

# **Strategic Control**

**in**

## **The Extended Enterprise**

**Benn Konsynski**  
**Emory Business School**

### **ABSTRACT**

The author examines the strategic role of information systems in "extending" the enterprise. These issues emerge as essential considerations in the strategic alignment of the investment in information technology and business strategy. Information technologies transform organizational boundaries, interorganizational relations and marketplace competitive, and cooperative, practice. The paper presents a framework of *strategic control* that informs the planning and execution of these investments in information technology for business transformation, seeking increased *understanding* and *influence*. Emerging information technologies change the limits of what is possible in the leverage of strategic control through transformation of boundaries, relations and markets.

# Strategic Control in The Extended Enterprise

Benn Konsynski  
Emory Business School

<b>Extending the Enterprise.....</b>	<b>1</b>
<b>Systems that Transcend Organizational Boundaries.....</b>	<b>2</b>
<b>IT Role: Boundary Spanning and Enterprise Extension.....</b>	<b>3</b>
<b>Transforming Boundaries, Relations and Markets.....</b>	<b>4</b>
<b>Information, Organization, and Control.....</b>	<b>6</b>
<b>Control: Understanding and Influence.....</b>	<b>8</b>
<b>What is Strategic Control?.....</b>	<b>8</b>
<b>Controls and the Market.....</b>	<b>10</b>
<b>Information Intensity: IT Changing the Limits of the Possible.....</b>	<b>11</b>
<b>BOUNDARIES: Enhancing Understanding and Influence.....</b>	<b>13</b>
<b>Information Technology Role in Organization Transformation.....</b>	<b>16</b>
<b>Forms of Organizational Support Systems.....</b>	<b>17</b>
<b>Spanning the Boundary: Understanding the Competitive Marketplace.....</b>	<b>19</b>
<b>IT Transforming Environmental Monitoring.....</b>	<b>21</b>
<b>Environmental Monitoring and Distributed Problem Solving.....</b>	<b>23</b>
<b>RELATIONS AND PARTNERSHIP.....</b>	<b>24</b>
<b>Information Technology ACROSS Boundaries - LINKAGE.....</b>	<b>24</b>
<b>What is EDI?.....</b>	<b>25</b>
<b>EDI as an Extension of Internal Transaction Processing Systems.....</b>	<b>26</b>
<b>EDI as a Partnership Arrangement.....</b>	<b>27</b>
<b>Alliances and Information Partnerships.....</b>	<b>29</b>
<b>IT Role in Building and Sustaining Partnerships.....</b>	<b>30</b>
<b>Forms of Partnership.....</b>	<b>32</b>
<b>Intra-industry Coalitions.....</b>	<b>32</b>
<b>Customer-Vendor Relationship.....</b>	<b>32</b>
<b>Customer-Supplier Linkages.....</b>	<b>32</b>
<b>What is Shared in Partnership?.....</b>	<b>33</b>
<b>Partnership: Control Over Key Integration Factors.....</b>	<b>33</b>
<b>Bringing Something to the Technological Table.....</b>	<b>34</b>
<b>MARKETS and INDUSTRY PLATFORMS: Public and Private.....</b>	<b>35</b>
<b>Rationalizing Fragmented Markets.....</b>	<b>35</b>
<b>Linkage and Industrial Policy.....</b>	<b>37</b>
<b>Example: Participants and the Process of Alignment.....</b>	<b>39</b>
<b>Singapore TradeNet.....</b>	<b>41</b>
<b>Hong Kong: Hotline and Tradelink.....</b>	<b>42</b>
<b>Norway: The TVINN System.....</b>	<b>43</b>
<b>Public Policy and Strategic Control.....</b>	<b>43</b>
<b>Conclusion.....</b>	<b>45</b>
<b>References.....</b>	<b>47</b>

# Strategic Control in The Extended Enterprise

Benn Konsynski  
Emory Business School

## Extending the Enterprise

---

The traditional view of the organization with clear boundaries, limited relationships with other organizations, and a focus on internal efficiency and effectiveness is no longer adequate. Today's organizational boundaries are blurring, partnerships with clients and competitors are commonplace, and quality and efficiency issues extend well beyond the traditional enterprise boundary. The major strategic successes involving information technology in the last two decades have involved a redesign of inter-organizational relations. The now familiar stories in the airlines, hospital supplies and banking industries are not anomalies, but merely the tip of an emerging trend in new organization alliances, boundary redefinition and market structures. New product and service offerings, channel systems capabilities, and target marketing initiatives are enabled through these partnerships, alliances, and information interchange arrangements. These new organizational and market relationships are made possible through systems that cross organizational boundaries.

The management challenges are huge, messy, interfunctional, longitudinal and rich in operational and strategic threats and opportunities. The upside potential lies in the opportunity to effect a changing of the "rules" in the marketplace. The downside risk may even be life-threatening to the enterprise. In either case, inaction is not an option in many industries.

The constraints in leveraging information technologies in the the pursuit of "changing the rules" in an industry, or merely in a relationship, are both real and significant to the general manager. The structure of business processes across organizational boundaries is both an academic challenge and a senior management concern. Traditional concepts of organizational boundaries are challenged by these new organizational arrangements that blur distinctions between legal entities and create new opportunities for strategic initiatives. Strategic Alignment is an essential tool in designing and managing these new forms of partnership and alliances.

The framework presented in this paper is the result of the author's experience with more than 40 organizations that have pursued information technology initiatives that enhanced their strategic control within their organization, at the boundary, in relations and alliances, and in common practice and industry platforms in the marketplace. Obviously, this single lens on the

complex issues of strategic alignment is necessarily incomplete. It has been the author's experience, however, that many important opportunities have been missed through the neglect of impacts of information technology initiatives on boundary systems (ex. sales and service representatives), interorganizational relations (ex. electronic data interchange and database sharing), and marketplace systems (ex. IVANS in the insurance industry and Transnet in the automotive parts marketplace). The framework permits an examination of derived value through impact on the control systems in IT projects that "stretch" the enterprise.

### **Systems that Transcend Organizational Boundaries**

In their quest for operational efficiencies and competitive position, organizations today are more frequently looking beyond their traditional boundaries for cooperative arrangements. New inter-organizational arrangements, which variously take the form of strategic alliances, vertical integration, and new business partnerships and associations, are enabled through the leverage of unique information interchange relationships--electronic linkages across organizational boundaries. Because their impact on competitive position, market channels, logistics, distribution and administrative practices can be profound, attention to these initiatives could be one of the top items on the general manager's agenda for the next few years.

The variety of opportunities managers face in defining their relations, both formal and informal, with other organizations is growing. New technology-based information sharing support linkage initiatives that effect costs, time, integration, and operations facilitate a broad set of business activities and relationships designed to foster cooperative and competitive market situations.

Information technologies have a fundamental impact on business relationships among cooperating and competing entities in a market. When properly executed, information technology involvement in business process redesign enables companies to offer novel products, incentives and services, participate in new marketing programs, take advantage of multiple channels of distribution, or introduce operational efficiencies and realize revenue enhancements. Such arrangements can make small companies look, feel, and act *big*, reaching for customers once beyond their grasp, or they can make big companies feel *small* and close, targeting and servicing custom markets. The information technology function is being called upon to facilitate the design of these complex, inter-organizational systems (IOS) by supporting cooperative, intra- and inter-organizational, functional teams

## IT Role: Boundary Spanning and Enterprise Extension

There is little doubt that there exists a significant real and potential role for information technologies in influencing interorganizational relationships. In this view, information technology plays a critical role in “extending” the enterprise, well beyond the traditional organizational boundaries.

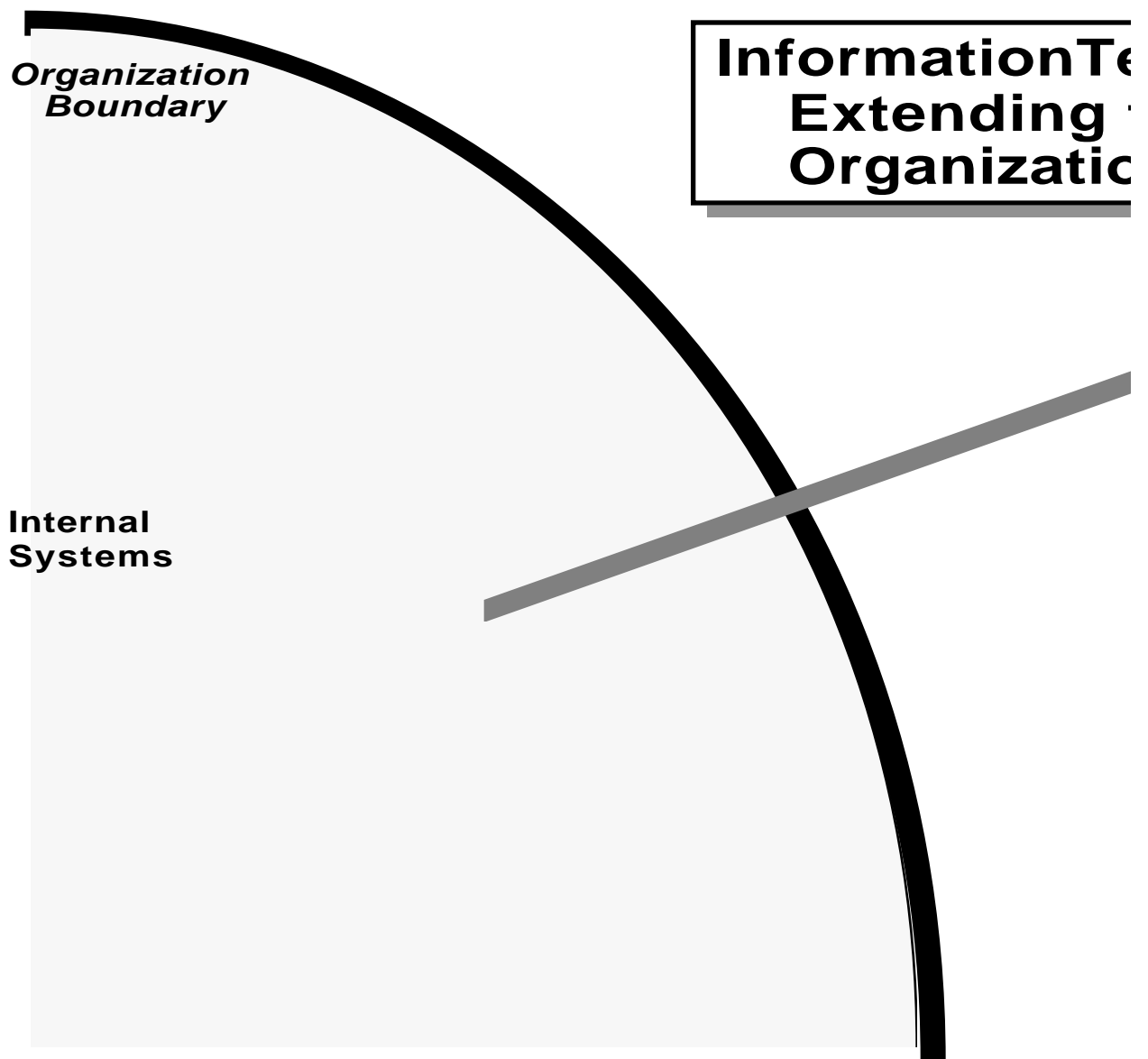


Figure 1. Transcending traditional organization boundaries

Applied both within and across organizations, information technologies are having a fundamental impact on the business relationships among traditional industry participants. These

technologies, and their applications, support new forms of marketing and distribution channel services that (1) strengthen relationships, (2) create channel "by-pass" opportunities, and (3) alter business relationships in the channel. The growing number of electronic linkages between and among buyers and sellers results in dramatic effects on the interorganizational relationships and industry structure. These *interorganizational systems*, IOS, may have significant impact on both cooperative and competitive associations within and across industries. Such systems involve traditional information system elements that *transcend organizational boundaries*, thus *permitting shared applications across legal enterprise boundaries*.

**Transforming Boundaries, Relations and Markets**

For our purpose we will focus on three elements that represent key managerially relevant issues in the consideration of interorganizational relations: *boundaries, relations and markets*.

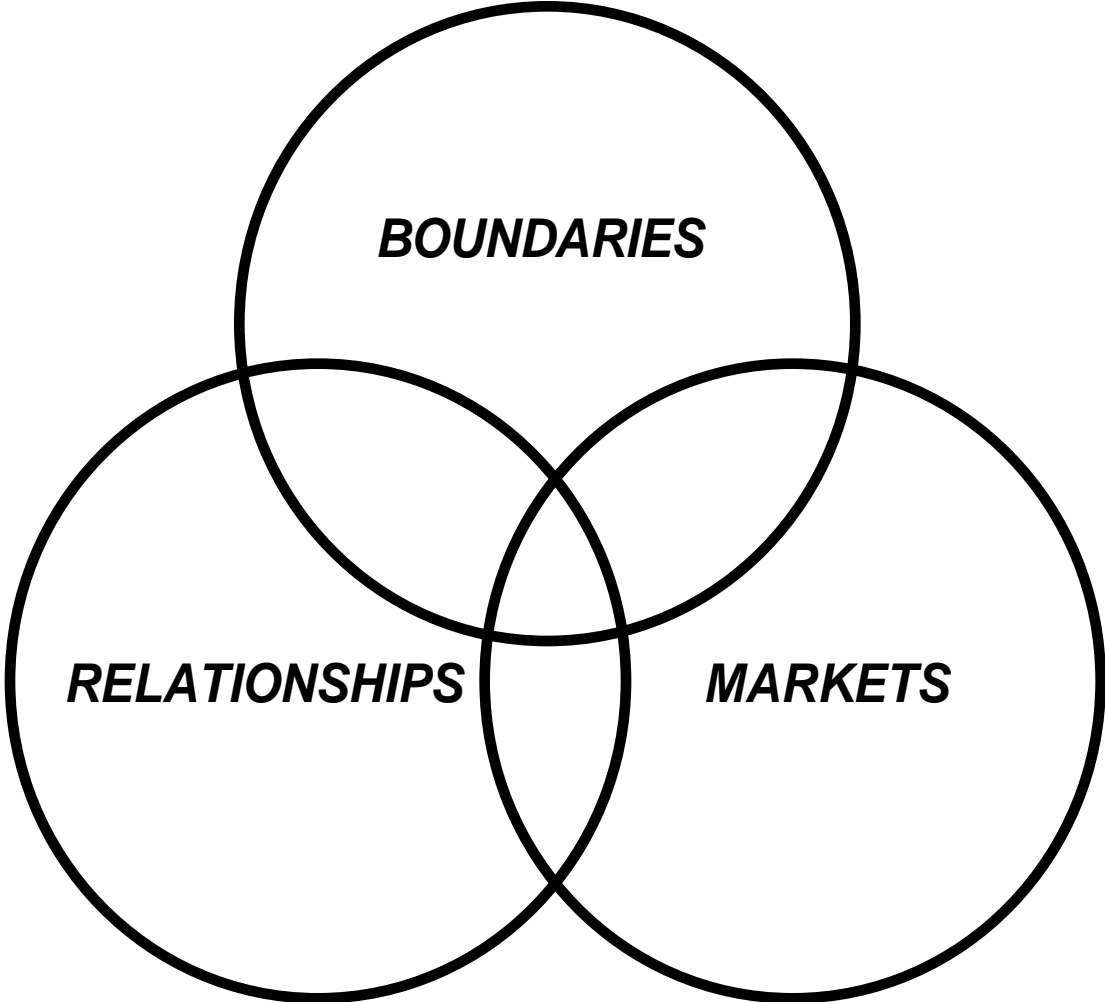


Figure 2. Transforming boundaries, relations and markets

**Boundaries** are transformed by the various forms of IOS initiatives. Culture and practice are interdicted. Operations and management practice and procedures are transformed and have a major impact on applications and human resource dynamics. Organization structure issues may be profoundly impacted - division of labor, conflict resolution, coordination mechanisms, accountability, authorities, identities are threatened. The boundary can be made "softer" or "harder" - more porous or more impermeable. In fact we can do both at the same time, as we turn the dial on the application of our information technologies to open or close the boundary to the ingress or egress of information. Another element is the attention to technologies that change the information access *at* the boundary. Wireless, handheld and portable technologies change what is possible at the point of sale, service or other "limits" of the enterprise.

Significant information technology facilitated **relationships** with parties outside the enterprise are of operational and often strategic concern to the general manager. Relations with suppliers, customers, competitors, and other forms of partners and affinity groups have earned significant management attention. A wide range of partnerships are made possible by the "linking" technologies that permit new associations, business processes, and "integration" effects that are reshaping organizations and industries. Associations between cooperating and competing corporate entities will never be the same as information technologies change the nature of these relations.

**Market** transformations can be profound as market search and coordination mechanisms are transformed by information technologies. In the 18th and 19th century, markets associated with financial and securities trading were transformed by government, international and industry standards and procedures that were invoked to "rationalize" the markets. The result was a dynamic and flourishing marketplace that was able to grow in the next century in 1) range of products, instruments and services, 2) channels for marketing and distribution, and 3) target and focus for special niches and interests. This "rationalization" of the fragmented markets in hard goods and services is now made possible by the information technologies. The information intensity required to support this rationalization process has eluded even those that were aware of the potential until recently. The speed and volume handling capabilities and the coordination potential offered by these emerging information technologies sets new options on the table.

Tomorrow's manager needs to pay attention to these boundary, relation and marketplace transforming issues, just as any general manager in a large bank in the last century had to pay attention to banking practices, standards, regulations and controls. Information technology influence on general management options suggest that few industries can neglect the potential changes that might take place in the next decades. The author's studies have shown that the timing and nature of these transformations are a strategic choice for managers. The ability to promote or inhibit these "market

rules” changes are profound. Participation or anticipation of these rule changes are the clear responsibilities of the general manager.

No longer do the decisions associated with information technology *follow* the business strategic planning discussion. In fact, information technology capabilities and initiatives change the strategic options available to the enterprise. Likewise, discussions of business transformation and business process reengineering require attention to information technology options. Organization design, in general, can no longer ignore the critical role of information technology in changing the nature of choice. It is no longer merely an implementation issue, rather the exercise of information technology is a critical organization design issue.

### **Information, Organization, and Control**

Business trends, such as globalization and right-sizing, lead to new organizational strategies that, when executed properly, transform the coordination and control systems, management practice and organization structure in the global enterprise. These changes in traditional modes of competition in the emerging global business environment suggest significant opportunity for the leverage of information technologies in transforming business and management processes. The management challenges create an "emotional stress" in the marketplace and in management practice. Coping with this ambiguity is a natural part of the internationalization of business, with its diversity and information intensity.

Particular challenges lie in the following areas:

*Coordination:* To compete effectively, at home or globally, firms require significant coordination skills that address value-chain management and relations with public sector entities..

*Time to Market.* Market and product innovation often involve cooperation and partnership across a diverse set of industrial and geographically dispersed entities.

*Management Control:* As time, costs, distance and other factors undergo radical change, the span of attention and control for decision makers requires significant effort.

*Organizational Learning and Talent/Skill Retention:* Two major challenges to management in the decade of the 1990s will be the retention of internal talent (people, skills, core competencies) and the retention of key relationships in the market (external talent) that provide important scale factors without ownership.

