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Economics Series

No. 31, August 2001

Governing Electronic Commerce in a Global Environment

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This is a shortened and updated version of a study, previously published by the Institute for Technology Assessment, Washington, D.C. An earlier version of the paper was presented at the World Engineering Conference held in Hanover, Germany, June 2000.

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That Adam Smith wrote *The Wealth of Nations* in 1776 is no coincidence. Only in the late 1700s were transportation and communication links sufficiently interconnected to allow states such as France, which were comprised of large land masses, to become the most efficient geographic units for organizing markets. Before then, the major port cities such as Lisbon, Venice, Genoa, Antwerp and Amsterdam, had served as the hub of economic activities. Located in the center of major trading routes, these cities capitalized on their privileged access to market information and the related economies of agglomeration to control world trade.¹

Writing today, Adam Smith might well have entitled his treatise, “An Inquiry into the Nature and Wealth of Networks.” In today’s knowledge-based global economy, advances in networking technologies are creating new economic opportunities, and greatly reducing the transaction costs entailed in doing business. As these technologies and their various functions are brought together into integrated and interactive networks, economic activities are increasingly being organized into electronic networks that cut across traditional organizational, market, and political boundaries. As more and more trade takes place electronically, networks—linked together on a global basis—will serve increasingly as the market.

Just as communication-related economic changes served to reconfigure social relationships and redefine political boundaries in the 17th century, so the rise of global networked commerce will have similar, far-reaching repercussions today. Speculating about these long-term impacts, many observers predict the collapse of government authority and—with it—the demise of the nation state.² In a globally networked environment—it is contended—transnational entities, ranging from businesses to organized crime, will be able to circumvent national information gatekeepers, making it increasingly difficult for governments to enforce their authority and control their fates. As foretold in one version of this scenario, multinational, networked companies will emerge as new power centers, acting not in accordance with “the public will” but rather in response to the profit motive and the dictates of the international

¹See Fernand Braudel, *The Perspective of the World, Civilization and Capitalism. 15th-18th Centuries* v. 3 (Berkeley, CA: University of California Press, 1992).

²See, for instance, R. O’Brian, *The End of Geography* (London, UK: Routledge, 1992).

marketplace.³ Or alternatively—as the publicists and proselytizers of the Internet envision—the fall of government will create an international political void. Emerging in its stead will be an apolitical, and highly libertarian, virtual global community.⁴

Each of these visions reflects some degree of reality. However, standing on their own, these scenarios are highly simplistic and incomplete. Above all, they fail to take into account the fact that markets—even when they are electronically based—do not exist in a vacuum. To the contrary, all economic activities are both embedded in social relationships and structured and sustained by political authorities.⁵ These institutional arrangements, which serve to reduce transaction costs, are essential to the functioning of the economy.⁶

Viewed in this light, it is clear that, even in a networked, global environment, Government will—of necessity—play a role. As markets are extended over time and space, economic relationships will

³ See, for instance, Saskia Sassen, *Losing Control? Sovereignty in an Age of Globalization* (New York, NY: Columbia University Press, 1996).

⁴J. P. Barlow, “Declaration of Independence in Cyberspace,” *Cyber-Rights Electronic List*, February 8, 1996. Or consider George Gilder’s vision of the future: New technology, he claims, “will blow apart all the monopolies, hierarchies, pyramids, and power grids of established industrial society. It will undermine all totalitarian regimes. ...All hierarchies will tend to become ‘heterarchies’—systems in which each individual rules his own domain.” George Gilder, *Life After Television; The Coming Transformation of Media and American Life*, rev. ed. (New York, NY: Norton, 1994), pp. 60-61.

⁵As Braudel emphasizes, “The market, in which the only elements are ‘demand, the cost of supply and prices, which result from a reciprocal agreement’ is a figment of the imagination. It is too easy to call one form of exchange economic and another social. In real life, all types are both economic and social. For centuries on end, there have been a whole variety of socio-economic types of exchange which have coexisted in spite of—or because of—their diversity.” Fernand Braudel, *The Wheels of Commerce: Civilization and Capitalism v. 2* (Berkeley, CA: University of California Press, 1992). See also Mark Granovetter and Richard Swedberg, *The Sociology of Economic Life* (Boulder, CO: Westview Press, 1992); and Roger Friedland and A.F. Robertson, *Beyond the Marketplace: Rethinking Economy and Society* (New York, NY: Aldine de Gruyter, 1990).

