environment, and the stress levels can be quite high.

5. Conclusion

This paper expands the fundamental framework offered by Transaction Cost Theory to understand the impact of emerging information and communication technologies on organizational forms. It is argued that the Internet has increased the efficiency of market-based transactions, thereby increasing the scope of market governance. It has also lead to the emergence of virtual (or boundary-less) organizations based on a new mode of governance, which is labeled self-governance, as a viable mode in certain contexts, that are even less structured than those conducive for clan governance. Extranets have enhanced the scope of network organizations by providing a more viable mode of governance, labeled network governance, which can be positioned between market and hierarchy. Finally, intranets have improved the efficiency of hierarchies thus expanding its applicability, and have also made clan governance more feasible. However, before designing organizational forms based on the potential offered by these technologies, need to acquaint themselves with the limitations that may sometimes be quite debilitating.

Reference

Ahuja, M.K. & Carley, K.M. (1999) Network Structure in Virtual Organizations, Organization Science, Nov/Dec.

Applegate, L.M. (2000) In Search of a New Organizational Model: Lessons from the Field, in DeSanctis, G. and Fulk, J. (eds) Shaping Organization Form: Communication, Connection, and Community. Sage Publications.

Barney, J. B. & Hesterly, W. (1996) Organizational Economics: Understanding the Relationship between Organizations and Economic Analysis, in Clegg, S.R., Hardy, C. & Nord, W.R. (ed.) Handbook of Organization Studies, Sage Publications: 115-147.

Constant, D., Sproull, L. and Kiesler, S. (1996) The Kindness of Strangers: The Usefulness of Electronic Weak Ties to Technical Advice, Organization Science, 7(2), March/April.

Dutton, W.H. (2000) The Virtual Organization: Tele-Access in Business and Industry, in DeSanctis, G. and Fulk, J. (eds) Shaping Organization Form: Communication, Connection, and Community. Sage Publications.

Evans, P. B. & Wurster, T.S. (1997) Strategy and the New Economics of Information, Harvard Business Review, September-October: 71-82.

Evans, P.B. & Wurster, T.S. (1999) Thinking Strategically about E-Commerce, The Boston Consulting Group Website.

Fulk, J. & DeSanctis, G. (1999) Articulation of Communication Technology and Organizational Form, in DeSanctis, G. and Fulk, J. (eds) Shaping Organization Form: Communiction, Connection, and Community. Sage Publications.

Gerstein, M.S. (1992) From Machine Bureaucracies to Networked Organizations: An Architectural Journey, in Nadler, D.A., Gerstein, M.S., Shaw, R.B. & Associates (ed.) Organizational Architecture: Designs for Changing Organizations. Jossey-Bass.

Gurbaxani, Vijay & Whang Sungjin, " The Impact of Information Systems on Organizations and Markets", Communication of ACM, January, 1991, 34 (1): 59 - 73.

Kulkarni, S.P. & Heriot, K.C. (1999) Transaction Costs and Information Cost as Determinants of the Organizational Form: A conceptual Synthesis, American Business Review, 43-52.

Monge, P. & Fulk, J. (2000) Communication Technology for Global Network Organizations, in DeSanctis, G. and Fulk, J. (eds) Shaping Organization Form: Communication, Connection, and Community. Sage Publications

Ouchi, W.G. (1980) Markets, Bureaucracies, and Clans. Administrative Science Quarterly. 25:129-141.

Scoot Poole, M. (2000) Organizational Challenges for the New Forms, in DeSanctis, G. and Fulk, J. (eds) Shaping Organization Form: Communication, Connection, and Community. Sage Publications.

Victor, B. & Stephens, C (2000) The Dark Side of New Organizational Forms, in DeSanctis. G. and Fulk, J. (eds) Shaping Organization Form: Communication, Connection, and Community. Sage Publications.

Williamson, O.E. & Ouchi, W.G. (1981) The Markets and Hierarchies and Visible Hand Perspectives in Van de Ven, A.H. and Joyce. W.F " Perspectives on Organization Design and Behavior", Wiley: 347-370.

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[i] Despite suggestions by Kulkarni and Heriot (1999) that transaction costs and information costs are different, in this paper information costs have been treated as part of transaction costs. This is consistent treatment of these costs by Don Tapscott in Digital Capital.

[iii] Economist, Novemeber 11, 2000
[iv] Economist, November 11, 2000
[v] Economist, Novemeber 11, 2000
[vi] Economist, Novemebr 11, 2000