This "emotional stress" often sets the direction and pace of development and assimilation of many emerging information technologies. Factors that influence both the *institutional* and *technical* innovation that are required in business transformation are varied. Directions in evolution of several emerging technologies that deserve attention are being scanned by Advanced Technology Groups,

ATG, in a wide range of organizations. Technologies including wireless communication, neural networks, multi-media interface, electronic linkages, and virtual realities, offer significant potential. The alignment of strategic institutional requirements and emerging "base" technologies is essential to effective execution of both intra- and inter-organizational initiatives. While the majority of papers in this issue focuses on the issues of strategic alignment within the organizational setting, the focus of this paper is the need for strategic alignment derived from the various forms of boundary, relationship and market transformations associate with IOS initiatives.

In the past thirty years, the information intensity of an organization's products and services and supporting business processes and management control activities have been rapidly increasing (Konsynski and McFarlan, 1990). As a consequence, IT has had a significant impact on business processes in all areas of the enterprise - from supply, to manufacture, to marketing and distribution. In addition to business processes, management decision processes associated with essential planning, coordination and control activities, are transformed by the increased need for and availability of information. This growth in information intensity will continue, earning software, communications and other IT an ever-increasing role in both business processes and management control activities.

Historically, IT initiatives have focused on individual decision making and small group decision facilitation. Computer-based technologies in support of organizational activities have existed since the advent of centralized computing with remote access and timesharing. For the most part, these technologies have played a passive role in the organization, providing raw computational capacity and passive communications platforms like electronic mail. Now, new organizational information demands and emerging information technologies have combined to make company-wide information access an organizational imperative.

Many cases have recently been reported of explicit design of organization-wide systems that serve business and decision processes across the traditional functional areas in the enterprise. Several firms have taken a team focus, while others are restructuring the business processes themselves. For example, Xerox, General Electric and others are experimenting with new "team-based" organizational forms that include information systems that differ radically from historic systems environments. Xerox applied interfunctional team practice to product development and quality control demands (Stoddard and Cash, 1988), while General Electric in Canada restructured their shared services facilities (Konsynski and Short, 1991) around interfunctional teams. A number of firms including Hewlett-Packard and AT&T have also redesigned their business processes to hasten the speed with which they respond to the marketplace (Business Week, 1989). As

organizations become “leaner”, they have begun to rely more and more on coordination and control mechanisms that are mediated by their information technology infrastructure.

Most strategic planning methods and frameworks, with few exceptions, focus on the role of *information* and *control* “inside” the traditional boundaries of the organization. Indeed, many discussions of strategic alignment method (Henderson and Venkatraman, 1990) focus on the intra-organizational management issues. In this paper we examine the means that a general manager might employ in the influence of behavior in the enterprise and its relationship to a competitive position in the marketplace. *Strategic control* in IOS approach offers the opportunity to examine these business and technology issues in an “extended” view of the enterprise. How might a general manager think about the opportunity to leverage information and control mechanisms to influence behavior in the extended enterprise that encompasses, at least, its buyer and supplier communities?

In order to appreciate the essential role that the strategic alignment process plays in the design and management of alliances and partnerships, the general manager should be aware of the critical role of management *control* in governing information flow and use, as well as defining the limits of the "quasi-organization" that emerges in a partnership or alliance. In the next section, we review the key elements of *control*.

### **Control: Understanding and Influence**

---

Control serves two ends: support for *understanding* what is taking place in the enterprise and in the market and support for *influence* the actions of participants, both inside and outside the enterprise.. *Understanding* refers to the awareness and appreciation of what *has* taken place, *is* taking place, or *could* take place in the environment. *Influence* refers to the ability to communicate, command, persuade, or otherwise induce a particular behavior. It is the author's hypothesis that these two, non-orthogonal, measures can be used to examine the purpose and value of a set of controls, and information technology investment. The key questions then are as follows: To what extent do the controls contribute to managerial, or organizational, *understanding*? To what extent does the control, or system of controls, create the proper level of *influence* that will lead to the desired behaviors?

## What is Strategic Control?

The word “control” has BOTH a noun and verb aspect.

The *verb* (process dimension) relates to checking, testing, or verifying; exercising restraint or directing influence; reducing the incidence or severity of adverse situations [dictionary uses].

The *noun* sense (authority, ability dimension) relates to a state, condition, authority, ability, or measure of power and influence. This is a tougher dimension to understand. It relates to the possession of the skills needed to use the tools, instruments and technique of control.

There is more to a *strategic* assessment than a review of the inventory of processes and mechanisms of control. There is a judgement of the state or condition of control- as “in control.” This informs on the boundaries of influence, the limits of an ability to understand and influence what is going on. But, one might ask, what does this have to do with our pursuit of strategic control? Control is basically one system (akin to the nervous system, or circulatory system, etc.) that is an important part of the enterprise. In a judgment of strategic alignment, we need to consider the delivery mechanism (information technology, designed) for this critical management process, or responsibility. Those systems that lead to a congruence of the strategic direction of the enterprise are thus key elements of *strategic control*.

The organizing principles, with respect to the leverage of information technology in support of management control, are 1) Essentials of strategic control (understanding and influence), 2) Systems for the individual (task, function, focus, single objective, etc.), 3) Systems for the organization (multi-objective, multi-function, organization wide, etc.), and 4) Systems for the extended enterprise (cross-organizational, boundary crossing, markets, etc.). The “systems” involve, for the most part, the leverage of information technologies in the evolution of information and control.

Organizations in the past have been defined with a focus on the human component. In such a view, information (and other) technologies were viewed as tools in the support of the mission and objectives of the human complement that *was* the organization. Descriptions of organizations were people-oriented (“An organization is a collection of people ...”). It is the author's belief that we can, and should, challenge that bias and definition. We might say that an organization is a collection of policies and beliefs, consisting of people and systems that operate in an environment, seek or encounter information, interpret and respond according to the operative values, beliefs and policies. This does not demote people, nor promote systems, merely recognize the parity and opportunity to leverage many varied resources in performing the judgement, decision making and action of organizations.

This view encompasses the organizations of the past (run exclusively by people driven processes) to possible unique organizations in the future (which might be relatively peopleless). These potential organizations are what the author has called employee-less firms, or ELFs<sup>1</sup>. The basic intent is to challenge the assumptions we have held in the past about what organizations are, and how they operate. We challenge issues of ownership, sourcing, strategy, mortality (yes, even the data and asset *immortality* assumption<sup>2</sup>), etc.

Information technologies offer the natural tensions of *constraint* and *freedom* that are a critical part of the discussion of control. Controls (and information technology applications) offer the dual dimensions of setting limits on what can be done, while offering a definition of the degrees of freedom of action. It is a role of the control systems to define (or at least implement and guarantee) limits on authority and initiative. Hence strategic control, by its nature, makes the case for attention to strategic alignment in partnerships, alliances and other forms of inter-enterprise interaction.

## **Controls and the Market**

In our strategic initiatives we deal with the *design and implementation of the mechanisms that we might employ to influence patterns of behavior within the organization and within the market*. If that is only partly true, we have to deal with the opportunity to leverage information technologies to create *influence* in the market. It is said that, “once you leave home, you lose almost 100% of your ability to influence events.” thus, if we think it is hard to design information and management control systems within the organization, it is much harder to design for, and implement, the means of influencing patterns of behavior beyond the enterprise boundaries. This is the challenge, and the opportunity in discussing the role that interorganizational systems might play in the institution of controls in the extended enterprise.

It has long been the author's belief that a critical aspect of IOS design are the decisions around the projection of *influence* beyond organizational boundaries. The compliance with standards, integration of applications across organizations, and promotion of unique systems (information, logistics, coordination, control, etc.) are the essential concerns of general managers. The technology innovations are, almost by necessity, modest (due to the disparate levels of sophistication across organizations) while the business innovations lead to the substantial benefits or failures in IOS initiatives.

**Design of Markets:** If most of our strategic initiatives are about issues related to “organization design” then this paper offers the opportunity to consider the extent to which information and control issues play a role in the evolution of *markets*. This is an invitation for the application of the frameworks and concepts we have applied to the individual organization in the examination of attributes of the market. We look at the means of creating new means of “organization” and governance in the market.

**Changing the Rules in Market:** From a competition and strategy standpoint, we deal with the opportunity to *change the rules* in the market: change, or leverage the basis of competition, increase the “specificity” in the transaction, facilitate “focus”, enable a low cost leadership, etc. Strategic Control is an opportunity to make a tighter link with the “competition and strategy” frameworks that are active in the minds of senior managers.

**Forms of Control in the Market:** The mechanisms that influence behavior in markets are many and varied. Standards, whether regulated by government or industry forces, are intended to influence the patterns of behavior in the participants in the market. Thus regulation and deregulation are essential elements of the controls systems in the market. At the same time, some standards, protocols, service levels, and other behavior determinants are mere guidelines, or “generally accepted procedures.”

**Complex, Messy, Issues:** These scenarios take a LONG time to play out. Fortunately, we have several industries (including airline and hospital supplies) that have a considerable history to offer insight in the management challenges. The myths that these activities serve to introduce simplicity and efficiency in the markets and lead these marketplaces to act as “markets” can be challenged. Commoditization of products, price-based competition, homogenization of products, reduced search costs, and other level playing field attributes are not the objectives of most players in these industries. In fact, managed complexity and significant bias are the usual result. So, waiting to jump on board when the efficiencies occur is a DUMB move. We cross generations of technology, cross vendors, cross, management processes, cross cultures of organizations, etc.

The author has found it useful to carefully examine the potential and limitations of the IT investment on the strategic control environment. The attainment of strategic control is an organization and a market issue. This involves the following considerations:

<b>Strategic Control</b>	<b>BOUNDARIES</b>	<b>RELATIONS</b>	<b>MARKETS</b>
<b>UNDERSTANDING</b>	Limits of scanning and interpretation	Shared measures and definitions	Shared values and expectations
<b>INFLUENCE</b>	Communication and measurement	Terms and conditions and escalation	Governance and sanction

Table 1. Strategic control and relationship transformation

## **Information Intensity: IT Changing the Limits of the Possible**

As organizations become more information-based and information from internal and external sources becomes available on demand, traditional corporate functions such as planning, marketing, technical support, documentation and publishing will be dramatically transformed or even eliminated. Although it is clear that these trends will increase the importance and visibility of the information technology contribution to the global enterprise, they could do so in a less than desirable way, creating almost unmanageable crises.

Today's enabling technologies and business trends, while allowing a new level of organizational flexibility and functionality, also have the capability of exacerbating information overload and gridlock problems. Some of these enabling -- and possible ultimately disabling -- trends include the following:

**High-capacity and high reliability in scanning and character recognition.** What is not in electronic form now, probably will be in the near future. New multipurpose copiers/scanners/facsimile machines act as high-capacity data-capture and conversion devices. Today, inexpensive multifont and multicolumn optical character recognition machines achieve impressive and practical levels of performance.

**Availability of external and internal information in electronic form.** Most major newspaper, magazine and book publishers make their publications available in electronic form. Many organizations are providing information they share beyond their organization boundaries in an electronic form. Desktop and electronic publishing, groupware, electronic mail, local area networks and word processors are accelerating the trend toward the availability of internal information in electronic form.

**Document format standards and automated recognition.** With the support of virtually all computer vendors and the aggressive endorsement of the U.S. Department of Defense, an International Standards Organization standard for the markup of technical documents -- the Standard Generic Markup Language (SGML)-- has been adopted. Products that automatically scan technical documents and insert the appropriate markup terms will vastly improve the speed and efficiency of technical documentation preparation and facilitate the automated classification and retrieval of complex technical and legal document.

**Hypertext and hypermedia.** Hypertext products link parts of different documents according to content. Such mechanisms exploit the malleability and shareability of text in its electronic form. Challenging old assumptions on linearity of presentation and reuse of content in multimedia forms is possible as these capabilities emerge.

**Knowledge codification.** Advances in object-oriented programming make it possible to encapsulate knowledge and software functions in independent modules that can be "plugged in" and combined with other modules as if they were integrated circuits. These techniques could make it feasible to assemble software applications from standard components. Simple knowledge codification techniques taken from the expert systems world make it possible to capture and distribute certain forms of routine knowledge as a corporate asset.

**Virtual bandwidth: Including inexpensive and high-capacity information distribution channels.** Methods for distributing information products and services are proliferating in the

form of high-capacity public and private networks, inexpensive one-and two-way satellite, fiber optics, giga-byte compact disk/read-only memory, approaching giga-byte erasable and writable 3 1/2-in. optical disks, high capacity removable disks, audiotext, FM broadcast and high speed digital telephone lines.

**Bulk pricing of corporate information purchases.** Information vendors are beginning to recognize that usage-sensitive pricing and onerous royalty agreements are inhibiting demand for their services and preventing the resale and republishing of their products. Customers are demanding the right to reuse and combine external sources.

**On-line and distributed management.** The advent of networked organizations, groupware and other ways of coordinating and directing work in globally distributed organizations will not only increase the volume and velocity of information within an organization but will require new business techniques for managing on-line and distributed data.

**Electronic data interchange.** Interorganizational systems for integrating many of the marketing, logistic and distribution functions of buyers, sellers, manufacturers and suppliers are growing at an enormous rate.

**High-performance platforms.** A respected pioneer in computer architectures, estimates that the price/performance ratio of processors is increasing at a rate of 70% annually. Reduced instruction set computing architectures and multiprocessing techniques promise to shortly deliver 100 million instructions per second (MIPS) to the desktop, with high I/Q capacity servers achieving performance levels in the range of 500 to 1,000 MIPS.

Interorganizational systems, groupware, document-based processing, information refineries, executive support systems, and other information technologies and applications will clearly have a fundamental impact on coordination and control. Each of these technologies offers significant potential in catalyzing changes in organization decision and business processes in the global enterprise. There are many opportunities for new IT initiatives such as these to expand the range of technology options.

## **BOUNDARIES: Enhancing Understanding and Influence**

In order to consider the nature of control mechanisms in the inter-enterprise setting, it is important to assess the range of organizational transformation that is a critical part of the evolution of partnerships and alliances and identify many of the electronic integration effects that result from such arrangements.

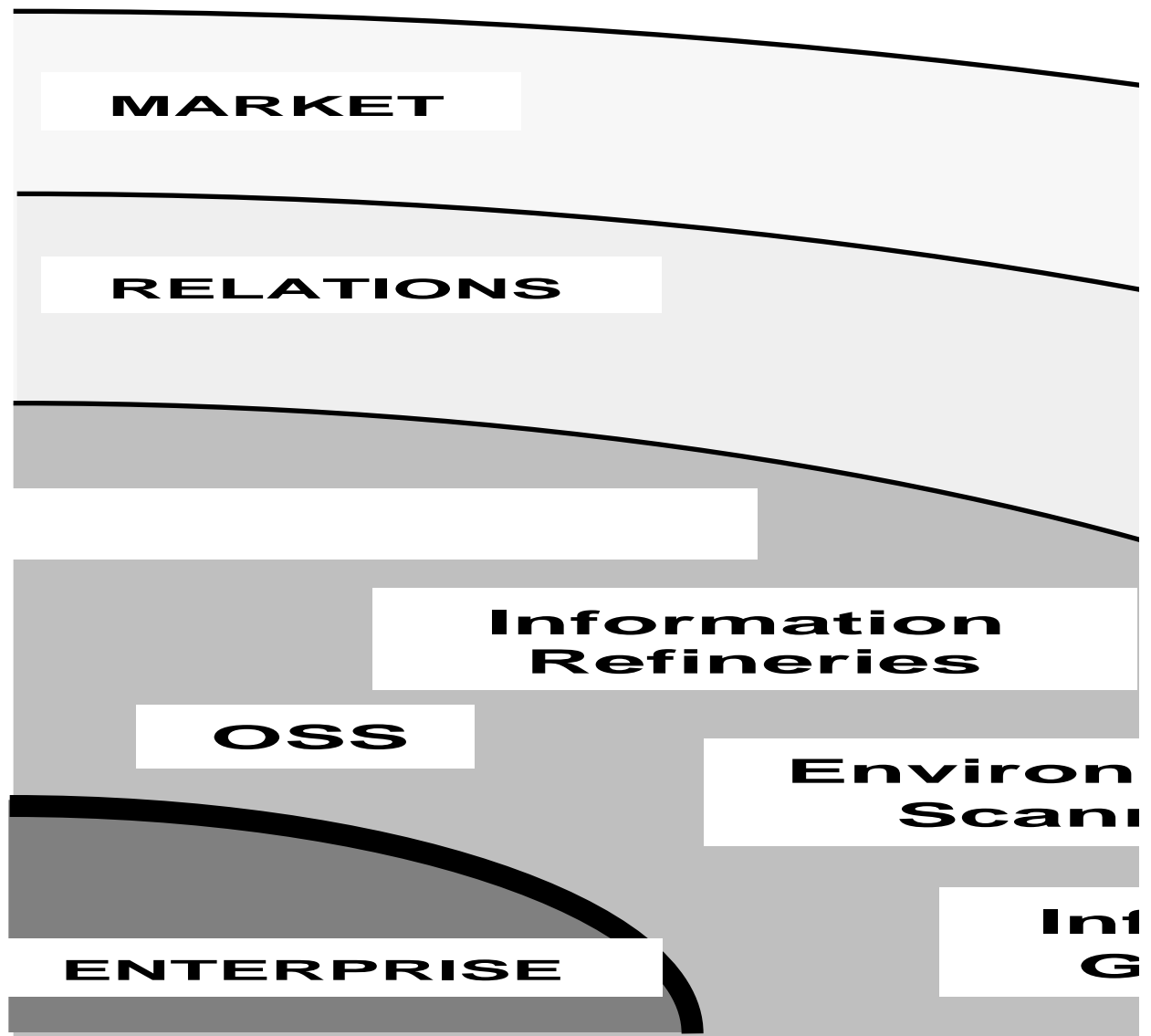


Figure 3. Boundary transforming technologies

Several factors are changing the role of organizational entities that serve at the boundary, ex. sales and service forces. These include:

- 1) The development of control and coordination systems that permit the allocation of decision rights, while maintaining general management ability to *understand* and *influence* these boundary functions.
- 2) The information requirements of the central authority require fast and accurate flow of information on boundary "events" and
- 3) A growing requirement for fast response and decision authority for boundary functions, ex. sales and service events,
- 4) The emergence of computer and communications technologies that are more accessible (portable, usable, functional, etc.) to individuals that serve "at the boundary,"

There are many management issues associated with the volatile class of technologies that bring portability to the personnel that work at the boundary of the enterprise - laptop, notebook, palmtop,

and handheld computers, radio and cellular communications, etc. The variety of situations we have examined, Frito-Lay, Brooklyn Union Gas, Hanes, Otis, and many more<sup>3</sup>, suggest that the nature of work at the boundary is transformed, relations within and outside the enterprise are affected, information flows are significantly impacted, and management control systems are transformed. Of particular interest to general managers are the impacts on division of labor, decision rights, conflict resolution, coordination mechanisms, and measurement and reward systems.