⁶As described by North, “Institutions provide the structure for exchange that (together with the technology employed) determines the cost of transacting and the cost of information. How well institutions solve the problems of coordination and production is determined by the motivation of the players (their utility functions), the complexity of the environment, and the ability of players to decipher and order the environment (measure and enforcement).” Douglas C. North, *Institutions, Institutional Change, and Economic Performance* (Cambridge University Press, 1990), p. 34.

become more complex, and transaction costs will continue to rise. At the same time, the social and cultural bonds that function to reduce these information-related costs may become diluted and extended beyond their limits. Advanced networking technologies are uniquely suited to interconnect economic activities, and can thereby help to reduce transaction costs in this new environment. However, the extent to which they do so will depend not only on their technical capabilities but also on their design and architecture as well as the rules governing their access and use. To establish and execute such rules, and to resolve competing claims with respect to them, some form of governance—operating at all levels—will be required. Absence governance, electronic networks will not reduce transaction costs, but will, instead, generate greater uncertainty. Networked markets will then—if they do not cease to exist—function very inefficiently as a result.

Electronic Commerce Defined

To determine whether, and the extent to which, networking technologies can substitute for institutional structures in reducing transaction costs, networked, electronic commerce must be defined in functional terms. A functional definition is unbiased with respect to structures and forms. In addition, it is only by positing a common objective that one can identify causes and effects, compare outcomes, and determine optimal patterns of success.

To this end, electronic commerce will be defined here as the use of information and communication technologies to network economic activities and processes, in order to reduce information-related transaction costs or gain a strategic advantage. Although transaction costs are generally associated with economic activities and outcomes, all institutions—political, social, cultural, as well as economic—play an important role in determining their levels. Assuming—for the purposes of this paper—that economic prosperity is an important overriding objective, and that transaction costs constitute a major factor determining performance, networking technologies and other institutions will be compared to one another to determine their substitutability in achieving these objectives. By making such

a comparison, it can be shown that, although networked technologies can reduce transaction costs and improve economic performance, their usage will generate a whole range of new uncertainties and transaction costs, which will likely require government intervention.

Transaction Costs and Economic Performance

The major force driving electronic commerce today is the ability of networks to reduce economic transaction costs. To fully appreciate this dynamic, it is necessary to consider, first, the origins of transaction costs, the means used to contain them under different historical circumstances, and their relationship to economic performance.

Transaction costs are the information-related costs associated with carrying out economic activities. They are inherent in the coordination required for all economic tasks.⁷ The exchange of information is, for example, at the heart of the market system. Capitalism depends on it to efficiently allocate resources. Similarly, within firms, the delivery of timely and accurate information is key to decisions about whether to enter or exit markets; how to secure financing; how to organize and manage workers effectively; and how to distribute and market goods. The time, money, and energy spent in gathering, processing, and employing economic related information constitute the costs of transacting.

Transaction costs are a function of uncertainty and the inclination and opportunity for economic actors to cheat one another.⁸ Such conditions are most likely to prevail, for example, when economic activities are carried out at great distances from one another; when there are many different economic

⁷The term “transaction costs” is generally associated with the works of Oliver Williamson. See, for instance, *The Economic Institutions of Capitalism* (New York, NY: The Free Press, 1985). Williamson limits his use of the term to information-related costs entailed in the process of exchange. Extending the notion of information costs further, Douglas North distinguishes between “transaction costs,” which he associates with the processes of exchange, and “transformation costs,” which he associates with the processes of production. See North, *op cit.*, footnote 4. As used here, transaction costs refer to all of the information costs that are related to economic activities. Combining these types of costs together is appropriate insofar as networking technologies are eliminating the boundaries between markets and firms.

actors who—rarely interacting—are unbeknownst to one another; when market information is impacted, or unevenly distributed; when production processes, worker skills, and products and services are highly differentiated and not substitutable for one another, etc.

Not surprisingly, transaction costs, as well as the value of market information, have increased over time as markets have expanded in scope and economic processes have become more complex.⁹ During the same period, a wide range of social, economic, political, and technological mechanisms and institutions either emerged spontaneously, or were intentionally created, to cope with them.

Trading in the Town Square

To appreciate how these multiple factors might interact to generate an operational or—at best—efficient market, one might consider, first, the market before the age of transport, which was confined to the local town square. As it existed then, the marketplace was not simply an economic mechanism for conducting exchange; it was at one and the same time a social and political institution. Here people assembled routinely, to share news and gossip, as well as to do business. Describing the central role of an English marketplace during this period, economic historian Fernand Braudel notes, for example:

Since people went [to the marketplace] on set days, it was a natural focus for social life. It was at market that the townspeople met, made deals, quarrelled, perhaps came to blows. All news political or otherwise was passed on in the market. In 1534 the actions and intentions of Henry VIII were criticized aloud in the market-place of Fakenham in Norfolk. And was there any English market down the ages where one would not have heard the vehement pronouncement of preachers? The market was a stimulus to everything—even, logically, the trade of local shops.¹⁰ This close proximity and shared activity served in one respect to reduce transaction costs, and

hence to make markets more efficient. Buyers and sellers were well known to one another. Given their common expectations and an established level of trust, credit was generally available, and social sanctions

⁸Williamson refers to this human trait as “self interest with guile.” op cit.

⁹For an account of the rise of transaction costs over time, see Douglas C. North and Robert P. Thomas, *The Rise of the Western World: A New Economic History* (Cambridge, UK: Cambridge University Press, 1973).