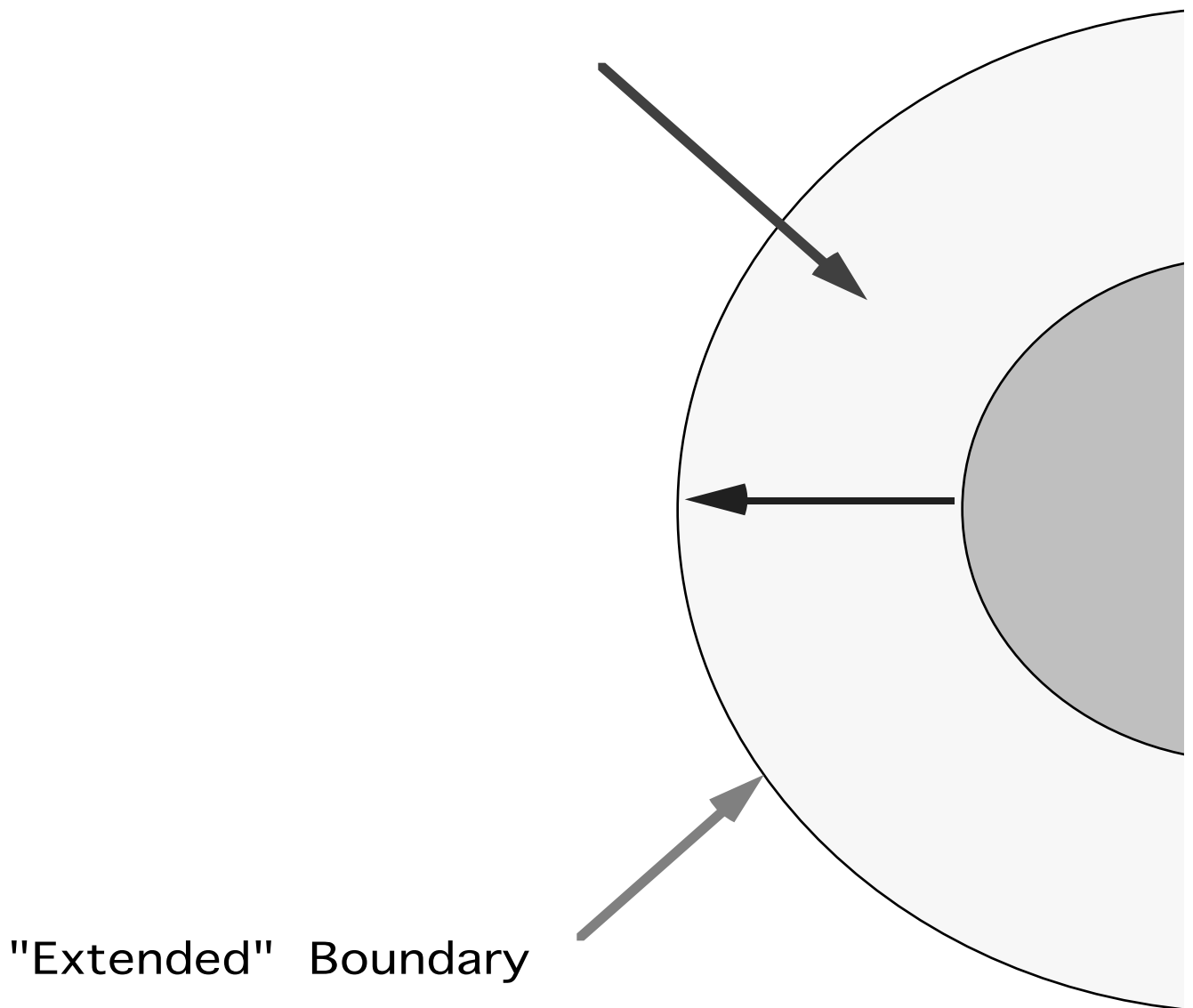
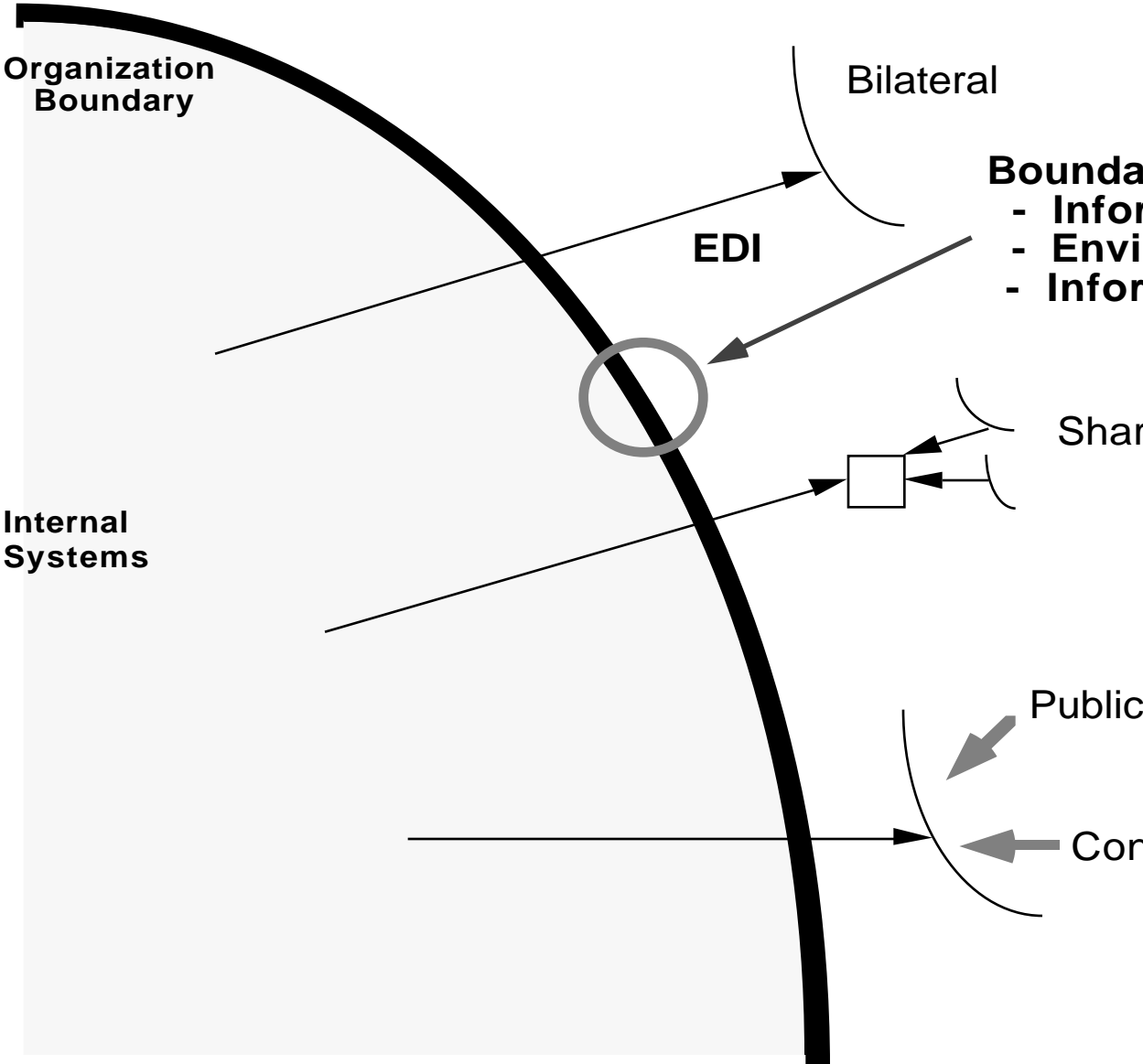


Figure 4. Portable technologies extend communications impact

This portion of the paper deals with information technologies that uniquely exist *AT* the boundary of the enterprise (information refineries and delegation technologies for environmental scanning). We explore the leverage of knowledge-based systems and other technologies to transform the functional and managerial options that define the boundary of the enterprise. The new capabilities help us to re-engineer our boundary systems and should therefore be part of the conscious options explored by general managers.



This section examines new boundary options that are possible as information technologies permit, at the same time - more flexibility and control over information flows, measurements, and decision authorities, and new means for influence of events that span the boundary of the enterprise. Information refineries<sup>4</sup> deal with the ingress of information - How do we pay attention to the

growing volumes of information and make decisions on what information is relevant to whom? in what form? in what context? etc.

Below we also consider the related theme of "delegation technologies" that make use of knowledge-based technologies to permit managers to "delegate" tasks to "intelligent agents" that can efficiently perform many of the cognitive activities associated with environmental scanning (say, for competitive assessment), relevance testing and reconciliation across information sources<sup>5</sup>. We briefly examine the opportunity for delegation technologies to support managerial activities that are beginning to elude current management practice as information volume and timeliness challenge the span of attention and control that is possible.

These technology-driven capabilities serve to transform the enterprise boundary, enabling simultaneous increase in accessibility of information from the enterprise to the external environment and ability to scan and pay attention to events and information that take place in the environment. There is much talk about the "blurring" of organizational responsibilities, yet we have yet to see a framework to discuss the coordination and control of interorganizational relations in an information and technology rich environment. This segment of the paper will focus on future options for design and management of organizational boundaries.

### **Information Technology Role in Organization Transformation**

The application of information technology will either support<sup>6</sup> (therefore *preserve*) or *transform* an organization's business processes and decision processes. The traditional *results reporting* function of IS in organizations does not interfere with, indeed enforces, the current business process structure and its decision processes. *Organization-wide systems*, such as executive information systems, involve information that is cross-functional in scope, supporting new arrangements of management, providing for a forum for integration of traditional functional responsibilities, supporting new business processes, such as product groups or order fulfillment groups, etc. *Spanning systems* involve applications of IT that are relatively independent of organization structure, but facilitate interaction, as in electronic mail, new forms of interchange and decision making patterns, roles and responsibilities across traditional organizational boundaries. Certain classes of organization support systems are intended to be *transforming*, enabling change in both the business processes performed by the organization and also the nature of the decision patterns - who makes what decisions, with what information and what authority and considerations? Thus, we need to separate the various forms of Organizational Support Systems, OSS, from the standpoint of the degree to which they serve to *preserve*, or *transform* the traditional, or existing, roles and

responsibilities. This relationship between business and decision process preservation and transformation is depicted in figure 2.

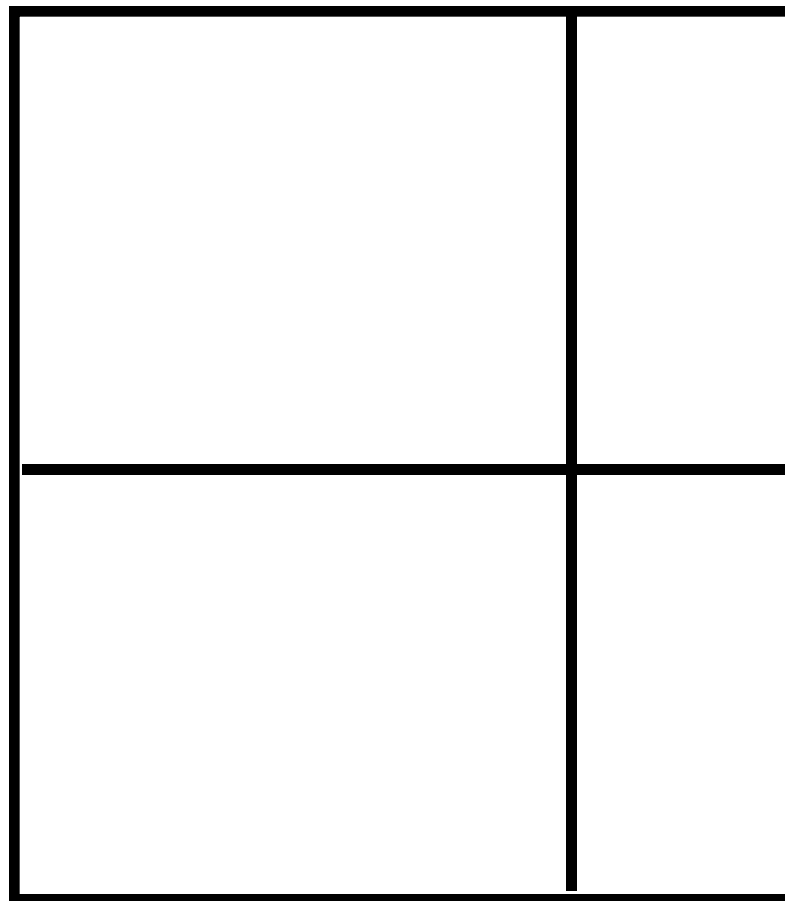


Figure 5. OSS support for Business and Decision Processes

The systems depicted here often involve the integration of many component technologies. The list of information technologies commonly associated with the support of business and decision processes continues to grow. On the communications side, they range from those technologies used to maintain interpersonal communications, for example, electronic mail, to those technologies supporting interorganizational communications, for example, electronic data interchange. On the information processing side, they span from expert systems and relational databases to specialized processors and information storage devices.

These information technologies often limit the information processing capacity of the organization, inhibiting information sharing through connectivity and access restrictions. As we shall propose, innovative uses of technology will bolster new organizational forms and their corresponding decision processes. In the next section, we discuss the role of IT in providing OSS for today's organizations. Future applications and strategies are suggested in the research agenda in the concluding sections.

## Forms of Organizational Support Systems

Organization Support Systems, OSS, provide an organization-wide platform to enhance, facilitate and enable the work of the organization members. They are, by their nature, cross-functional. OSS encompass four types of information systems environments. These are:

{Possible insert???

**Results Reporting Information Systems** - Any basic support system within an organization that reinforces traditional norms, often by embedding organization policy in the system's logic. This is the most subsumptive and most generic of the four types. An example would be the standard reporting and control systems, such as general ledger. Such environments are **Structure Enforcing**.

**Organization-wide Systems** - Information technology used at an organizational, or multi-functional, level. An example is top management use of an Executive Information System to access or analyze organization-wide data. These systems result in changes to decision processes, but do not directly affect business processes. Such environments are **Structure Preserving**.

**Spanning Systems** - Technology that spans the organization, in that it is used by individuals across functional or hierarchical boundaries. These technologies transcend organizational structure, neither requiring nor deliberately defying traditional norms. An example is an electronic mail system available to all members of the organization. These environments are **Structure Independent**.

**Transformational Systems** organizational structures. An example might be special forms of groupware which permit work teams to be formed independently of geographic or traditional hierarchical relationships. Such environments are **Structure Transforming**.

Each of these types have different impacts upon the business and decision processes of the organization. Figure 3 represents the relationships implied by the taxonomy. As can be seen, each type enables a different set of process transformations, ranging from stability of enforcement to the flexibility of continuous structure transformation.

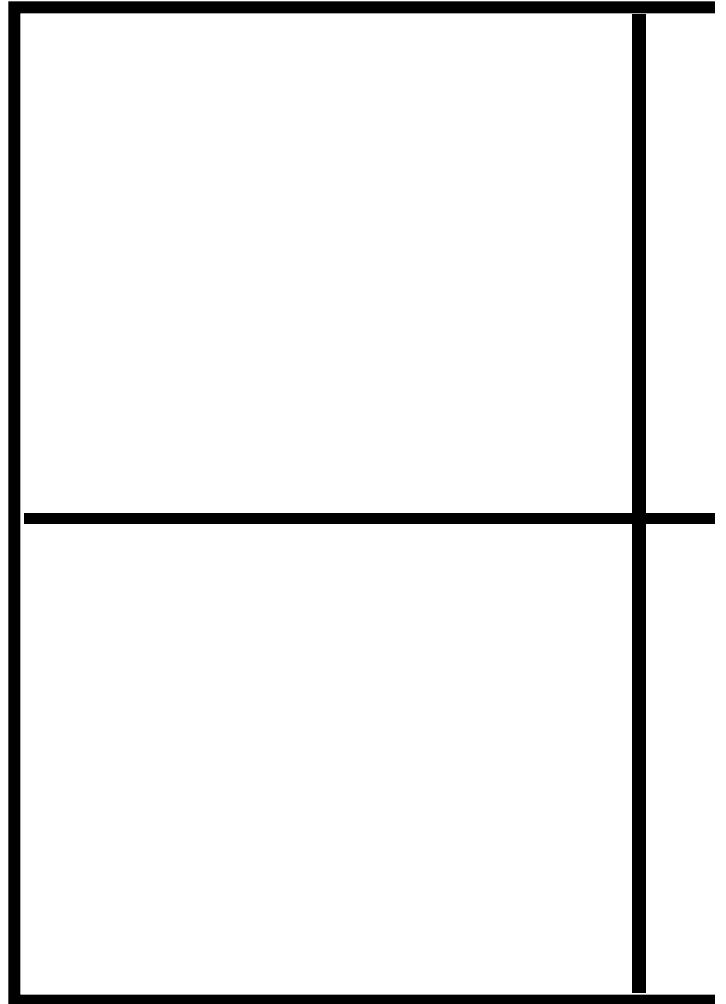


Figure 6. OSS Structural Relationships

In the following section we move from a view of the internal transformation to a beginning of the extension of the enterprise, the external scanning of the environment that is an essential part of the organizations outreach.

### **Spanning the Boundary: Understanding the Competitive Marketplace**

Identification and evaluation of relevant trends and patterns are critical steps in an organization's business environment monitoring. While the prior section focused on the patterns of

internal communications and information interchange, the successful organization of the next decade is required to invest a considerable amount of resources "scanning" the external environment. Not surprisingly, the "experts" that perform this evaluation are seldom skilled in all the disciplines necessary to accomplish a thorough evaluation of the environmental indicators. While one expert may be skilled at recognizing the potential for political turmoil in a foreign nation, another is skilled at recognizing how Japanese government de-regulation is meant to complement the development of new products. Moreover, these experts often benefit from one another's skills and knowledge in assessing activity in the organization's environment. Often the interchange among variously skilled analysts becomes a distributed problem solving activity that creates the quality, interdisciplinary analysis essential for an effective environmental monitoring activity.

Problems in the environmental monitoring process often occur when a particular expertise, an agent in the problem solving network, is unavailable and knowledge from that domain does not play a role in the analysis. The focus of this paper is on the distribution of expertise and the sharing of knowledge in the critical process of environmental monitoring. A technical approach is adapted in this effort - an architecture and a prototype are described that provide the capability of capturing, organizing, and distributing knowledge that may be used by experts in classifying patterns of qualitative indicators in the business environment.

U.S. corporations known to collect business intelligence include Ford Motor Co., Westinghouse Electric, General Electric, Emerson Electric, Rockwell International, Celanese, Union Carbide, and Gillette. Also, Digital Equipment Corp and Wang Laboratories both have environmental monitoring groups. The list of organizations goes on to include (not exhaustively) Chemical Bank, the USV Laboratory subsidiary of Revlon, Del Monte, General Foods, Kraft, and J. C. Penney<sup>7</sup>. At Westinghouse, for example, environmental monitoring personnel act as information consultants and are involved in all phases of monitoring projects, ranging from defining intelligence objectives to insuring effective dissemination and utilization of results. At General Mills, all members of the organization have been given basic training in recognizing and tapping sources of competitor intelligence, (Smith and Prescott, 1987).

The first step an organization takes in monitoring the external business environment for threats and opportunities often entails identifying and evaluating patterns of qualitative indicators (Terry, 1977 and Nanus, 1982). From a multiplicity of sources such as online data bases, Freedom of Information Act sources, Montgomery, 1978, news clippings, financial reports, etc., experts and senior managers from a variety of backgrounds scan and evaluate information that, taken together, may suggest an early warning of threats or opportunities. For example, Berry Cash, vice-president of semi-conductor producer Mostek Corp., says the following: "It's up to each product manager to keep up with what

the competition is doing...[for example] personnel looks at what kind of engineers they're hiring. You start seeing aggressive quotations for parts. We talk about these things every Monday at staff meetings. It's almost a form of gossip" Such tasks form a continuous activity performed by organizations, but often draw on little support from the information technology of the organization.

Not surprisingly, the experts that make these assessments are not equally adept across all disciplines, and often they benefit from "comparing notes." For example, a particular expert may notice that a competitor has recently severed long-standing relations with foreign distributors - as well as having acquired a sizable interest in a foreign manufacturing facility. This competitor appears to be making aggressive moves, preparing to enter new and perhaps sensitive markets. With the help of another expert, one familiar with the geo-political make-up of the area in question, the fact that the foreign government in question is making serious efforts at economic expansion - requiring foreign business to increase participation in the country's development - may serve to explain the competitor's activities.

The director of a well-developed environmental monitoring unit summed up his department's activities in the following way: "It's like putting together a puzzle...my people contribute pieces, and after awhile a pattern of what's going on out there starts to form." Within his department, insights and conclusions are shared among others. But, as with many activities that require expert assistance, work stops when the expert is unavailable and can't share his/her knowledge. This knowledge extends to questions asked as well as determining and interpreting the answers given. Also, the expert or senior manager may leave the firm - in which case the continuity of aggregate knowledge or expertise available to the firm is interrupted. At other times, the expert may be unavailable to others requiring his assistance, simply because he is on the phone, at lunch, or in a meeting - making communication difficult if not impossible.

The emerging enterprise involves the use of multiple agents to facilitate the sharing of knowledge in the distributed problem solving activity of monitoring the business environment. Here, the knowledge to be distributed is not only that which an expert or senior manager uses to identify a pattern of indicators suggesting a threat or opportunity to the organization, but also the knowledge of exactly what indicators are particularly pertinent to the classification problem of current concern. Not only is it important to provide an assessment of information once the right questions have been asked, but it is also useful to know just what those "right questions" are.

### **IT Transforming Environmental Monitoring**

Environmental monitoring falls under the aegis of *organizational attention*; the process of perceiving and interpreting both the internal and external environment for the purpose of making

appropriate operational, tactical, and strategic decisions that help to ensure the success of the firm. From these three points of concern (strategic, tactical, operational) there are issues pertaining to individual, group, and organizational performance. Instances of these issues include the following:

Bounded rationality and cognitive re-apportionment - are there methods available for reducing the limited capacity of individuals in assessing environmental queues and re-apportioning them to a technology platform?

The phenomenology of enactment - can technology be used to shape the expectations of individuals in recognizing threats and opportunities in both crisis and non-crisis situations?

Span of control - can advanced technology provide greater span of control without information loss?

Organizational learning, vigilance, and design - how can technology and design aid levels of vigilance and learning in the organization?

Boundary spanning technologies - can shared technological platforms be used as sources of meaningful information?

Information refineries - how can the organization better channel and harness the ocean of data and information in which it finds itself?

Environmental monitoring typically matches the capabilities of individuals and groups in identifying strategically relevant events external to the organization. In a series of discussions with personnel from several environmental monitoring units, we found that monitoring in large organizations often requires the cooperative effort of many individuals. Additionally, the skills of these individuals fall into two broad categories: 1) those who are adept at finding and evaluating singular pieces of information, and 2) those who are adept at looking at patterns of indicators and recognizing whether those patterns represent relevant threats or opportunities to the organization. The first group of individuals fall under the rubric of “intelligence analysts.” The second group, the experts in some aspect of the external environment such as political events, regulatory measures, competitor financial status, etc., are “area specialists.”

Based on the current goals of the organization, the area specialists decide upon the monitoring of a set of qualitative indicators that might provide insight into various threats and opportunities to the organization. Once the indicators are chosen, the area specialists request estimates from the intelligence analysts of the indicators' values. The intelligence analysts have the role of locating and interpreting information that will shed light on the disposition of the indicators in question.

In continually evaluating the competitive position of another firm, the area specialist may look for patterns over attributes such as bidding behavior, R&D expenditures or hiring, new manufacturing methods, suppliers, etc.. The area specialist may use his expertise to infer that a very low bid on the competitor's part may indicate several conditions: 1) the competitor's backlog is very low, or 2) the competitor has made a leap in manufacturing methods and can reasonably meet their bid, or 3) the competitor has made a gross error in judgement, or 4) the competitor has linked with a

new supplier that, itself, can provide materials at a much lower cost (Montgomery and Weinberg, 1979). If R&D hiring has recently increased, and the competitor has invested in a new manufacturing site, it may be that technological innovation is the best explanation for the very low bid. Conversely, if it is known that R & D expenditures have recently been cut and that there has been a hiring freeze, then the area specialist will likely infer that either the competitor's backlog is low or there was a gross error in judgement.

Historically, the scope of these activities represents a distinct departure from the sixties and early seventies, when environmental monitoring was largely an informal activity in corporations that relied on personal contacts to capture market/sales related information, (Aguilar, 1967). Somewhat more recently (by the mid-seventies), work being produced in the area reflected increased organizational awareness of environmental factors in strategic planning. And, with the advent of the eighties, interest in environmental monitoring has grown along with the vastly increasing amount of publicly available information about the competitive environment (Kennedy, 1984).

Still, while research has been done to aid planners in enumerating potential threats and opportunities (Nanus, 1982) analyzing the results of monitoring, and disseminating environmental monitoring conclusions, less attention has been devoted to monitoring patterns of indicators in the external environment. While El Sawy, 1985, discussed the activities of CEO's doing their own environmental monitoring, specifically for small to medium sized firms, a literature search into the application of information technology in the support of the monitoring activity has revealed that there has been little activity beyond providing an E-mail facility to simplify some communication tasks.

### **Environmental Monitoring and Distributed Problem Solving**

Environmental monitoring entails the recognition that many aspects of distributed problem solving are evident in this process. This section discusses the nature of distributed problem solving and how it relates to environmental monitoring. Additionally, by examining monitoring from this perspective, research opportunities for IS are identified and elucidated.

Durfee, 1987, describes distributed problem solving as the outcome of several agents communicating with each other, providing solutions to subproblems and integrating these subproblem solutions into an overall solution. Generally, each agent has some kind of problem solving skill at which it is most adept (as well as other, less refined, skills). Moreover, these agents typically share solutions in their endeavor to solve both sub-problems as well as “larger problems.”

Generally, there are three dominant approaches to distributed problem solving: 1) multi-agent planning, 2) negotiation, and 3) the functionally oriented, cooperative approach. Multi-agent planning entails the selection of a central planning agent who is given all pertinent information from which to generate a plan. In this scenario, the chosen agent forms a multi-agent plan and distributes the plan to the remaining agents in the problem solving network. Here, a global view of the problem is available and allows activities between agents to be predicted and synchronized.

The negotiation approach accounts for the decomposition of a task into sub-tasks and the delegation of these sub-tasks to other agents through some kind of negotiation or bidding protocol. Here, bidding allows specialization in that agents choose sub-tasks that are best matched to their capabilities. The sub-tasks are offered for evaluation to the agents sequentially, making it possible for an agent to commit to a sub-task prematurely (in that a sub-task offered later might suit its abilities better, but having already committed to another sub-task, it cannot take up the current one that it is better suited to.)

In a functionally accurate, cooperative approach, agents cooperate by exchanging tentative, partial solutions based on their limited view of the problem-solving network. By exchanging their sometimes inconsistent and inaccurate partial solutions, they converge on a solution. For improved cooperation, these agents need to be made aware of what partial solutions need to be exchanged in the future to allow them to alter problem solving activities to form compatible partial solutions in a timely fashion.

Distributed problem solving activities like those described above frequently occur in organizations. For example, in keeping with activities that involve the exchange of knowledge and information, the business planning group at SRI has weekly meetings where the individuals doing business intelligence work exchange information and conclusions with their peers (in addition to informal meetings as an ongoing process). In a similar vein, the environmental monitoring groups at NCR have recently joined activities under one department head in order to better coordinate their efforts in putting together the environmental “puzzle.”

These organizational efforts suggest a tacit confirmation of the theoretical characterization of distributed problem solving. That is, according to Durfee, “better predictions [ie. plans] in these [distributed problem solving] approaches have been achieved through organization: by providing nodes with organizational information (the general capabilities and responsibilities of other nodes, the communication patterns between nodes), the agents have a general understanding of each other and can therefore make better predictions.”

As distributed problem solvers, intelligence analysts and area specialists interact to contribute environmental monitoring information to the organization. Intelligence analysts need to be fully connected to one another in the process of finding information for the area specialists. Additionally, they interact with every area specialist inasmuch as they are all ostensibly available for the purpose of answering information requests. Likewise, the area specialists are fully connected with one another during the process of detecting threats and opportunities to the organization. And, additionally, once a threat or opportunity has been detected, the information is reported to by the area specialists to the strategic planning function.

## **RELATIONS AND PARTNERSHIP**

---

### **Information Technology *ACROSS* Boundaries - LINKAGE**

There is an accelerating trend toward the application of computer and communications technologies in the establishment of connections between independent organizations in order to achieve efficiencies in their routine interactions. Streams of electrons traveling over the country's telecommunications networks replace the flow of paper through the mail. These organizational interconnections often grow from a need to share information, controls and protocols. The rationale for such communication links include efficiencies, performance increases and competitive benefits.

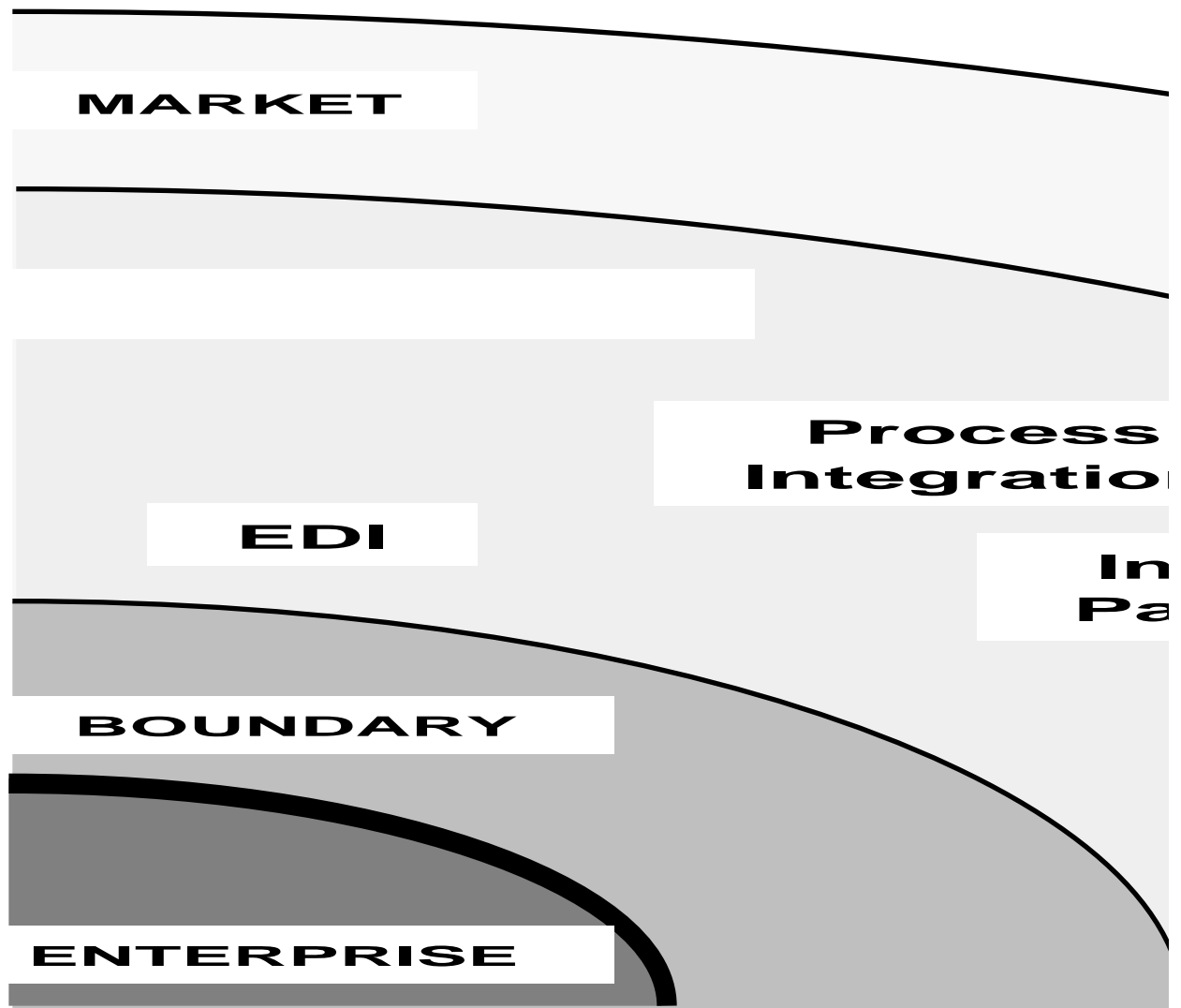


Figure 7. Technologies transform relationships between organizations

The majority of current activities in IOS are related to the establishment of bilateral (dyadic) linkages and other forms of simple, information-based alliances that leverage information technologies. Electronic Data Interchange<sup>8</sup> (EDI), Quick Response, UCS protocols, and other forms of standardization to support interorganizational relations are emerging in a wide range of industries. The evolution of these, relatively, technically and organizationally simple, phenomenon need to be examined in the context of overall IOS evolution and impact.

The use of computer and communications technology to support the information exchanges needed to carry out day-to-day business activities is generally referred to as "Electronic Data Interchange" (EDI). Today, EDI is a major information technology and communications issue in

many U.S. industries. Accounts in the business and trade press and reports at trade conferences suggest the level of activity and potential benefits of widespread adoption of EDI;

- The U.S. Treasury Department makes over 150,000 electronic payments per month to vendors. The cost of an electronic check is estimated at 4 cents per check compared with the 30 cents needed for a paper check.
- The Electronic Data Interchange Association estimated that over 6,000 companies in 70 different industries were using EDI in 1988.
- K-mart transmits over 60% of its freight bills electronically, amounting to more than 2 million transactions in 1990.

### **What is EDI?**

At its simplest, EDI automates existing paper flows between organizations in much the same way as paper flows within organizations have been automated. EDI can also represent the opportunity to rethink and restructure the relationships between organizations. While the benefits are significant, so too are the pitfalls that can derail EDI initiatives, or their business impacts.

Masses of paper documents support the routine interaction between most business organizations. The simplest purchase of office supplies can involve requisitions, purchase orders, sales orders, invoices, packing slips, receiving reports, and checks. Besides the two organizations engaged in this simple exchange, banks and delivery services may be involved. The purchase of raw materials and parts for use in manufacturing or the sale of finished goods for distribution may involve even more information exchange based on paper documents.

Many businesses have long since automated these activities within the boundaries of their own organizations. Transactions are captured at the point of entry into the organization, converted into machine-readable form, and managed with the support of computer-based information systems thereafter. Inventory control systems determine when new materials should be ordered. Order entry systems record customer orders received in the mail or over the phone. Accounts receivable systems record payments received from customers.

From the standpoint of the general manager, EDI, as it is currently known, involves:

- *Cross organization* information interchange -
- *Application to application* communications (system to system)
- *Forms oriented* messages (transaction sets)
- *Information and commitment exchange* (protocols for timing and interpretation)
- *Few new associations* - we are dealing with traditional business functions

### **EDI as an Extension of Internal Transaction Processing Systems**

All of these transaction processing systems have traditionally stopped at the boundary of the organization. The machine-readable data maintained within these systems was transcribed onto purchase orders or invoices or shipping notices and then mailed off to another organization for action. On reaching the appropriate destination, the information on these paper forms was converted back into machine-readable form for entry into and processing by the transaction processing systems of the receiving organization. If transaction processing systems reduced clerical costs, improved accuracy, and improved processing speed within the organization, why can't the same benefits be obtained between organizations?

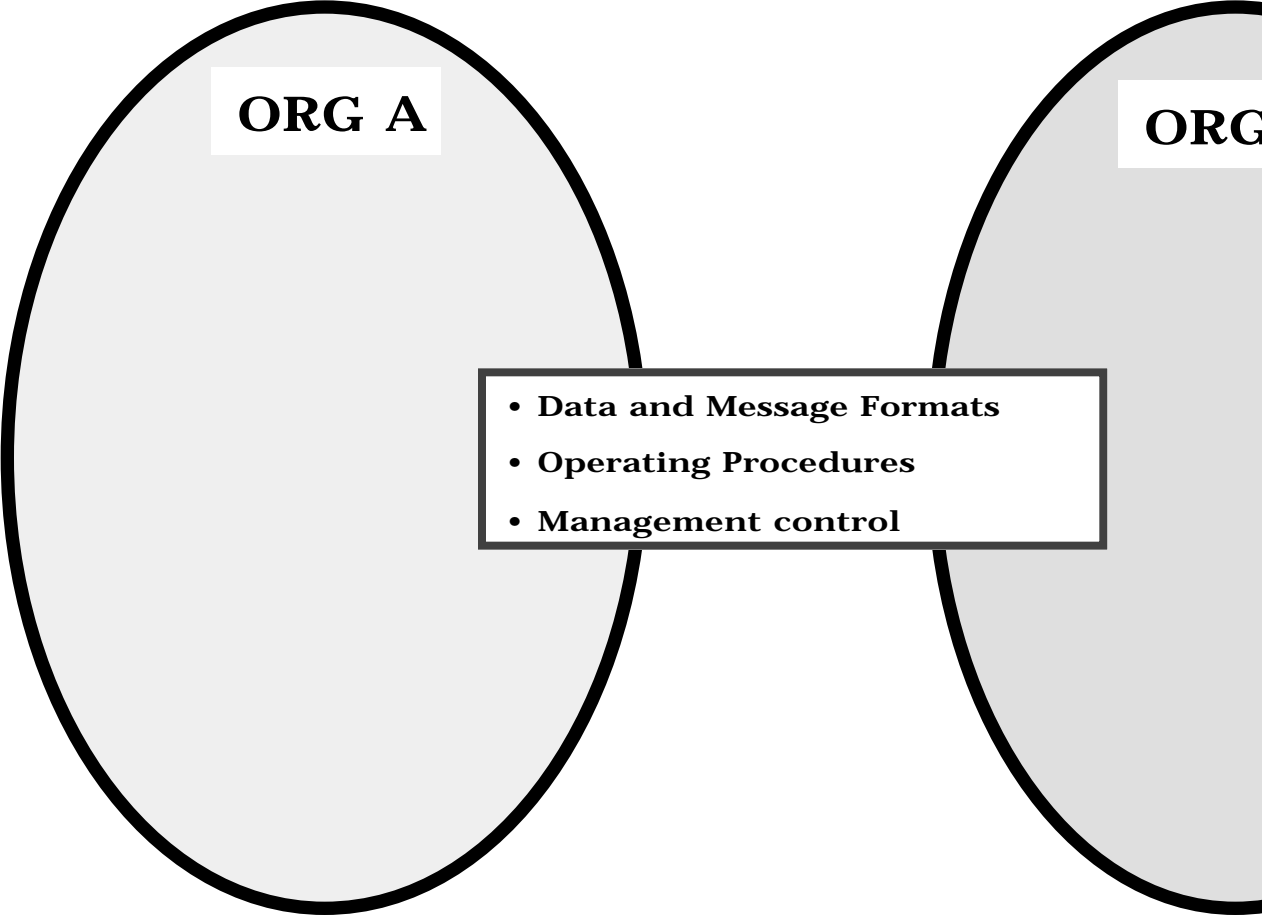


Figure 8. Multiple levels of interchange

This is the fundamental logic of EDI. The transaction processing systems of the organization would be extended beyond the organization's boundaries and linked electronically with the business and information systems of other organizations. Instead of paper documents linking the organizations, electronic equivalents of the documents would be transmitted. This substitution requires efforts in three broad areas. First, each organization must replace the manual interpretation of incoming documents with computer software. Second, the two organizations must replace the

functions of the postal service with an agreement on a telecommunications link. Finally, the two organizations must establish the terms and conditions governing electronically placed orders and agree on the operational details of an electronic link. Often, pressures associated with inventory carrying costs play a role.