¹⁰Fernand Braudel, *Wheels of Commerce*, op. cit., p. 30.

served—to some degree—to constrain people from exploiting one another, or from renegeing on their agreements.

Local markets also had their negative aspects. Because there were only a few sellers, who offered a limited number and variety of choices, sellers could at times exact monopoly rents. To prevent this from happening, local authorities routinely intervened setting caps on prices and interest rates. Sanctions against violators could be quite severe. Again, in the words of Braudel:

The urban authorities therefore took [the market's] organization and supervision firmly in hand: it was a matter of vital necessity. And these were on-the-spot authorities, prompt to react or devise regulations, and always keeping a sharp eye on prices. In Sicily, if a vendor asked a single *grano* over the fixed tariff, he would be sent to the galleys.¹¹

Distance Trading and the Rise of Cities

With improved transportation—in particular, large sailing ships—markets were extended over much larger geographic areas. As a result, culture, language, and shared political institutions no longer served to reduce the uncertainties of the market. Economic risks were, therefore, higher, and the need for market information much greater. Market information also became more costly and less evenly distributed.

For markets to operate at such scale, trading intermediaries—who specialized in accumulating, transporting, and distributing market information, as well as in brokering and financing deals and exchanges—were required. Included among these, for example, were shippers, bankers, wholesalers, jobbers and retailers.¹² These

¹¹ Fernand Braudel, *The Perspective of the World*, op. cit.

¹² Commenting on the role of intermediaries in facilitating trade, Braudel notes, for example, “Another effect of the organization of the London market was the dislocation (inevitably, in view of the scale of the enterprise) of the traditional open market, the public market where nothing could be concealed, where producer-vendor and buyer-consumer met face to face. The distance between the two was becoming too great to be travelled by ordinary people. The merchant, or middleman, had already, from at least the thirteenth century, made his appearance in England as a go-between for town and country, in particular in the corn trade. Gradually, chains of intermediaries were set up between producer and merchant on the one hand, and between merchant and retailer on the other; along these chains passed the bulk of the trade in butter, cheese, poultry produce, fruit, vegetables and milk. Traditional habits and customs were lost or smashed. Who would have thought that the belly of London or the belly of Paris would cause a revolution? Yet they did so simply by growing.” Fernand Braudel, *The Wheels of Commerce*, op cit., p. 42.

trading intermediaries were essential, for example, in financing and carefully orchestrating the vast network of town and regional fairs that linked European merchants between the 12th to the 14th centuries.¹³

As trade grew and became more complex, intermediaries became more and more specialized, and trade fairs were increasingly organized not only horizontally—across time and space—but also, vertically—according to their roles and functions in the overall scheme of economic affairs. At the bottom rung were the small local fairs and merchants who conducted minor transactions, most often involving perishable goods. Next up the ladder were larger fairs frequented by long distance merchants who dealt in more expensive, luxury items. At the top of the pyramid were bankers and large merchant families whose revolving fund of cash and credit served to link and bring together all the players at six annual fairs, alternating every two months—like clockwork—between Champagne and Brie. Connecting the trade routes from the Netherlands to northern Italy, these two regional fairs provided the hub of European economic activity.¹⁴

To reduce the costs and risks associated with long distance trading, merchants also established a number of financial mechanisms and social arrangements. The invention of bills of lading, which provided a source of credit that—circulating together with the sale of goods—bridged the long trading cycle, was critical in this regard. Retailers and wholesalers also established elaborate trading networks; sellers in one part of the world established reciprocal arrangements—often on a commission basis—with their counterparts in other trading areas. These arrangements worked best when they were reinforced through social connections. Trading associates were, therefore, typically drawn from members of the same family or ethnic group. Trade, as a result, came to be dominated by the great trading European merchant families whose power and prestige often rivaled that of princes.

Information and Specialization

The impacts of these developments were cumulative. Trade gave rise to more trade. As markets

¹³Fernand Braudel, *The Perspective of the World: Civilization and Capitalism, 15th-18th Century*, v. 3, (Berkeley, CA: The University of California Press, 1992).

¹⁴According to Braudel, “The trade caravans would converge on Champagne and Brie in assembled and guarded convoys, not unlike the other caravans with their camels which crossed the great deserts of Islam on their way to the Mediterranean. Fernand Braudel, *The Perspective of the World: Civilization and Capitalism, 15th-18th Century*, v. 3 (Berkeley, CA: The University of California Press, 1992), p. 111.

expanded so did the density of merchant exchange networks and the amount of available market information. As a result, distribution costs declined, and merchants were further encouraged to engage in trade. Moreover, with larger markets and better information, merchants faced fewer risks, and thus they were able to specialize in particular aspects of trading such as importing, wholesaling, retailing, or exporting. This increased specialization led, in turn, to greater coordination of markets and reduced costs, making trade even more attractive.