### **EDI as a Partnership Arrangement**

Three levels of inter-dependencies occur in decisions involving linkages. Decisions on the technical interconnection, business process (application) dependencies and management practice (multiple business applications) integration may require evaluation. Each aspect may be facilitated by industry, or cross-industry, standards. The likelihood of the emergence of standards, or the opportunity to influence standards development, often set competing or cooperating organizations to work together in formulating shared business practices.

Simply providing automation of company border to company border data transport offers little real benefit to the organizations. Speeding the information links with little thought to the restructure of associated business processes may be more costly than beneficial. The systems in and across organizations have "settled" into certain operating assumptions and often, major changes in one portion of the relationship necessitates a significant review of many other internal systems. For example, a major retailer sends orders to a packaged goods supplier, who takes a printed copy of the transmission and re-keys the information into their order processing activity. There is little benefit to either party without further integration through application sharing.

Recently, a supplier for a large retail department store chain initiated an EDI (Electronic Data Interchange) linkage for order transmission. The process targeted the speed of order transmission and little thought was given to the internal impact on the order processing system, which was designed around the traditional order handling mechanisms. As a result, the two partners found that neither side could fully benefit from merely automating the order transmission, without a redesign of their respective order handling processes.

In addition to the business agreement, partnering organizations seek control over the key forms of integration across their organizations - technical, business process and management practice. If the arrangement is to be successful, these management issues, traditionally handled within the legal boundary of the enterprise must be examined within the context of an "extended view" of the enterprise that involves key management participation from all participants.

The least of these, technical, involves the sharing of technology standards (data, communications, etc.) that facilitate an interconnectivity, or ability to exchange information. There

of the is no shared knowledge of an application, say order processing. At this level, there may be little more than door-to-door shipment of data. As mentioned earlier, many EDI arrangements involve agreements on data formats, key product or other codes and basic communications protocols.

At the business process level, common procedures and common applications mark a higher dependence on coordinated activities across one, or a small number, of business applications. In these situations, there is reason to have coordination meetings involving members from each of the partners. The credit card and airline scenarios involve shared business processes.

Management practice refers to arrangements involving a major renegotiation of the business relationship and management control processes, impacting multiple systems in participating organizations build a significant amount of dependence. When an auto maker establishes a relationship with a supplier to support a "just-in-time" operation, significant commitments in technology, business process and common strategy need to be accommodated. The negotiation for, and management of, such arrangements is not a simple matter. While major issues of business police must be shared, so to the rules of fair competition need to be addressed. To avoid litigation, the parties must be aware of not only the internal impacts among the participants, but also anti-trust issues that may arise.

### **Alliances and Information Partnerships**

Partnerships that leverage forms of electronic "integration" can change the dynamics in the industry. As stated earlier, small companies can look, feel and act "big" and large companies can target market and service to look "small" and close. The rules of time, distance and complexity are changed. For better or worse, there is a blurring distinction in responsibilities and authorities. These blurred distinctions offer challenges and opportunities. To the customer, the blurred distinction between Citibank and American Airlines in associating purchases and frequent flyer program mileage credits is unimportant, as long as the benefit is derived. To the partnering organizations, responsibilities, authorities and coordination need to be clearly identified.

Firms now use data linkages to establish combined marketing programs reaching across traditional industry boundaries to a common customer database. This has been accelerated by dramatic reductions in data storage and transmission costs. for example, airlines, hotels, rental cars, and bank credit cards are now being woven together in a single combined marketing effort. These joint alliances often unevenly benefit the different parties, create barriers for other non-participants in the industry, and represent a new dimension of competition.

In order to operate effectively, both general management and the information technology function often make a number of simplifying assumptions about the environment in which they operate. Periodically, however, it is useful to re-examine the validity of these assumptions. One frequent assumption is that the firm is the appropriate unit of analysis for the leverage of information technology applications. In tomorrow's business environment, few organizations will be immune from the need to involve information technologies outside the organization. Issues of design, capitalization and control become obvious considerations as these shifting organizational competitive positions arise.

Current views focus on the concept of a centralized administrative control over the information assets of the organization. This frequently involves the discussion of a Chief Information Officer (CIO) role: managing relationships inside the firm, developing appropriate planning and control systems, identifying emerging information technologies, etc. Today, the notion of the firm as a stand-alone unit of analysis is more suspect than in previous times. The establishment of strategic alliances among organizations is a rapidly emerging phenomenon, and has been given inadequate attention in many boardrooms. Many strategic alliances involve, and are predicated on, the availability of information technology that give structure to these arrangements. Many forms of these strategic alliances exist. Information technologies offer the opportunity to consider more complex relationships between organizations than have been the case in the past.

It is clearly impossible in today's business climate to ignore those aspects of the organization that extend beyond the traditional, or legal, boundaries of the organization. The volatility in the marketplace often comes as a shock to those that have held too long onto the beliefs that: 1) The competitors we have today will be tomorrow's competition, 2) The rules by which we conduct business tomorrow will be the same as those of today, and 3) We will grow along the traditional lines of growth that have served us since the business began. While difficult to recognize and challenge these beliefs, it is clear that general managers need be cognizant of these radical changes.

It is no longer possible to look strictly inside when dealing with a restructuring or reorganization. Downsizing, delaying, downscaling the organization involve consideration of outsourcing business functions, possibly purchasing services on a usage sensitive basis. No business processes are immune from a review that asks the question, "why are we doing this in-house with this overhead associated with retention of that capability?"

## IT Role in Building and Sustaining Partnerships

In today's volatile, competitive world, the effective use of information technology is both an element of a competitive strategy and is often a core competency required in the emerging competitive arena<sup>9</sup>. Cash and Konsynski (1985) and others cite examples of many organizations that have made use of information technology to build and sustain new relationships with suppliers or customers and achieve significant competitive advantage. A common theme in these examples is the use of information technology to improve the *coordination* activities across organizations that are critical to developing and delivering products and services to a market. However, it is often noted that these organizations did not gain their advantage by virtue of the information technology in and of itself. Johnston and Lawrence (1988) point out that Foremost McKesson radically changed both its internal operations and its working relationships with customers in its efforts to build and sustain a competitive advantage over large, integrated pharmaceutical companies. Rockart and Short (1989) discuss the need for effective internal integration across value-added functions as a critical aspect of effective execution of interorganizational information systems. Konsynski and Warbelow (1989) argue that the use of information technology linkages between organizations will only "speed up the mess" unless fundamental restructuring of the nature of work in organizations is achieved.

Further, while there are many examples of how investments in technology have yielded significant competitive advantage, there are also many examples where such investments have resulted in no measurable impact. In many cases, this failure appears to stem not from an inappropriate vision but from the inability of the organization to effectively integrate the use and the management of the technology into the mainstream of the firm. Successful partnership and the process of building partnership as a management strategy. Regardless of the level of decentralization of the US function, there still remains a critical need to build an effective working relationship between organizations. While some may envision the day in which information systems specialists are not required, trends in technology and the increasing complexity of the technology infrastructure (such as telecommunications, database systems and large transaction/application systems) suggest that this functional area of the business will not soon disappear.

Corporate strategy researchers have focused on the concept of alliances and partnership as a general management strategy. While their focus is often external, i.e., understanding the working relationships across organizational boundaries, the term "partnership" is used to describe a working relationship that reflects a long term commitment, a sense of mutual cooperation, shared risk and

benefits, and other aspects that are consistent with concepts and theories of participatory decision making. Among the key elements are:

- Stability of the Relationship
- Sustained over time (no explicit end point)
- Self-maximizing behavior is not optimal
- Opportunistic behavior controlled through processes rather than contracts
- Significant contract ambiguity
- Interdependence of the Relationship
- Stream of exchanges that are highly Interdependent
- Joint acceptance of costs/burdens/risks
- Flexibility of the Relationship
- Willingness to Invest In relationship
- Mechanism for adapting to uncertain events
- Mechanisms of the Process
- Influence relationship
- Operational exchange of key Information
- Economic relationship
- Social/political networks

## **Forms of Partnership**

Many forms of partnership arise in the business environment. The stated purpose does not always reveal the true nature of, or motivation for, the arrangement. Among the various forms are Intra-industry coalitions, customer-vendor relationships, customer-supplier linkages, and other market transforming relationships that are intended to change the balance of power and create new patterns of behavior in the marketplace.

### **Intra-industry Coalitions.**

The economies of scale associated with certain kinds of hardware/software configurations have facilitated a very different method of operations. In the airline industry, for example, the economies of scale in developing and managing a reservation system are now beyond the capacities of the medium-sized airlines. In Europe, two major coalitions have been created: the Amadeus Coalition and the Galileo Coalition. Amadeus is built around the United Airlines software, and Galileo around the Continental software. Even the largest carriers have acknowledged their inability to handle this problem by themselves and have joined coalitions.

### **Customer-Vendor Relationship.**

The establishment of joint research projects on new technologies through Beta sites can provide advantages to both parties. For the vendors, this relationship gives valuable insight into the

practical field problems associated with their technology. Further, the ability to resolve these problems in prestige accounts gives vendors highly visible reference sales. For the customer, the relationship is a cost-effective way to learn and participate in new technology developments that may be beyond individual skill and financial resource levels. On both sides, considerable care must be taken to select the right partners to ensure good relationships.

### **Customer-Supplier Linkages.**

These joint efforts potentially provide better service to both parties, enabling them to better control investments in inventory, storage facilities, and operating costs. Sensibly architected, these linkages can give both parties a competitive advantage. If the two firms are of unequal size, however, a risk exists that the larger party can force its standards upon the smaller party. Such a major power transfer can potentially destabilize the relationship.

### **What is Shared in Partnership?**

Three dimensions of technology application play a role in the managerial confidence that new partnerships and arrangements are now feasible - control and coordination, information sharing and business application sharing. It is only due to our increased ability to share capabilities along these dimensions that make these new arrangements possible.

- *Information* sharing involves the capability to organize information in ways that will serve all participating organizations efficiently. This factor involves joint design and sharing data definitions, data formats, data relationships and search patterns. Shared and common dictionary and directory functions offer improved capability to jointly use shared data bases.
- *Business applications* sharing refers to the joint design of business processes that can be held common across organizations. This often involves coordination on business policy, definition of common procedures, standards on systems development and maintenance, and periodic review of systems and procedures.
- *Controls and coordination* cooperation are essential to the new relationships. Information technologies enable the institution of internal controls that govern the new associations and offer the confidence in the integrity and fairness of the systems and transactions.

### **Partnership: Control Over Key Integration Factors**

In addition to the business agreement, partnering organizations seek control over the key forms of integration across their organizations - technical, business process and business practice. The least of these, technical, involves the sharing of technology standards (data, communications, etc.) that facilitate an interconnectivity, or ability to exchange information. There of the is no shared knowledge of an application, say order processing. At this level, there may be little more than door-to-door shipment of data. Many electronic data interchange (EDI) arrangements involve

agreements on data formats, key product or other codes and basic communications protocols. For example, a retailer sends orders to a supplier, who takes a printed copy of the transmission and re-keys the information into their order processing activity.

At the business process level, common procedures and common applications mark a higher dependence on coordinated activities across one, or a small number, of business applications. In these situations, there is reason to have coordination meetings involving members from each of the partners. The credit card and airline scenarios involve shared business processes.

Business practices refers to arrangements involving a major renegotiation of the business relationship, impacting multiple systems in participating organizations build a significant amount of dependence. When an auto maker establishes a relationship with a supplier to support a "just-in-time" operation, significant commitments in technology, business process and common strategy need to be accommodated. The negotiation for, and management of, such arrangements is not a simple matter. While major issues of business police can be shared, so to the rules of fair competition need to be addressed. To avoid litigation, the parties need to be aware of not only the internal impacts among the participants, but also anti-trust issues that may arise.

A retailer, a major regional department store chain, is renegotiating its relationships with certain suppliers. For one of it's suppliers of ladies garments, the retailer provides point of sale information and allows the supplier to make all merchandising decisions for the fixed display area. Several other department stores are creating such arrangements, which significantly reduce the buying costs of the retailer.

A regional food retailer, is centralizing its buying force to create a Direct Product Costing management strategy with a centralized buying organization that integrates decisions on advertising, warehousing and other commitments that affect product costs. The single buying point has a significant impact on the organization's operations from supplier relations, to shipment and warehousing, to regional and in-store merchandising and marketing support. Yet another parallel group is concerned with the profitability of the products. It is expected that, once these two functions are integrated, a full Direct Product Profitability (DPP) program will have a significant effect on the various arrangements with suppliers that will develop.

### **Bringing Something to the Technological Table**

Partnering arrangements, whether to leverage or acquire a technical competence, involve the review of both the organizational and technical cultures. In addition to the normal factors that a

general manager considers, the compatibility of the technical architecture plays a significant role in the partnering decision. Arrangements often involve the need to share:

- Capital infrastructure
- Technical architecture
- Information resources
- Established software
- Technical expertise

The sharing of information technologies requires considerable thought and planning. Those organizations that are ill prepared to provide the connectivity and openness needed to make the connections across the technical cultures should carefully evaluate the potential benefits of a partnering initiative, as the organizational investments in time and resources is no guarantee of success in the partnering arrangement.

## **MARKETS and INDUSTRY PLATFORMS: Public and Private**

---

### **Rationalizing Fragmented Markets**

The role of information technologies in the rationalization of the many fragmented markets is the theme of this next part of the paper. The fragmented markets are those that involve many buyers and sellers, often governed or supported by trade associations. Whether in insurance or automobile parts, a significant portion of transaction costs have to do with identification of trading partners and coordination of transaction execution and settlement. The class of IOS I call *virtual system* is the most primitive form of these shared platforms, involving agreement only on data interchange protocols and basic operations procedures. However, other shared platforms involve direct support for transactions, introducing new economies and discipline to the market.

Several individual or groups of stakeholders (trade participants, trade or industry associations, vendors, etc.) may take the initiative to influence the direction of rules changes in the market through the leverage of information technologies to create integration effects, build dependence and otherwise impact the pattern of exchange practice in an industry. Internal and external market forces trigger these unilateral or collaborative initiatives.

**Individual initiatives** - A market leader or innovator seizes the initiative and establishes a climate for participation in alliances. The airline initiatives of American and United illustrate such unilateral initiatives that resulted in a shared platform.

**Competitive Response** - In response to a significant move in a market, an organization creates, in the name of defense, a partnered environment. Johnson and Johnson developed the COACT system, partially in response to previous initiatives by American Hospital Supply.

**Collaborative Effort** - A coalition of medium sized players collect the capital and skills required to create the technology infrastructure for an industry. Several cases in the ATM arena illustrate such coalitions.

**Professional Organization** - Trade organization serves as a fair broker in specification and management of a shared platform. IVANS was an initiative of ACORD in the insurance industry; while Transnet resulted from actions by MEMA in the motor equipment sales market.

**Distribution Channel Consolidation** - Intermediaries collect to defend their distribution status. Efforts in the travel agency arena in the 1970s illustrate a failed attempt at a consolidation for creation of a shared reservations platform.

**New Entrant** - A new entrant to a market may lay the groundwork for IOS initiatives. Sears move into new markets, leveraging its distribution channel services is one example. A technology vendor may bring its technology to a market and provide a market platform, say General Electric Information Services and Automatic Data Processing which provide electronic data interchange platforms in specific industries.

Where the intermediary attempts merely to create a level playing field and reduce transaction costs for all parties, I call these *industry platforms*. Where the intermediary defines market rules for buyers and sellers and performs more and more significant market activities, I call these *electronic market access forums*, EMAFs. While both involve shared technology platforms, the EMAF involves a major intervention into the practice of the market. These classes of IOS initiatives can now be summarized in the following figure:

{Candidate for insert}

### IOS Taxonomy Overview

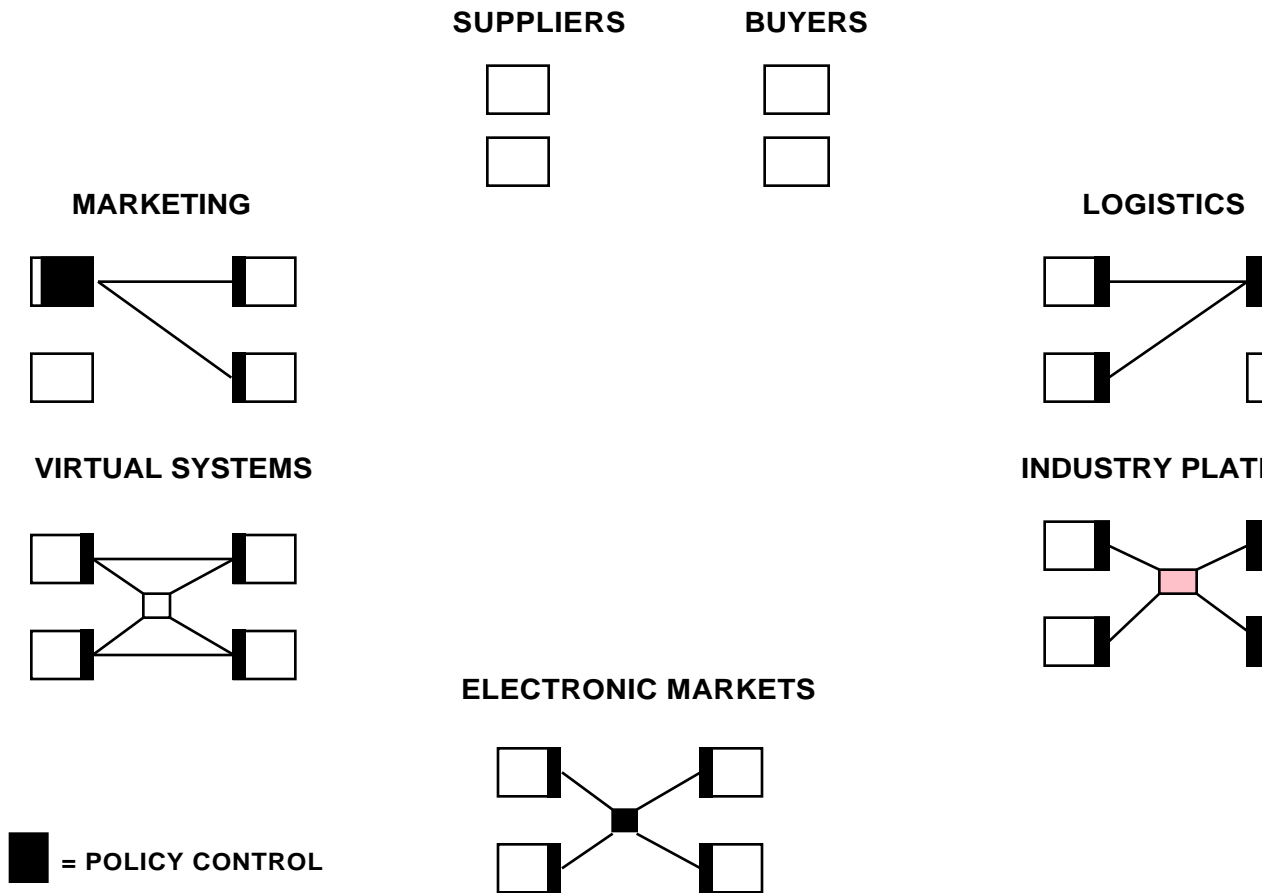


Figure 9. Forms of interorganizational systems

**MARKETING** and **LOGISTICS** systems involve bilateral linkages of buyers and suppliers, often using proprietary protocols (communications, product identifiers, data formats, etc.). Such linkages offer significant product or service differentiation (**MARKETING**, e.g. Levi Strauss **LEVILINK**, Hagggar **HOTS**) or influence inventory and ordering procedures (**LOGISTICS**, e.g. many EDI initiatives like K-Mart). The intent of these forms of IOS linkages is *COOPTIVE*.

**VIRTUAL SYSTEMS** arise when national, or international, standards are selected by a community of market participants. The "policy" for selecting the appropriate protocols is owned by the community, and each individual entity (supplier or buyer) is responsible for their own systems that implement those standards. For example: UCS codes, X12 or EDIFACT standards, GEIS value-added network services, etc., might be adopted by an industry to prevent the dominance of one or more proprietary standards. Pressures for this approach often arise from the emergence of multiple proprietary standards that reduce the overall efficiency of the participants. Several industries have undertaken such initiatives: **WINS** (warehousing), **TALC** (textile), etc. Such forms of IOS linkages are *COLLECTIVE*.

**INDUSTRY PLATFORMS** represent the initiative of one, or more, players in a market to provide a common "platform" for the industry. Often these platforms emerge from trade associations that

wish to leverage the transaction economics of the collection of participants to bring economies of scale to reduce the costs for all participants. Thus, standards are set to raise the level of the industry's efficiency (ex. TRANSNET in auto parts, and IVANS in insurance). The intent is to establish a relatively level playing field to the benefit of the entire participating community. Further, the information sharing opportunity may offer important coordination that is essential to the operation of the market (e.g. airlines reservation systems). Such IOS linkage arrangements are *COLLABORATIVE*.

**ELECTRONIC MARKET ACCESS FORUMS** refer to environments where the intermediary offers more than transaction economics, actually performing many essential market functions. These functions include seller and buyer identification, matching, negotiation, settlement, etc. In these trading environments, the third party intermediary sets and enforces the rules of the trading environment. The EMAF facilitator has the responsibility to reduce the risk of participants in the market. Horizontal market trading is often enhanced in these environments. Examples include: American Gem Market System (gemstones), TELCOT (cotton), Inventory Locator Service (airplane parts), Autoinfo (auto dismantlers), Reuter's INSTINET, etc. The intent is often the promotion of fair, competitive markets. These IOS arrangements are *COMPETITIVE*.

The unique phenomenon of Electronic Market Access Forum (EMAF), involves an intermediary that defines market rules and governs transactions. It is important to distinguish EMAFs from "electronic markets" as the economists use the term<sup>10</sup>. Indeed, most EMAFs serve very poorly as "markets." Most fragmented markets are susceptible to the intervention of a participant, or third party, intermediary to provide market management functions. These functions include identification of buyers and sellers, matching buyers and sellers, negotiation, product and substitution identification, settlement, insurance and trust brokering, market history management, product and service valuation, etc.

### **Linkage and Industrial Policy**

As we have discussed earlier, vertical market electronic data Interchange systems that tie together organization's production systems of particular industries, such as EDI between manufacturing companies and their suppliers, are relatively uncomplicated socially and politically. Such linkages can be built through agreements among the parties involved without much controversy. This is especially true when these information linkages serve to enhance current bilateral arrangements through operations cost reductions and improved coordination. With the exception of situations in which buyers leverage extraordinary power to reduce logistics costs, such arrangements are frequently the result of amicable agreement and expectations of mutual benefits.

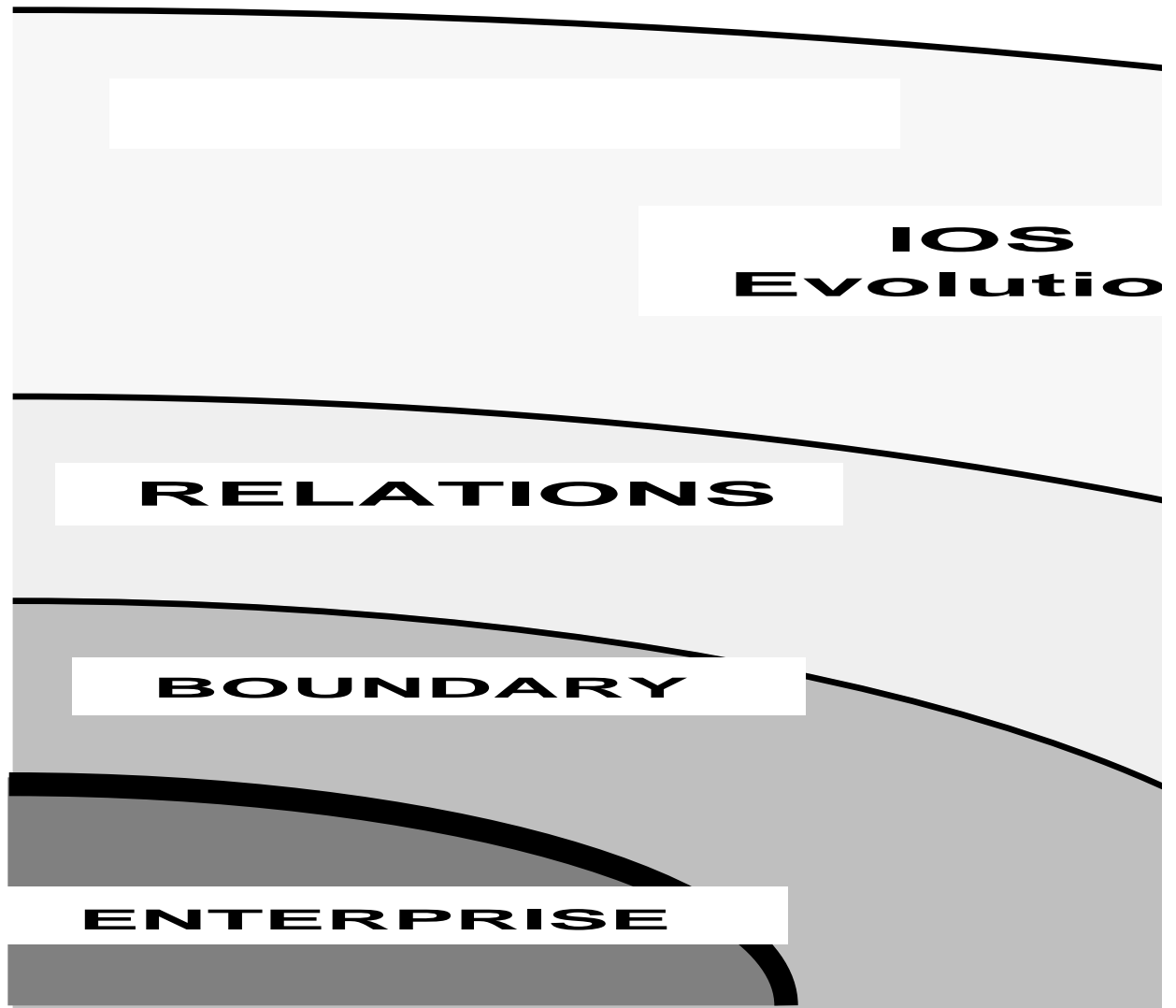


Figure 10. Technologies transform market process and practice

However, EDI systems that cut across industries, especially industries characterized by strong competition, are much more difficult to construct, and usually never get started, nor advance, by simply leaving things “to the market.” Often government and quasi-governmental entities can and do play a key role in facilitating the development of such EDI systems. Examples in the trading sector in Norway, Singapore, the U.S. and Hong Kong, highlight the range of possibilities and opportunities for government to play a significant role in the evolution of EDI across industry boundaries.

The situation reflects the significant role that government policy influencing the application of information technologies can play in the establishment of unique industry relationships. Whether for the leverage of a product portfolio, technology or service capabilities, unique skills or

market presence, new forms of alliances and partnerships are forming. In the cited cases, government is contributing through a range of interventions from declaration of standards to operation of the facilitating market information mechanisms. Government proscribed information technology (standards and protocols) are playing a critical role in the formation of these new arrangements. Through a review of some of the factors that contributed to the governmental arrangements in the Singapore TradeNet and Hong Kong TradeLink situations we can examine some of the issues in the formation of these arrangements. Issues of partnership, benefits, fairness and control arise in an examination of the challenge faced by government in determination of an appropriate role in defining its level of influence in market practice.

Vertical EDI systems tie together the production systems of particular industries. Examples include EDI between manufacturing companies and their suppliers. They are relatively uncomplicated socially and politically. They can be built through agreements among the parties involved without much controversy, especially when these information linkages serve to enhance current bilateral arrangements through operations cost reductions and improved coordination. With the exception of situations in which buyers leverage extraordinary power to reduce logistics costs, such arrangements are frequently the result of amicable agreement and expectations of mutual benefits.

Horizontal EDI systems that cut across industries, especially industries characterized by strong competition, are much more difficult to construct. When they do get started, they grow with difficulty. Building successful horizontal EDI systems cannot be done simply by leaving things “to the market.” They require the leadership and control structures of large social institutions, particularly government and quasi-governmental organizations. In this paper we provide examples of EDI efforts from Singapore, Hong Kong, and Norway to illustrate the important role that government and quasi-governmental organizations can play in the evolution of EDI across industry boundaries. The focus of our discussion is on EDI systems related to trade.

### **Example: Participants and the Process of Alignment**

At the extreme, an inter-industry partnership may be actively led by government. Consider the TradeNet system of Singapore, which plays a role in the management of one of the world's largest ports. The Singapore government has spent a significant amount to link trade agents with relevant government agencies at the port--freight forwarders, shipping companies, banks, and insurance companies, with customs officials and immigration officials. Clearing the port, which used to take a vessel two to four days, now may take as little as ten minutes. This startling reduction has more than halved the time any ship has to remain in port and is believed to be a key to

ensuring that Singapore remains a port of choice in the Far East, where the competition is clearly growing.

The Singapore TradeNet situation demonstrates the role that government sponsorship of information technologies can play in the competitive position of the nation. The story represents the issues behind the development of a transportation industry information technology based platform to facilitate trade documentation processing. The system is important for the competitive posture of the transportation industry in Singapore and is therefore important for the economic health of the entire nation. TradeNet itself involves the partnership of a unique assortment of government agencies, bureaus, statutory boards, private agencies and companies involved in all aspects of shipment of goods. The apparent success of the effort invites a review on the factors that contributed to the initiative. In the Singapore situation we see the development of a critical system in an industry that is vital to the future of the Singapore economy. The effort not only served the core industry, but was used to develop, exercise and demonstrate the growing “computerization” skills deemed important to the future of the city state. It was an important application in a critical area and served to demonstrate the developing systems integration skills that it hopes to leverage in a variety of areas.

The TradeNet initiative illustrates a contrast to the initiatives of the Finnpap/Finnboard (paper and wood products associations) effort in Finland. The role of the government in the Singapore initiative was significant and was probably critical to the success of the endeavor. The broad range of stakeholders required incentive to coordinate and cooperate. The trading environment for Finland in the international wood and paper products was no less significant. However, in the Finland situation, the government opted to play no significant role in the coordination of the eighteen midsize paper companies. The paper companies jointly developed a global electronic information system to link themselves with hundreds of key customers and international sales offices. The system is costing over \$50 million to develop, and is meant to provide a speed and quality of response that would have been technically and financially unattainable by any of the individual participants acting in their own behalf.

The paper companies, whose sales amount to nearly \$4 billion, came to feel that to compete effectively in a service-oriented business such as paper products, they had to provide on-line, global data interchange with key customers. They wanted to provide customers a virtually instantaneous means of placing status inquiries or new orders--in contrast with the 12 days that had become the industry norm. Moreover, considering their size, they were all uneasy about joining one of the proprietary information networks of their big, global competitors; they had seen what had happened to midsize airlines. Yet in spite of the critical contribution to the country’s manufacturing GDP, the

government played no significant role in the formation of standards and the investment in and establishment of the system.

In the Singapore situation there was a total commitment with the government playing a critical role in setting deadlines and coordinating resource allocation. another factor was the technology infrastructure, the one they had and the one they were building. Another factor was the leverage of interlocking directorates that are important to the patterns of public-private business practice in Singapore, contributing also to a knowledge transfer that is associated with the rotation across the various directorates. In addition, the initiative did not just “speed up the mess” rather they redesigned the forms and procedures that make up the trade document processing. Other factors such as the strict change control processes and unique accounting arrangements contributed to the effort.

### **Singapore TradeNet**

Singapore is an island nation of only 625 square kilometers and a population of 2.7 million<sup>11</sup>. It has one major port, and a large international airport. It is located at the tip of the Malay peninsula, along centuries-old trade routes between the Indian Ocean and the Pacific. Trade is important to Singapore – it is the country's biggest industry. In 1989 Singapore switched on its TradeNet EDI system, the most comprehensive trade-related EDI system in the world. It serves many different organizations and interests in the trade sector, including government departments such as customs, the port and airport authorities, cargo companies, freight forwarders, shipping and airline companies, banks, and insurance companies. Most export and import declarations are done through TradeNet at this time, and all will be done through the system within a year. The system has greatly decreased the time and trouble of trade documentation. Approval for declarations, which used to be a time consuming process involving much paperwork and as long as four days, can now be done in as little as ten minutes. Errors are reduced, labor costs are cut, and handlers can make more efficient use of their staff and equipment. TradeNet promises to be an important factor in Singapore's maintaining a competitive position among the region's major ports.

TradeNet is owned by a private firm, Singapore Network Services, Ltd., and it was built by a partnership of two companies, IBM and Computer Systems Advisers, Ltd. On the surface it looks like a great private-sector EDI success story. But the system would never have materialized without direct and critical government leadership. The government of Singapore was instrumental in the creation of TradeNet in at least four ways. The government initiated and underwrote the build-up of information technology infrastructure in the country between 1979 and 1989, increasing by tenfold the number of IT professionals and greatly expanding computerization of key

government agencies. This was essential because it provided the means by which the system could be created and sustained by Singapore itself and not merely "leased" from some external supplier. The government also provided authoritative leadership and assigned key, high-ranking personnel from government agencies and statutory boards to organize the social architecture for the project and oversee the technical development of the system. The social architecture was very important because all the parties involved in the trade sector had to agree on the procedures around which the EDI system would be built. Finally, the government underwrote the project through the four statutory boards that together own Singapore Network Services (the Trade Development Board, the Port of Singapore Authority, the Civil Aviation Authority of Singapore, and Singapore Telecoms).

One might argue that the government's role in the TradeNet case was important, but that the same results would have been possible if the various private companies involved in the trade sector had agreed among themselves to create a horizontal EDI for trade, and then involved the government. The story of the Hong Kong Hotline and Tradelink experiences shows this to be incorrect.

### **Hong Kong: Hotline and Tradelink**

Like Singapore, Hong Kong is a trading center that depends greatly on the vitality of its trading companies for its welfare. And like Singapore, visionary leaders in the trade sector saw early-on that EDI offered promise for improving trade. In fact, Hong Kong got started on a project to create EDI for trade *before* Singapore did. Yet today there is no EDI system for trade in Hong Kong. What happened?

In 1983, the Hong Kong Government helped sponsor the creation of a special council to improve trade. This council was made up of representatives of HKG plus major trading companies and financial institutions. The council, after some deliberation, proposed the creation of an EDI system – a data base of consignments, actually – to facilitate trade. The proposed system, called Hotline, looked promising. At this time, the Singapore government became aware of the Hong Kong efforts, and redoubled their efforts to create what became TradeNet. As promising as Hotline looked, however, the council did not have the means or the charter to pay for the system. The council took the project to the Hong Kong Government, suggesting that the government build the system. The government's reply was that such a system would be of benefit mainly to business, and therefore business should pay to build it. A survey of trading companies done by the council provided another argument for government sponsorship, noting that most trade business people said they would feel uneasy if competitively sensitive trade data were stored by any organization other than the government. Again, the government argued that it was not in the business of

providing information processing services that could well be done by other value-added network suppliers.

The government's unwillingness to take the lead on Hotline resulted in a hiatus in EDI for trade in Hong Kong. For many months, nothing happened. Still, the belief that EDI was needed for trade was alive, and several companies that had participated in the council started their own firm, Tradelink, in order to support a consultancy study investigating the commercial viability of a trade-related EDI system. The resulting report indicated that such a system would probably not be a money maker from a strictly business point of view, and further obscured what roles should be played by the government and the private sector in creating such a capability in Hong Kong. At about the time the consultancy report came out, TradeNet was turned on in Singapore. Suddenly it was clear that such a system could be built, that it had real advantages, and that some kind of partnership between government and private businesses would be required to make it happen. The Special Project on EDI, SPEDI, was created as a result of this realization. The job of SPEDI is to come up with a framework and a general plan for building a trade-related EDI system in Hong Kong.

### **Norway: The TVINN System**

EDI projects for trade are not limited to the Far East. Norway has successfully implemented the TVINN system for automated clearance and control in the Norwegian Customs department. This system is significant in two respects. First, it was a very early arrival on the trade-related EDI scene. It came on line in August of 1988, four months before TradeNet. Second, since it is not a comprehensive trade-related system, and focuses only on customs, it represents an intermediate solution to the trade documentation problem.

The Norwegian government's Customs Department took the lead on this project. The decision to build an EDI system was made in 1985. The project was managed by the Norwegian computer consulting and design firm Avenir, and the TVINN system was built in about two years (similar to TradeNet). Unlike TradeNet, which is essentially fully automatic, with rare human intervention, TVINN was designed to allow routine intervention by customs officers to watch the documentation process and modify the process as necessary. Like TradeNet, the project has been very successful, and Norwegian Customs claims significant labor savings, improved accuracy, and faster turnaround. TVINN is a trade-related EDI system that serves only the customs function of trading. But this is often a bottleneck, and the system alleviates that bottleneck.