Although trading intermediaries were essential to trade, they also introduced new uncertainties and bottlenecks into the economy. Determining the costs and availability of market information, they had a great influence over the size, structure, and efficiency of markets. Moreover, when intermediaries were able to gain control over access to critical market information, they were not only able to reap powerful competitive advantages but also to determine who, as well as the basis upon which, buyers and sellers could trade.

The importance of having a good communication infrastructure, as well as control over market information, is clearly illustrated by the rise of Venice (and subsequently other port cities) to economic prominence in the late 14th century at the expense of the merchant bankers and regional fairs. Located at the heart of the trading route between Europe and the Levant, the city of Venice was uniquely positioned to serve as the central intermediary in the Mediterranean trading system. To secure such a place for itself, the state's political leaders developed, in partnership with the private sector, a vast commercial shipping infrastructure—the *galere da mercato*—for the benefit of the merchants of Venice.¹⁵ Complementing this transportation infrastructure was an elaborate network of commercial institutions, all working

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As described by Braudel, “The chartering of these state vessels was adjudicated by an annual auction. The patrician who was successful at the *incanto* could in turn collect charters from other merchants, the freight charges corresponding to the volume of goods loaded. Thus the ‘private’ sector was able to make use of facilities built by the ‘public sector.’ Ibid., p. 126.

together to reduce the costs of transacting. According to Braudel, for example:

...the Venetian economy was already well-equipped with institutions; it had markets, shops, warehouses, the Ascensiontide Fair, the Mint, the Doges' Palace, the Arsenal, the Dogana. Every morning, while the money changers and the bankers stationed themselves in front of the little church of San Giacometto, opposite them on the Rialto would assemble all the wealthy merchants... The bankers were conveniently nearby, pen and notebook in hand, to write down the transfers of money from one account to another. ...The 'stock-exchange' meetings on the Rialto fixed commodity prices, and were before long fixing the interest rates on public loans... All major business matters were therefore handled literally in the streets surrounding the bridge. If a merchant was deprived of his right to go to the Rialto, this punishment signified 'as numerous appeals indicate' that he was deprived of the right to participate in big business.¹⁶

These tightly knit social, economic, and political relationships not only reduced transaction costs; they also gave rise to significant economies of agglomeration.¹⁷ More and more trade was attracted to Venice. Seeking to benefit from this expanded trade without sacrificing its own competitive advantage, Venice restricted access to trade-related information, going so far as to segregate and conduct strict surveillance over all foreign merchants. As Braudel has described this policy:

¹⁶Ibid., pp. 128-129.

¹⁷Agglomeration economies include scale economies that result from spatial concentration instead of the scale of a specific individual firm. Moreover, whenever businesses are concentrated together they also benefit from the law of larger numbers, which allows them to share risks. Agglomeration economies also result from complementarity in labor supply and in production. In addition, spatial concentration can foster personal interaction, which in turn generates new ideas, products, and processes. See Edwin S. Mills and Bruce W. Hamilton, *Urban Economics* (Glenview, IL: Scott, Foresman, and co., third edition, 1984).

All trade to and from the Terra Firma, all exports from her islands in the Levant or cities in the Adriatic (even goods traveling to Sicily or England) were obliged to pass through the port of Venice. Thus Venice had quite deliberately ensnared all the surrounding subject economies, including the German economy, for her own profit; she drew here living from them, preventing them from acting freely and according to their own lights.¹⁸

The Convergence of Markets and Nation States

The merchant exchange networks provided an adequate infrastructure for long-distance trade, which was centered in, and controlled by, major port cities such as Venice, Lisbon, Antwerp and Amsterdam. However, these networks were unable to support the emergence of national markets, integrated at the level of the territorial state. The transaction costs were simply too high.

To develop authentic national markets it was necessary not only to transcend the barriers of time and space, but also to eliminate the social and political structures that remained from the feudal era.¹⁹ Overcoming these obstacles required the intervention of the state, and the imposition of new rules governing economic activities—such as the laws of enclosure and the poor laws—as well the establishment of a stable currency as a means of exchange. Describing the state’s role in establishing the English market, Polanyi notes, for example:

Deliberate action of the state in the fifteenth and sixteenth centuries foisted the mercantile system on the fiercely protectionist towns and principalities. Mercantalism destroyed the outworn particularisms of local and inter-municipal trading by breaking down the barriers separating these two types of noncompetitive commerce and thus clearing the way for a national market.²⁰

¹⁸Braudel, *Perspective of the World*, op cit., p. 228.

¹⁹As described by Kenneth Lux, Under a feudal system, “The lord’s inheritance of the manor was fixed, and he could no more sell it to someone else than, as Heilbroner so aptly puts it, the governor of Rhode Island could sell off some counties to the governor of Vermont. All transfer of land, and this happened rarely, was either by gift deed or by conquest. The concept of selling land didn’t exist, and the present notion of land as a commodity was literally unthinkable. That selling land become first thinkable and then actually practiced marked one of the great and momentous changes from the feudal world to that of the new economic society.” *Adam Smith’s Mistake: How a Moral Philosopher Invented Economics and Ended Morality* (Boston, MA: Shambhala Publications, Inc., 1990), p.-

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²⁰Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time* (New York, NY: Beacon Press, 1957), pp. 65-66.

Acting on its own, the state could not, however, have reduced transaction costs enough to generate a national market. Social and economic forces, working together, continued to play a critical role. With the increasing density of the market, merchant exchange networks were overtaken by a new merchant class, which had a distinct culture of its own.²¹ No longer considered on the outskirts of respectable society, this merchant class came to be closely identified with the nation's welfare. Thus it was the merchants themselves who set national standards of behavior, standards that coincided with their own commercial values and the imperatives of the marketplace. Propagated by the philosophers of the day, and enforced by the authority of the state, this marketplace code of behavior helped to unify the disparate cultures and political jurisdictions that made up the nation, thereby reducing the costs and risks associated with trade.²² To carry out these fundamental and far reaching social, economic, and political changes, only an advanced, and tightly networked, communication system—one that could support both highly organized administrative structures as well as more densely networked information flows—would suffice.²³ Responding to this need, governments and private entrepreneurs alike began—in the late eighteenth century—to interlace the nation state in an elaborate network of canals and roads. These efforts, notwithstanding, it was only a century later—with the advent of the telegraph and the railroads—that the low speeds and limited interconnections of transportation and communication networks ceased to be a limiting factor in the evolution of national markets.

Standards and Mass Markets

The value of an advanced infrastructure is well illustrated with respect to the development of a

²¹Albert O. Hirschman, *The Passions and The Interests: Political Arguments for Capitalism before Its Triumph* (Princeton, NJ: Princeton University Press, 1977). See also, Kenneth Lux, op cit., footnote 16.

²²Op.cit. Hirschman.

²³Braudel, *The Perspectives of Our Time*, op.cit., footnote--, pp.

mass market in the United States. Here, the telegraph and the railroads served not only to greatly increase the size and scope of the market, but also—and equally if not more important—to provide the means by which businesses could revamp their operations and reorganize their activities for mass production, so as to benefit from both greater economies as well as the reduction of transaction costs associated with such large-scale operations.

The positive effect that the telegraph had on trade expansion was clearly exhibited, for example, with the development of the transatlantic cable in 1866. Before the completion of the Atlantic telegraph, New York financiers were unwilling to trade in London markets, unless prices were very attractive, because it took six weeks to clear prices and have their orders executed there. The completion of the undersea cable radically changed the situation, bringing about an immediate convergence of prices on both sides of the Atlantic.²⁴

With the expansion of trade, however, came new risks and thus the need for even greater information, coordination, and control. In this new trading environment, economic activities took on such complexity that the previous means of minimizing transaction costs no longer served.²⁵ Thus, instead of relying on intermediaries to process and convey market information, businesses sought to eliminate the need for many middlemen by standardizing their processes and vertically integrating their organizations. Communication technologies proved essential to the success of both of these efforts.

Standardization was a highly effective way of coping with the growing size and complexity of the

²⁴Kenneth D. Garbade and William L. Silber, "Technology, Communication, and the Performance of Financial Markets 1840-1975," *Journal of Finance*, v. 33, June 1978, pp. 819-832.

²⁵Louis Galambos and Joseph Pratt, *The Rise of the Corporate Commonwealth: U.S. Business and Public Policy in the Twentieth Century* (New York, NY: Basic Books, 19--), pp. 26-27. As Stuart Bruchey points out, there had been little change in business operations before this period. As he describes it, the merchants of Venice, operating in the 15th century, would have felt perfectly at home in Baltimore in the late 18th century, working under similar conditions using the same methods and performance criteria for business organization and management, record keeping, and investment. See Stuart W. Bruchey, *Robert Oliver, Merchant of Baltimore, 1783-1819* (Baltimore MD: Johns Hopkins Press, 1956), pp. 370-371.

market. Standards lower transaction costs directly, by reducing the opportunities for cheating and the amount of information that needs to be transmitted in any exchange. Thus, using standards as a trademark, many manufacturers were able to differentiate their products from those of their competitors and price products for different markets without a middleman.²⁶ Buyers, on the other hand, were able to use standards to assure that products manufactured in different locals could work together and be easily replicated, assembled, and repaired. Standards also served as the building blocks of mass production, which depended on precision manufacturing and the use of highly specified, interoperable parts.²⁷ They reduced the need for information by greatly simplifying the production process, automating tasks, and making jobs much easier to monitor and control. Not surprisingly, therefore, standards first appeared in industries—such as gun manufacturing and clock making—where the need for information and precision was greatest.²⁸

To take full advantage of standardization, however, advanced communication systems were required. As both Alfred Chandler and James Beniger have pointed out, specialization of production and increases in productivity could not have taken place without the speed and processing capabilities that the railroad and the telegraph afforded.²⁹ Similarly, standardized mass production could not have progressed

²⁶American farmers, for example, realized that by grading and classifying their products, they could set up separate distribution channels and increase their profits. Thus, when they moved west, they labeled their products by the region of their origin, while wholesalers used these names—Goschen butter, Genesse flour, and Herkimer cheese—as designations of grade. Beniger, op cit., footnote ----.