## Public Policy and Strategic Control

Generally speaking, competition through the private sector is likely to result in more innovative and effective systems than will the monopoly function of government. However, there are times when the public sector might take the lead in order to move the creation of an EDI system forward in a timely manner. When should the public sector take the initiative and influence through policy and regulation? Under the following conditions:

- 1) When cross industry conflicts develop due to incompatible business procedures that could be standardized, but that no one business wants to bear the costs for standardizing. The public sector usually intervenes to find ways to facilitate standardization and to ensure that the costs of coming into compliance are fairly borne by the various parties that will benefit.
- 2) When the competitive posture of the nation or region is threatened (e.g., a competitor installs a capability that puts one at a genuine disadvantage, and a response in kind is called for), or when particular windows of opportunity exist that might be exploited quickly.
- 3) When key elements of an EDI capability require construction or use of "natural monopolies" such as the local telephone network or specialized government data resources.
- 4) When key functions to be served by the EDI network require the actions of a government agency.

There can be little doubt that EDI in areas like the trade sector will grow rapidly in the coming years. There is also little doubt that government can take an active, and often leading, role in the creation of trade-related EDI systems. The inevitable involvement of customs and possibly other government agencies in the trade process make this a certainty. But what about other cross-cutting EDI systems that do not necessarily involve government agencies. Can we expect the government to play major roles there as well? Yes, because the government has an abiding interest in ensuring that systems built to facilitate business among competing companies are not designed or used in ways that give any business unfair competitive advantage. This principle has been enforced with much controversy in the United States, where the airline companies that own and operate computerized reservation systems have come under government orders to alter the ways their systems perform in order to eliminate systematic unfair competitive practices that were facilitated by the designs. We can expect similar concerns to arise with respect to horizontal EDI systems, and in many cases, government agencies are likely to look upon such systems as analogs of "common carrier" networks such as the telephone system. While such systems can be privatized, as is the Singapore TradeNet system, the government will probably be required to have an ongoing role ensuring that key social objectives are upheld in the actual functioning of the systems.

## Conclusion

---

The author has taken an ambitious sweep in review of the information technology role in extending the enterprise and the strategic control implications. We have moved from a discussion of the key elements of control - understanding and influence, to a review of the internal and boundary spanning role of information technologies, to an overview of relations in multi-national and global enterprise, then to review of elements of relations and partnerships. This sweep of internal employment, boundary transformation, relationship and partnership and market transformation was intended to underscore the need assessment of strategic alignment at all levels of organization and inter-organizational relations.

In this paper, we have challenged the traditional view of the organization with clear boundaries, limited relationships with other organizations, and a focus on internal efficiency and effectiveness as no longer adequate. Today's organizational boundaries are blurring, partnerships with clients and competitors are becoming commonplace, and quality and efficiency issues extend well beyond the traditional enterprise boundary. There is an emerging trend in new organization alliances, boundary redefinition and market structures. New product and service offerings, channel systems capabilities, and target marketing initiatives are enabled through these partnerships, alliances, and information interchange arrangements. The effective employment of these information technologies requires an effort along the lines of the internal strategic alignment analysis discussed in the several papers in this volume.

In this paper, we have looked at the internal structure of the enterprise and have made the case that *boundaries* are transformed often through employment of these information technologies. Culture and practice are interdicted. Operations and management practice and procedures are transformed and have a major impact on applications and human resource dynamics. Organization structure issues may be profoundly impacted - division of labor, conflict resolution, coordination mechanisms, accountability, authorities, identities are threatened.

We explored new forms of *relationships* with parties outside the enterprise are of operational and often strategic concern to the general manager. Relations with suppliers, customers, competitors, and other forms of partners and affinity groups have earned significant management attention. Many forms of partnership arise in the business environment, including Intra-industry coalitions, customer-vendor relationships, customer-supplier linkages, and other market transforming relationships. These alliances, when properly executed, change the balance of power and create new patterns of behavior in the marketplace.

Among the information technologies that we have considered are

<b>Example Technologies</b>	<b>BOUNDARIES</b>	<b>RELATIONS</b>	<b>MARKETS</b>
<b>UNDERSTANDING</b>	<b>Personal/Portable Information Refineries</b>	<b>Electronic Data Interchange</b>	<b>Information Partnership</b>
<b>INFLUENCE</b>	<b>Intelligent Agents Information Gateways</b>	<b>Shared Databases</b>	<b>Inter- Organizational Systems</b>

Table 2. Information technologies transform control options

Some of the organizational initiatives that represent each of the issues:

<b>Example Initiatives</b>	<b>BOUNDARIES</b>	<b>RELATIONS</b>	<b>MARKETS</b>
<b>UNDERSTANDING</b>	<b>Gillette Statoil</b>	<b>K Mart Levi-Strauss</b>	<b>TradeNet TVINN</b>
<b>INFLUENCE</b>	<b>Frito-Lay, Hanes</b>	<b>AEtna Gemini Baxter's ASAP</b>	<b>IVANS Transnet</b>

Table 3. Organizations deploy technology to transform strategic control

Organization boundaries are being transformed by these new linkage relationships. Where one company ends and another begins is no longer an easy question, if it ever was. Distinctions associated with legal definitions and formal authorities and responsibilities are being challenged as the new arrangements defy traditional boundary tests. A supplier of parts to a major automotive manufacturer recently told the author, "I don't know who we are anymore. Day-today decisions that were traditionally made in my organization seem now to be made by my major buyer. These electronic linkages are messing up the old relations."

The internal structure of the organization is not immune from impacts associated with these linkages. An interesting emerging phenomenon is the recognition that an organization's *entire transaction set* is potentially subject to EDI. Therefore they need to establish and design a new architecture. They're going to treat a lot of their internal, interdivisional transactions as if they were cross organizational. Therefore they'll create what I call the organizational *agility* to make the decisions on the location of processing, even outside the organization. They may be introducing some near term inefficiencies in the process to set up the infrastructure for future - *tactical flexibility*.

Management needs to play a significant role in the development and maintenance of policy that relates to electronic linkages involved in relationships with suppliers, customers, and competitors. These initiatives have a high potential for radically transforming the organization, its market position, and overall market practice and balance of power. When senior managers “think” about “linking” there is a higher potential for the enterprise when they recognize that these issues involve *more of a business innovation than a technical innovation*.

The management challenges are significant and rich in operational and strategic threats and opportunities. The constraints in leveraging information technologies in the the pursuit of "changing the rules" in an industry, or merely in a relationship, are both real and significant to the general manager. Strategic Alignment is an essential tool in designing and managing these new forms of partnership and alliances.

---

<sup>1</sup> "Toward the Employee-Less Firm or ELF," B. Konsynski and D. Overman, 1984.

<sup>2</sup> The assumption that once data is created, it should never be lost, regardless of cost to maintain.

<sup>3</sup> See also "Personal Portable Technologies: A Taxonomy," by Konsynski and Ostrovsky, Working Paper, 1990.

<sup>4</sup> See also "Information Refineries: Distilling Management Information Needs," by J. Clippinger and B. Konsynski in ComputerWorld, 1989.

<sup>5</sup> See also "Delegation Technologies: Environmental Scanning with Intelligent Agents," G. Elofson and B. Konsynski, JMIS, Spring 1991.

<sup>6</sup> See also "Organization Support Systems: Bridging business and Decision Processes," J. Fedorowicz and B. Konsynski, Journal of MIS, V8, N4, Spring 1992.

<sup>7</sup> "Knowing Your Competitors," Fortune, 5/14/84

<sup>8</sup> "A Note on Electronic Data Interchange," J. McGee and B. Konsynski, 9-190-022 Rev 7/19/89.

<sup>9</sup> For further elaboration, see "The Structure of Partnership: Key Elements of Successful Partnership," J. Henderson and B. Konsynski, Working Paper, 1991.

<sup>10</sup> It is interesting to note that many of my own cases and studies have been used to argue the case for "electronic markets." - IVANS, TRANSNET, TELCOT, American Gem Market Service, etc. Simply interconnecting fragmented buyers and suppliers does not engender "market" behavior. Indeed, most of the EMAs carry extraordinary discipline and bias that can significantly inhibit "market" behavior.

<sup>11</sup> For further information on public and private sector cooperation in information technology policy and trade see, "Government Playing a Critical Role in the Business Cycle," by John King and Benn Konsynski.

## REFERENCES

---

- Achabal, Dale D. and Shelby H. McIntyre (1987), "Information Technology is Reshaping Retailing," *Journal of Retailing*, 63(4), 321-325
- Achrol, Ravi Singh, Torger Reve and Louis W. Stern (1983), "The Environment of Marketing Channel Dyads: A Framework for Comparative Analysis," *Journal of Marketing*, 47(Fall), 55-67
- Aguilar, F., *Scanning the Business Environment*, New York, MacMillan, 1967.
- Anderson, Erin, Leonard M. Lodish and Barton A. Weitz (1987), "Resource Allocation Behavior in Conventional Channels," *Journal of Marketing Research*, 24(1), 85-97
- Anderson, James C. and James A. Narus (1990), "A Model of Distributor Firm and Manufacturer Firm Working Partnerships," *Journal of Marketing*, 54(1), 42-58
- Ansoff, H.I., "Managing Strategic Surprise by Response to Weak Signals." *California Management Review*, Winter, 1975, Vol. 18, No. 2, pp. 21-33
- Applegate, L., J. I. Cash, Jr. and D. Q. Mills, "Information Technology and Tomorrow's Manager", *Harvard Business Review*, Nov.- Dec., 1988, p. 128-136.
- Attewell, Paul and James Rule, "Computing and Organizations: What We Know and What We Don't Know", *Communications of the ACM*, Vol. 27, No. 12, 1984, p. 1184-1192.
- Arndt, Johan (1979), "Toward a Concept of Domesticated Markets," *Journal of Marketing*, 43(Fall), 69-75
- Bakos, Y. (1987), "Interorganizational Information Systems: Strategic Implications for Competition and Cooperation," Doctoral Thesis, Sloan School, MIT, (November)
- Balig, R., and Jaeger, A. M. Multinational Corporations: Control Systems and Delegation Issues. *Journal of International Business Studies*, XV, 2 (Fall 1984), 25-40.
- Barrett, S., and Konsynski, B. Inter-Organizational information sharing systems. *MIS Quarterly*, Special Issue, (1982), 93-105.
- Bartlett, C. A., and Ghoshal, S. Organizing for worldwide effectiveness: the transnational solution, *California Management Review*, 31, 1 (1988), 1-21.
- Bartlett, C. A., and Ghoshal, S. Managing Across Borders: The Transnational Solution, Boston, Mass: Harvard Business School Press, 1989.
- Bower, J. and T. Hout, "Fast-Cycle Capability for Competitive Power," *Harvard Business Review*, Nov. - Dec., 1988, p. 110 - 118.
- Bullen, Christine V. and John L. Bennett, "Groupware in Practice: An Interpretation of Work Experience", CISR Working Paper No. 205, MIT, March, 1990.
- Bullen, Christine V. and Robert R. Johansen, "Groupware: A Key to Managing Business Teams?", CISR Working Paper no. 169, MIT, May, 1988.
- Clark K., B. Chew and T. Fujimoto, "Product Development in the World Auto Industry," *Brookings papers on Economic Activity*, 1987, p. 729-771.

- Cash, J. and B. Konsynski, "IS Redraws Competitive Boundaries," *Harvard Business Review*, April 1985, 63[2], p. 134-142.
- Cash, J., W. McFarlan and J. McKenney, *Corporate Information Systems Management*, second edition, Irwin, Homewood IL, 1988.
- Chandler, A. D. The evolution of modern global competition. in Competition in Global Industries, Porter, (ED.), Cambridge, Mass: Harvard Business School Press, 1986, 405-448.
- Clement, A. and C. C. Gotlieb, "Evolution of an Organization Interface: The New Business Department at a Large Insurance Firm", in Greif, ed., *Computer-Supported Cooperative Work: A Book of Readings*, 1988, p. 609-622.
- Clemons, Eric , "Information Systems for Sustainable Competitive Advantage," Working Paper, The Wharton School: Reginald H. Jones Center, WP 86-05, 1986.
- Clippinger, J.H., and Konsynski, B.R., "Information Refineries: Electronically Distilling Business' Raw Material to Make it More Useful." *Computerworld*. August 28, 1989, pp. 73-77.
- Cleland, D. L., King, W.R., "Competitive Business Intelligence Systems." *Business Horizons*, December 1975, pp 19-28.
- Davenport, Thomas H. and James E. Short, "The New Industrial Engineering: Information Technology and Business Process Redesign", *Sloan Management Review*, Summer, 1990, p. 11-27.
- Davis, Stan., *Future Perfect*, Addison Wesley, Reading MA, 1987.
- DeLong, David, "Computers in the Corner Office", *The New York Times*, Sunday, August 21, 1988.
- Drucker, Peter F., "The Coming of the New Organization", *Harvard Business Review*, Jan.-Feb., 1988, p. 45-53.
- Dwyer, F. Robert, Paul H. Schurr and Sejo Oh (1987), "Developing Buyer-Seller Relationships," *Journal of Marketing*, 51(April), 11-27
- Dwyer, F. Robert and M. Ann Welsh (1985), "Environmental Relationships of the Internal Political Economy of Marketing Channels," *Journal of Marketing Research*, 22(4), 397-414
- Eccles, R., "Performance Measurement Manifesto," *Harvard Business Review*," January-February, 1991.
- Eels, R. and Nehemikis, P., *Corporate Intelligence and Espionage*, New York, Macmillan, 1984.
- Eisenhardt, Kathleen M., "Making Fast Strategic Decisions in High Velocity Environments", *Academy of Management Journal*, Vol. 32, No. 3, September, 1989, pp. 543-576.
- Ellis, C. A., S. J. Gibbs, and G. L. Rein, "Groupware: Some Issues and Experiences", *Communications of the ACM*, Vol. 34, No. 1, Jan., 1991, p. 38-58.
- Fedorowicz, Jane, "The Future of Decision Support: An Examination of Managers' Decision Making Needs", *Proceedings of the Twenty-second Annual Conference on Systems Sciences*, Kona, Hawaii, January, 1989, p. 167-174.
- Fjeldstad, O. and B. Konsynski, "Cognitive Reapportionment," in *Decision Support Systems: A Decade in Perspective*, editors H. Sol and E. McLean, Academic Press, 1988.
- Foster, Lawrence W. and David M. Flynn, "Management Information Technology: Its Effects on Organizational Form and Function", *MIS Quarterly*, December, 1984, p. 229-236.

- Farley, John U., Barbara Kahn, Donald R. Lehmann and William L. Moore (1987), "Modeling the Choice to Automate," *Sloan Management Review*, (Winter), 5-15
- Frazier, Gary L. (1983), "Interorganizational Exchange Behavior in Marketing Channels: A Broadened Perspective," *Journal of Marketing*, 47(Fall), 68-78
- Frazier, Gary L. and John O. Summers (1984), "Interfirm Influence Strategies and Their Application within Distribution Channels," *Journal of Marketing*, 48(Summer), 43-55
- Gatignon, Hubert and Thomas S. Robertson (1989), "Technology Diffusion: An Empirical Test of Competitive Effects," *Journal of Marketing*, 53(January), 35-49
- Georgeff, M., "Communication and Interaction in Multi-Agent Planning," *Proceedings of the Eighth International Joint Conference on Artificial Intelligence*, August 1983 pp. 125-129.
- Gordon, Michael D., "Information Retrieval in Business: An Unmet Challenge", unpublished paper, University of Michigan, 1990.
- Ghoshal, S., and Noria, N., International differentiation within multinational corporations. *Strategic Management Journal*, 10, 4 (July-August 1989), 323-337.
- Grabner, John R. and L. J. Rosenberg , "Communication in Distribution Channel Systems," in *Distribution Channels: Behavioral Dimensions*, Louis W. Stern, ed., Boston, MA: Houghton Mifflin Co, 227-252, 1969.
- Greif, I., *Computer-Supported Cooperative Work*, Morgan Kaufmann Publishers, Inc., San Mateo, CA, 1988.
- Greif, I. and S. Sarin, "Data Sharing in Group Work", *ACM Transactions on Office Information Systems*, Vol. 5, No. 2, April, 1987, p. 187-211.
- Hambrick, D. C., "Specialization of Environmental Scanning Activities Among Upper Level Executives." *Journal of Management Studies*, 18, 3, 1981 pp. 299-320.
- Heide, Jan B. and George John, "Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships," *Journal of Marketing Research*, 27(1), 24-36, 1990.
- Haavind, Robert, "Hypertext: The Smart Tool for Information Overload", *Technology Review*, Nov.-Dec., 1990, p. 43-49.
- Hammer, Michael, "Reengineering Work: Don't Automate, Obliterate", *Harvard Business Review*, Jul-Aug, 1990, p. 104-112.
- Hansen, J. V., and Hill, N. C. Control and audit of electronic data interchange. *MIS Quarterly*, 13, 4 (December 1989), 403-413.
- Harrigan, K. R. Strategies for Joint Ventures, Lexington, MA. 1985.
- Harvard Business Review, "The Information Infrastructure," 1990, N90078.
- Huber, G. P. The nature and design of post industrial organizations. *Management Science*, 30, (1984), 928-951.
- Johansen, Robert and Christine Bullen, "Thinking Ahead: What to Expect from Teleconferencing", *Harvard Business Review*, Mar-Apr, 1984, p. 4-10.
- Johnston, Russell and Paul R. Lawrence (1988), "Beyond Vertical Integration-the Rise of the Value-Adding Partnership," *Harvard Business Review*, 66(4), 94-101