²⁷As described by Harold Williamson, "Chief among the elements in the pattern of mass production is the principle of standardization. Stemming from the rudimentary division of labor, standardization involved the continuous pursuit and progressive realization, of uniformity of the materials, operations and products of industry, which made possible the future subdivision of labor." Harold Williamson, ed., *The Growth of the American Economy* (New York, NY: Prentice hall, 1951), p. 722.

²⁸Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York, NY: Scribner, 1954).

²⁹Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press, 1977), p. 130. See also Beniger, op cit. For a discussion of how the telegraph and railroads facilitated the vertical integration of the meat packing industry, see Michael Scott Morton, *The Corporation of the 1990s* (NY: NY: Oxford University Press, 1991), p. 80.

very far, had not the development of mass media technologies served to reinforce national markets by molding tastes and preferences into a more uniform cast.³⁰

When standards were unavailable or inadequate, businesses vertically integrated their organizations to eliminate the need for middlemen and gain greater control.³¹ Thus, for example, businesses that were highly dependent on their suppliers integrated backwards to incorporate them into the firm. They integrated forward if—as in the case of sewing machines and photography equipment—the distribution and marketing of their products was information intense, requiring special attention to service and sales.³² One measure of the success of this approach was the substantial number of middlemen whose fortunes precipitously declined.³³ As in the case of standardization, however, such success would not have been forthcoming were it not for the existence of a national, and technologically sophisticated, transportation and communication infrastructure. The railroad industry served not only as a

³⁰As William noted, “mass consumption was the main support as it was the prerequisite for mass production. ... The American home market, in the words of Andrew Carnegie, is a ‘vast homogeneous market’ and this factor was a major influence affecting the evolution of mass production. Across the horizontal plane and its great geographical extent, as well as up and down the vertical social scale, the American market place underwent a radical standardization of taste and consumption that bore profound psychological and economic significance. In part, the demand for greater quantities of identical and similar commodities was built up by the subtle suggestions of salesmanship and advertising that were a parallel and logical accomplishment of mass production itself.” Harold Williamson, *op cit.*, footnote ---, p. 721-22.

³¹As described by Lazonik, “Organizational coordination of vertically integrated structures speeds up the flow of work because bottlenecks in vertically related processes can be better eliminated by the planning process than by market coordination. Within a planning process, shortages at any given vertical stage can be foreseen before they actually occur, and systems of rewards and punishments can be put in place to induce employees to provide the effort needed to maintain desired work flows. ... In addition, through forward integration into the distribution of final goods and services, particular business organizations can attempt to control the extent of the market for their products. The resultant control over product markets in turn provides an informational basis superior to that available through market conditions.” William Lazonik, *Business Organization and the Myth of the Market Economy* (New York, NY: Cambridge University Press, 1994, p. 81).

³²Oliver Williamson, *The Economic Institutions of Capitalism*, *op cit.*, footnote ----, p ---.

³³As Beniger notes, the decade of the 1880s... “saw the wholesalers challenged by new mass retailers—department and chain stores and mail order houses—that purchased from manufacturers directly and thereby integrated still further the processes of distribution and marketing. Although the total number of wholesalers continued to grow into this century, their market share began to decline.” *Op cit.*, p. 258.

means of executing these changes—by providing economies of speed—but also as an organizational model for companies in other sectors to follow.

The Railroad's Lesson for 20th Century Networks

Because of its high fixed costs, fluctuating demand, scale of operations, and need for coordination and specialized engineering skills, the railroad industry was—from its inception—prone to exceptionally high transaction costs. After numerous failed efforts by companies to jointly develop standards, coordinate operations, stabilize prices, and rationalize the industry structure, railroad industry magnates began to merge and integrate their operations, frenetically buying up both their customers and their competitors.³⁴ As Chandler has described it:

A multitude of commission agents, freight forwarders, and express companies, as well as stage and wagon companies, and canal, river, lake, and coastal shipping lines, disappeared. In their place stood a small number of large multi-unit railroad enterprises. . . . By the 1880s, the transformation begun in the 1840s were virtually completed.³⁵

Although these mergers reduced some of the uncertainties that companies faced in their external environment, they greatly exacerbated the problems of internal control. To deal with these new administrative complexities, railroad companies developed an entirely new type of business enterprise, based on a bureaucratic and hierarchical organizational structure. The railroad model, which others were quick to emulate, prepared the way for an entirely new industrial era.

Notwithstanding these radical changes, all transaction costs did not disappear—to the contrary. As is often the case, efforts to reduce transaction costs in one part of the system led to the emergence of new economic bottlenecks in other parts as well as new government efforts to control them. Once again,

³⁴Robert Dawson Kennedy, Jr., “The Statist Evolution of Rail Governance in the United States, 1830-1986,” in L. Cambell, J. Rogers Hollingsworth, and Leon N. Lindberg, Eds. *Governance of the American Economy* (New York, NY: Cambridge University Press, 1991).

³⁵Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press, 1987), p. 130.

the role of the railroad companies provides the best example of this dynamic.

To reduce the uncertainty that stemmed from overbuilding in the industry, railroad magnates pushed their social, political, and economic advantages to the maximum.³⁶ By some accounts, their *modus operandi* verged on the extreme. As described, for example, by Neuman, et. al.:

Greed could be most furthered by control of gateway routes, gateway processes and gateway agencies. The war--and indeed it was a war, fought with guns and settled only after much bloodshed--between the Santa Fe and Rio Grande railways for control of the key mountain pass in the Rockies, exemplified the lengths to which the railroad magnates would go to further their own personal interests.³⁷

In their efforts to establish greater market stability, the railroad companies alternated their strategies between two extremes--cutthroat competition or pooling and price fixing. Because the economic stakes and uncertainties were so high, neither strategy proved successful. Cutthroat competition was ruinous for all, but cooperative agreements were untenable without some mechanism for control.³⁸

The railroad owners were not alone in questioning whether the market, functioning on its own, could solve the problem of too much competition. The railroads were at the center of national activity. The nation's financial markets were greatly influenced by rail financing, and commodity prices were directly linked to railroad rates.³⁹ It is no surprise, therefore, that the bankers were among the first to intervene. To force a solution, J.P. Morgan--acting as a neutral third party--sequestered many of the key

³⁶The railroad magnates had considerable political power. Even though they were considered to be guilty of some of the worst market-related abuses, most people recognized that a national rail system was critical for economic growth and development. The railroads, everyone recognized, had made it possible to open up the West, a fact that led government to subsidize their development through huge land grants and other financial benefits. The Union Pacific Railroad, for example, was given 12 million acres of land, while the Central Pacific received 11 million. See L.C.A. Knowles, *Economic Development in Nineteenth Century: France, Germany, Russia, and the United States* (New York, NY: Augustus M. Kelley Publishers, Reprints of Economic Classics, 1967), pp. 91-93.

³⁷W. Russell Neuman, Lee McKnight, and Richard Jay Solomon, *The Gordian Knot: Political Gridlock on the Information Highway* (Cambridge, MA: The MIT Press, 1997), p. 29.

³⁸Kennedy, et. al., op cit.

railroad owners on his yacht. Acting under duress, they were able to come to terms. However, they were quick to renege on their agreement when there was no longer a means of enforcing it.⁴⁰

The competitive machinations of the railroad owners quickly spilled over into the political arena. Most vocal in calling for reform were small business owners and farmers in the west who had been forced, by the railroad companies, to subsidize the discounted rates offered to the large, eastern industrialists. An increasingly disgruntled and activist labor force soon joined these voices. Under mounting political pressure the government decided the time had come to intervene.

Perhaps it is only fitting that the railroad companies—having provided the industrial model for vertical integration—inspired the American model of government regulation as well. Acting to protect the consumer and stabilize the market, the Government, in 1887, established the Interstate Commerce Commission.⁴¹ Three years later, Congress passed the Sherman Antitrust Act, a law intended to inhibit monopoly power.⁴² The Interstate Commerce Commission, together with the Sherman Act, created a new legal basis for market governance in the United States—a framework that endured for almost a century.

Technological Drivers for Market Transformation

Today we are witnessing revolutionary changes in our social and economic life that rival those of the fifteenth and eighteenth centuries. As in the past, advances in communication and information technologies are driving these changes.

New technologies now make it possible for businesses to network their activities on a global

³⁹Knowles, op cit.

⁴⁰Neuman, et. al., op cit.

⁴¹The overall mission of the Interstate Commerce Commission was to assure that rates were ‘just and reasonable. In addition, price discrimination and pooling arrangements were prohibited. To carry out this mandate, the President was to appoint five commissioners who were to serve for a term of 6 years.

⁴²Building on common law prescriptions that dated from the 1840s, this act sought “to protect trade and commerce against unlawful restraints and monopolies.” The Sherman act was somewhat ambiguous, however, because it did

scale. Configured in a networked architecture, they not only extend *the reach of market information*, as in the past, but perhaps more importantly, they can greatly enhance *the density and the functionality* of market information, thereby generating the kinds of economies of agglomeration that hitherto were available only in local, tight knit, geographic, markets. To fully appreciate this unique aspect of networks, it is necessary to look in some detail at the technological trends driving their development. Included among these trends are:

Greatly improved performance at decreasing costs.

The technical performance of all network components has greatly increased at the same time that costs have fallen. This, more than any other advance, will have a pervasive impact on the evolution of communication infrastructures, providing greater capacity, flexibility, and functionality.