- Johnston, Russell and Michael Vitale (1988), "Creating Competitive Advantage with Interorganizational Information Systems," *MIS Quarterly*, (June), 153-165
- Karimi, J. and B. Konsynski, "Globalization and Information Management Systems," *Journal of MIS*, V7 N4, Spring 1991, p 7-26.
- Karimi, J. Strategic planning for information systems: requirements and information engineering methods. *Journal of Management Information Systems*, 4, 4 (Spring, 1988), 5-24.
- Keen, P. G. Competing in Time: Using Telecommunications for Competitive Advantage. Cambridge, Mass: Ballinger Publishing Company, 1988.
- Kennedy, C. Jr., "The External Environment - Strategic Planning Interface: U.S. Multinational Corporate Practices in the 1980's," *Journal of International Business Studies*, Fall 1984 pp 99-108.
- King, J. and Konsynski, B., Singapore TradeNet: A tale of one city. N1-191-009, Harvard Business School, 1990, p17.
- King, J. and Konsynski, B., Hong Kong TradeLink: News from the second city. N1-191-026, Harvard Business School, 1990, p14.
- King, W. R. Strategic planning for IS: The state of practice and research. *MIS Quarterly*, 9, 2 (June 1985), Editor's Comment, vi-vii.
- Konsynski, B. and Warbelow, A. Cooperating to compete: Modeling interorganizational interchange, Harvard Business School Working Paper, 90-002, 1989, p19.
- Konsynski, B. and McFarlan W. Information partnership: Scale without ownership. *Harvard Business Review*, September-October 1990.
- Konsynski, B. and J. Short, "Redesigning the Back Office: Creating the Shared Services Organization, Working Paper, 1991.
- Konsynski, B. and J. Sviokla, "Reapportionment of Cognitive Responsibilities," Harvard University Working Paper, 1989.
- Konsynski, B. and A. Warbelow, "Cooperating to Compete: Modelling Interorganizational Interchange," Harvard University Working Paper 90-002, 1989, pp. 20.
- Konsynski, Benn and Art Warbelow, "AETna Gemini System," Harvard Business School, Boston, MA, No. 9-188-111, 1988.
- Konsynski, Benn and Art Warbelow, "IVANS," Harvard Business School, Boston, MA, No. 9-187-188, 1987.
- Krapfel, Robert E. and Dave Guinn (1990), "Using Electronic Data Interchange to Build Customer Relationships," Working Paper, University of Maryland, College Park, MD
- Leonard-Barton, Dorothy (1988), "Implementation as Mutual Adaptation of Technology and Organization," *Research Policy*, 17, 251-267
- Macneil, Ian R. (1980), *The New Social Contract*, New Haven: Yale University Press
- Mahajan, Vijay, Eitan Muller and Frank M. Bass (1990), "New Product Diffusion Models in Marketing: A Review and Directions for Research," *Journal of Marketing*, 54(January), 1-26
- Malone, T. W. (1985), "Organizational Structure and Information Technology: Elements of a Formal Theory," Working Paper 130, Center for Information Systems Research, MIT, Cambridge, MA

- Malone, T. W. and S. A. Smith (1984), "Tradeoffs in Designing Organizations: Implications for New Forms of Human Organizations and Computer Systems," Working Paper 112, Center for Information System Research, MIT, Cambridge, MA
- Malone, T. W., R. I. Benjamin and J. Yates (1987), "Electronic Markets and Electronic Hierarchies: Effects of Information Technology on Market Structure and Corporate Strategies," *Communications of the ACM*, 30(6), 484-497
- Malone, T. W.; Yates, J.; and Benjamin, R. I. Electronic markets and electronic hierarchies. *Communications of the ACM*, 30, 6 (June 1987), 484-497.
- March, James G. and Lee S. Sproull, "Technology, Management, and Competitive Advantage", in Paul S. Goodman and Lee S. Sproull, eds., *Technology and Organizations*, San Francisco: Jossey-Bass, 1989.
- Marcus, M. Lynne and Daniel Robey, "Information Technology and Organizational Change: Causal Structure in Theory and Research", *Management Science*, Vol. 34, No. 5, May, 1988, p. 583-598.
- McGee, J. and B. Konsynski, "Inter-Organizational Systems and Organizational Integration Effects," Working Paper, 1991.
- McGee, James and B. Konsynski (1989), "A Note on Electronic Data Interchange," Harvard Business School, Boston, MA, No. 9-190-022
- McFarlan, F. Warren, "Information Technology Changes the Way You Compete," *Harvard Business Review*, May-June 1984, p.98.
- Miles, R. E., and Snow, C. C. Organizations: new concepts for new forms. *California Management Review*, 28 (1986), 62-73.
- Montgomery, D., B., and Weinberg, C., B., "Towards Strategic Intelligence Systems," *Journal of Marketing*, Fall 1979 pp. 41-52.
- Myerson, Paul and Robert D. Hamilton IV, "Matching Corporate Culture and Technology" *SAM Advanced Management Journal*, Winter, 1986, p. 8-13.
- Nunamaker, J., Lynda M. Applegate, and Benn R. Konsynski, "Computer-aided Deliberation: Model Management and Group Decision Support", *Operations Research*, Vol. 36, No. , Nov.-Dec. 1988, p. 826-848.
- Porter, M. E. The competitive advantage of nations. *Harvard Business Review*, (March-April 1990), 73-92.
- Quinn, James Brian, Thomas L. Doorley and Penny C. Paquette, "Beyond Products: Services-based Strategy", *Harvard Business Review*, Mar-Apr, 1990, p. 58-67.
- Reinhardt, W., A., "An Early Warning System for Strategic Planning," *Long Range Planning*, Vol 17, No 5, 1984 pp. 25-34.
- Robey, Daniel, "Computer Information Systems and Organization Structure", *Communications of the ACM*, Vol. 24, No. 10, October, 1981, p. 679-687.
- Rockart J. and D. DeLong, *Executive Information Systems*, Dow Jones Irwin, 1988.
- Rothfeder, Jeffrey and Jim Bartimo, "How Software Is Making Food Sales a Piece of Cake", *Business Week*, July 2, 1990, p. 54-55.
- Salk, G., "Time - The Next Source of Competitive Advantage," *Harvard Business Review*, July-August 1988, p. 41-51.

- Selig, G. J. A framework for multinational information systems planning. *Information and Management*, North Holland Publishing Company, 5 (1982), 95-115.
- Spekman, Robert E. and Wesley J. Johnston (1986), "Relationship Management: Managing the Selling and the Buying Interface," *Journal of Business Research*, 14, 519-531
- Sproull, Lee and Sarah Kiesler, "Reducing Social Context Cues: Electronic Mail in Organization Communication", *Management Science*, Vol. 32, No. 11, 1986, p. 1492-1512.
- Stern, Louis W. and Abel I. El-Ansary (1982), *Marketing Channels*, Second Edition, Englewood Cliffs, N.J.: Prentice-Hall, Inc
- Stern, Louis and J. L. Heskett (1969), "Conflict Management in Interorganization Relations: A Conceptual Framework," in *Distribution Channels: Behavioral Dimensions*, Louis W. Stern, ed., Boston, MA: Houghton Mifflin Co., 288-305
- Stern, Louis W. and Patrick J. Kaufmann (1985), "Electronic Data Interchange in Selected Consumer Goods Industries: An Interorganizational Perception," in *Marketing in an Electronic Age*. R. Buzzell, ed. Boston, MA: Harvard Business School Press, 52-74
- Stoddard, D. and Cash J., "Xerox Corporation: Information Technology Support of Product Development," *Harvard Business School Case* 189-022, 1988.
- Terry, P.T., "Mechanisms for Environmental Scanning," *Long Range Planning*, V10, 3, June 1977 pp. 2-9.
- Thomas, Philip S., "Environmental Scanning - The State of the Art," *Long Range Planning*, Vol 13, February, 1980 pp. 20-25.
- Venkatraman, N. and Akbar Zaheer (1990), "Electronic Integration and Strategic Advantage: A Quasi-Experimental Study in the Insurance Industry," *Information Systems Research*,
- Wall, J., "What the Competition is Doing: Your need to Know." *Harvard Business Review*, Nov/Dec, 1974, pp. 22-38.
- Warbelow, A., Kokuryo, J. and Konsynski, B. Aucnet: TV auction network system, 9-190-001, Harvard Business School, 1989, p19.
- Warbelow, A., Fjeldstad, O. and Konsynski, B. Bankenes BetalingsSentral A/S: The Norwegian bank giro, N9-191-037, Harvard Business School, 1990, p17.
- Williamson, Oliver E. (1983), "Credible Commitments: Using Hostages to Support Exchange," *The American Economic Review*, 73(4), 519-540
- Williamson, Oliver E. (1975), *Markets and Hierarchies: Analysis and Antitrust Implications*, New York: The Free Press
- Zammuto, R. Organization Design: Structure, Strategy, and Environment, The Dryden Press, forthcoming, 1990.

## **RELATIONS: Coordination in the Global Enterprise**

---

To compete effectively, at home or globally, firms often coordinate their activities on the world-wide basis. Although many global firms have an explicit global business strategy, few have a corresponding strategy for managing information technology internationally. Many firms have information interchange protocols across their multi-national organizational structures, but few have global information technology architectures. A global information management strategy is needed as a result of (1) **industry globalization**: the growing globalization trend in many industries and the associated reliance on information technologies for coordination and operation, and (2) **national competitive posture**: the aggregation of separate domestic strategies in individual countries that may contend with global industry strategies and may transcend mere multi-national coordination. While Procter and Gamble contends with the need to more effectively address its global market in the branded packaged goods industry, Singapore requires improved coordination and control of trade documentation in order to compete more effectively in the cross industry trade environment that is vital to the economic health of that nation. Each approach recognizes the growing information intensity in their expanding markets. Each in turn will meet the challenges brought about by the need for cross-culture and cross-industry cooperation.

Globalization trends demand an evaluation of the skill portfolio that organizations require in order to participate effectively in their changing markets. Porter<sup>12</sup> suggests that coordination among increasingly complex networks of activities dispersed world-wide is becoming a prime source of competitive advantage: global strategies frequently involve coordination with coalition partners as well as among a firm's own subsidiaries. The benefits associated with globalization of industries are not tied to countries policies and practice. Rather, they are associated with how the activities in the industry value-chain are performed by the firm's world-wide systems. These systems involve partnerships with independent entities that involve information and management process interchange across legal organization boundaries as well as national boundaries.

For a global firm, the coordination concerns involve an analysis of how similar or linked activities are performed in different countries. Coordination involves the management of the exchange of information, goods, expertise, technology and finances. Many business functions play a role in such coordination - logistics, order fulfillment, financial, etc. Coordination involves sharing and use, by different facilities, of information about the activities within the firm's value-chain. In global industries these skills permit a firm to (1) be flexible in responding to competitors in different countries and markets, (2) respond in one country (or region) to a change in another, (3) scan markets around the

world, (4) transfer knowledge among units in different countries, (5) reduce costs, (6) enhance effectiveness, and (7) preserve diversity in final products and in production location. The innovations in information technology in the past decades have greatly reduced coordination costs by reducing both the time and cost of communicating information. Market and product innovation often involves coordination and partnership across a diverse set of organizational and geographically dispersed entities.

## **Coordination and Control in the Global Enterprise**

Changes in technologies and market structures have shifted competition from a national to a global scope. This has resulted in need for new organizational strategies/ structures. Traditional organizational designs are not appropriate for the new strategies because they evolved in response to different competitive pressures. New organizational structures<sup>13</sup> need to achieve both flexibility and coordination among firm's diverse activities in the new international markets.

Globalization trends invite an evaluation of the skill portfolio that organizations require to participate effectively in the changing markets. Coordination among increasingly complex networks of activities dispersed world-wide is becoming a prime source of competitive advantage: global strategies frequently involve coordination with coalition partners as well as a firm's own subsidiaries. The benefits associated with globalization of industries are not tied to countries. Rather, they are associated with how the activities in the industry value-chain are performed by the firm's world-wide systems. These systems involve partnerships with independent entities that involve information and management process interchange across legal organization boundaries as well as national boundaries.

For a global firm, the coordination concerns involve an analysis of how similar or linked activities are performed in different countries. Coordination involves the management of the exchange of information, goods, expertise, technology and finances. Many business functions play a role in such coordination - logistics, order fulfillment, financial, etc. Coordination involves sharing and use, by different facilities, of information about the activities within the firm's value-chain. In global industries these skills permit a firm to

- (1) be flexible in responding to competitors in different countries and markets,
- (2) respond in one country (or region) to a change in another,
- (3) scan markets around the world,
- (4) transfer knowledge among units in different countries,
- (5) reduce costs,
- (6) enhance effectiveness, and
- (7) preserve diversity in final products and in production location.

The innovations in information technology in the past two decades have greatly reduced coordination costs by reducing both the time and cost of communicating information. Market and product innovation often involves coordination and partnership across a diverse set of organizational and geographically dispersed entities. Several recent cases suggest ways in which companies/nations achieve competitive advantage through innovation. The activities surrounding trade documentation handling in Singapore (Tradenet), Hong Kong (TradeLink) and other nations (Australia, Norway, United Kingdom, etc.) recognize the need for national structures to prepare to compete more effectively in global markets through the leverage of information technologies.

Organizations need to recognize the coordination needs of a global management team. The country centered, multi-national firm will give way to truly global organizations that will carry little national identity. It is a major challenge to general management to build and manage the technical infrastructure that supports a unique global enterprise culture.

For a global firm, value-chain activities are pulled together by two environmental forces, (1) national differentiation, i.e., diversity in individual country-markets; and (2) global integration, i.e., coordination between activities in various countries. For global firms forces for integration and national differentiation can vary depending on their global strategies.

Under a *Multinational* strategy a firm differentiates its products to meet local needs and to respond to diverse national interest. It delegates considerable operating independence and strategic freedom to its foreign subsidiaries. Under this **decentralized** organizational structure, highly autonomous national companies are often managed as a portfolio of offshore investments rather than as a single international business. A subsidiary is focused on its local market. Coordination and control are achieved primarily through personal relationships between top corporate management and subsidiary managers rather than by written rules, procedures, or a formal organizational structure. Strategic decisions are decentralized and top management is involved mainly in monitoring the results of foreign operations. This model was the classic strategy/structure adopted by most European based companies expanding before World War II. However, much changed for European companies in the 1970's with the reduction of certain tariff barriers by the E.E.C and with the entrance of both American and Japanese firms into local markets.

Under a pure *Global* strategy a firm may seek competitive advantage by capitalizing on the economies associated with standardized product design, global scale manufacturing, and a centralized control of world-wide operation. The key parts of a firm's value-chain activities, typically product design or manufacturing, are geographically concentrated. They are either retained at the center, or they are centrally controlled. Under this **centralized** organizational structure, there are,

primarily, one way flows of goods, information and resources from headquarter to subsidiaries; key strategic decisions for world-wide operations are made centrally by senior management. This export-based strategy was/is typical in Japanese based companies which required highly coordinated activities among subsidiaries in post war years. For example, Toyota started by capitalizing on a tightly controlled operation that emphasized world-wide export of fairly standardized automobile models from global scale plants in Toyota City, Japan. Lately, because of growing protectionist sentiments and lower factor costs in lessor developed countries, Toyota, among others, has found it necessary to establish production sites in lessor developed countries in order to sustain its competitive edge.

Under an *International* strategy a firm transfers knowledge and expertise to overseas environments that are less advanced in technology or market development. Local subsidiaries are often free to adapt new strategies, products, processes or ideas. Under this **coordinated federation** organizational structure, the subsidiaries' dependence on the parent company for new processes or ideas requires a great deal more coordination and control by headquarters than under a classic multinational strategy. This strategy/structure defines the managerial culture of U.S.-based companies. These companies have a reputation for professional management that imply a willingness to delegate responsibility, while retaining overall control through sophisticated systems and specialist corporate staffs. But, under this structure international subsidiaries are more dependent on the transfer of knowledge and information than are subsidiaries under a multinational strategy; the parent company makes a greater use of formal systems and controls in relations to subsidiaries.

Under a *Transnational* strategy a firm coordinates a number of national operations and it retains the ability to respond to national interests and preferences. National subsidiaries are no longer viewed as the implementors of centrally developed strategies. Each, however, is viewed as a source of ideas, skills, capabilities and knowledge that can be beneficial to the company as a whole. It is not unusual for companies to coordinate product development, marketing approaches, and overall competitive strategy across interdependent national units. Under this **integrated network** organizational structure, top managers are responsible for: (1) coordinating the development of strategic objectives and operating policies, (2) coordinating logistics between operating divisions, and (3) coordinating the flow of information among divisions. During the 1980s, forces of global competition required global firms to be more responsive nationally. As a result, the transnational strategies are being adopted by increasing numbers of global firms. This adoption is becoming necessary because of the need for world-wide coordination and integration of activities upstream in the value-chain, e.g., inbound logistics, operations, and because of the need for a greater degree of national differentiation and responsiveness at the downstream end, e.g., marketing, sales and

services. For example, in the consumer electronics and branded package goods industries, global companies were forced to replace exports with local manufacture and to develop more locally differentiated products

Another form of **coordinated federation** organizational structure is *interorganizational*. An interorganizational design consists of two or more organizations that have chosen to cooperate by combining their strengths to overcome individual weaknesses. There are two modes of interorganizational design: equity and non-equity collaboration. **Equity collaborations** are seen in joint ventures, minority equity investments, and franchises. **Non-equity collaborations** are seen in forms of licensing arrangements, marketing and distribution agreements, and Interorganizational Systems (IOSs) for linking a company to its suppliers, distributors, or customers. For example, in the airline industry, achieving the economies of scale in developing and managing a large scale reservation system are now beyond the capacities of the medium sized airlines. In Europe, two major coalitions have been created, the Amadeus Coalition and the Galileo Coalition. Software for Amadeus is built around System One, the computer reservation system for Continental and Eastern. Galileo makes use of United's software. Even the largest carriers have acknowledged their inability to manage a large scale reservation system by themselves; they have joined coalitions.

There has been a virtual explosion in use of interorganizational designs for both global and domestic firms as a result of increased global competition during 1980s. In 1983 alone, the number of domestic joint ventures announced in communications and information systems products and services industries, exceeded the sum of all previously announced joint ventures in those sectors. Research suggests that interorganizational designs can lead to (1) "vertical disaggregation" of functions, e.g., marketing, distribution, typically conducted within the boundaries of a single organization performed independently by the organizations within the network, (2) the use of "brokers", or structure independent organizations, to link together the different organizational units into "business groups" for performance of specific tasks, and (3) the substitution of "full disclosure information systems" in traditional organization for lengthy trust building processes based on experience.

<b>Business Strategy/Structure</b>	<b>Strategic Management Processes</b>	<b>Tactical Business Processes</b>	<b>Coordination and Control Processes</b>
<b>Multinational/Decentralized-Federation</b>	<b>Informal HQ-sub relationships; Strategic decisions are decentralized</b>	<b>Mainly financial flows; capital out and dividend back</b>	<b>Socialization; careful recruitment, development, and acculturation of key decision makers</b>
<b>Global/Centralized-Federation</b>	<b>Tight central control of decisions, resources, and information</b>	<b>One way flows of goods resources and information</b>	<b>Centralization; substantive decision making by senior management</b>
<b>International/Coordinated-Federation</b>	<b>Formal management planning and control systems allow tighter HQ-sub linkages</b>	<b>Assets, resources, responsibilities decentralized, but controlled from HQ</b>	<b>Formalization; formal systems, policies, and standards to guide choice</b>
<b>Transnational/Integrated-Network</b>	<b>Complex process of coordination and cooperation in an environment of shared decision making</b>	<b>Large flows of technology, finances, people, and information among interdependent units</b>	<b>Co-opting; the entire portfolio of coordination and control mechanisms</b>
<b>Inter-organizational/Coordinated-Federation of Business Groups</b>	<b>Share activities and gain competitive advantage by lowering costs and raising differentiation</b>	<b>Vertical disaggregation of functions</b>	<b>Formalization; multiple and flexible coordination and control functions</b>

**Table 1. Global Business Environment - Strategy/Structure and Coordination/Control**

<sup>12</sup> The models and frameworks on global organization structure and competition reflect the models presented in Porter, M. E. "The competitive advantage of nations" *Harvard Business Review*, (March-April 1990), 73-92 and Bartlett, C. A., and Ghoshal, S. Managing Across Borders: The Transnational Solution, Boston, Mass: Harvard Business School Press, 1989.

<sup>13</sup> The following models are adapted from models presented in, "Globalization and Information Management Strategies," by J. Karimi and B. Konsynski, *Journal of Management Information Systems*, Summer 1991.