The convergence of communication functions, media, and services.

Technology advances—and in particular digitization—have led to convergence of communications functions and media. Allowing different types of information to be transmitted together using shared network capacity, convergence serves not only to reduce communication costs; it also enriches communication by increasing the “density” of information flows. When information density is high, economies of agglomerations will be high and transaction costs will likely be low.

Decentralization of intelligence throughout communication systems

The greatly improved performance of computer technologies and their convergence with communication technologies have facilitated the dispersal of intelligence and control throughout communication systems. More and more, systems are becoming defined and driven by software, which provides network structure and functionality, determining such critical features as interconnection, interoperability, and ease of use. Software-defined communication facilities are not only more flexible and versatile, they empower users, given them greater control over network access, configuration, and

not define which particular practices constituted either ‘a restraint on trade’ or ‘an attempt to monopolize.’

use. Equally important, software can execute a number of tasks, eliminating the need for many human operations.

Unbundling of communication services and functions.

Unbundling refers to the ability to separately purchase communication and computer services and functions that were once available only as a single unit. Linked to the trends towards convergence and decentralized intelligence, unbundling fosters competition and provides users much greater flexibility and control, allowing them in some case to bypass economic intermediaries. At the same time, however, unbundling shifts the transaction costs entailed in setting up networks to the user, giving rise to the need for new intermediaries such as “system integrators.”

Increased portability

Miniaturization and the ability to unbundle intelligent equipment from the communication infrastructure have allowed for the portability of communication products and services as well as the mobility of users. Employing portable equipment, such as cellular telephones, users can now communicate from any geographic location.

Improved ease of use

Systems interfaces that make it easier for people to interact with technologies are increasingly being developed, greatly facilitating access to high powered and sophisticated communication technologies. Included among these, for example, are icon-based graphical user interfaces; speech processing technologies that can speedily and systematically sort through vast amounts of data, as well as format and present it in one place. These tools will be critical for reducing transaction costs in an era of information abundance.

Increased networking capabilities

Although seemingly paradoxical, the unbundling of the communication infrastructure, in conjunction with the distribution of intelligence throughout communication systems, has led to the

simultaneous reintegration of communication systems through the process of computer networking. Increasingly, networks are being used to link businesses to support a wide range of applications such as remote processing, shared information systems, enterprise integration, groupware, and electronic data interexchange. Linking economic activities both horizontally and vertically, networks can greatly reduce transaction costs and thereby generate wealth.

The Rising Economic Value of Information

Notwithstanding this wide range of potential economic benefits, the “net” impact of electronic commerce will depend, not only on the technical characteristics and capabilities of advanced communication and information technologies. Equally important will be whether these technologies generate new transaction costs, and whether the deployment of these technologies is accompanied by new organizational innovations and institutional mechanisms that can help to reduce rising transaction costs.

Transaction costs, as well as the value of market information, have continued to grow over time as markets have expanded and economic processes have become more complex. These costs will increase even more in an electronically networked, knowledge-based global economy, which is based on flexible, customized production as opposed to mass production.⁴³ In this new environment, a firm’s economic performance—as well as a nation’s competitiveness—will increasingly rest on its ability to efficiently process and distribute business-related information. Gaining competitive advantage in a knowledge-based global economy no longer depends on achieving efficiency and cost reduction.⁴⁴ Increasingly, it

⁴³See Charles Johnshur, “Information Resources and Economic Productivity,” *Information Economics and Policy* (The Netherlands: North Holland, Elsevier Science Publishers, 1983), pp. 13-15.

⁴⁴As noted by Gehani, “For many years, the delay and the cost...in the development of new products did not hurt most companies’ bottom line very much. The customers generally waited patiently for new products to appear in the market. With few new organizations entering an oligopolistic and mainly domestic U.S. economy, there was no significant erosion in the customer base of an organization due to such delays. But with globalization of competition in the 1980s and ease of transcontinental movements of goods, money, and information, foreign competitors started entering as soon as some gaps appeared in the highly valued U.S. or European markets.” R. Ray Gehani, “Concurrent Product Development for Fast track Corporations,” *Long Range Planning*, v. 25, n. 6, 1992,

depends on the effectiveness of businesses—their ability to innovate, respond just-in-time, focus on quality, and establish more cooperative interfirm and intrafirm relationships. To enhance their effectiveness, businesses must take advantage of more timely and appropriately packaged information to help them shift from business models based on mass production to those that center around the concept of flexible, decentralized production.⁴⁵

In this new economic environment, information is fast becoming a primary resource and a prerequisite for the development of all other resources. As such, it is treated less and less as a free good and more and more as a commodity to be bought and sold in the marketplace. As the economic value of information increases, the economic rewards of those who have greatest access to it, and who use it most effectively, will grow as well. Describing this trend, Merrifield notes, for example:

Wealth will no longer be measured primarily on the basis of ownership of fixed physical assets, but rather in terms of time-critical access to needed resources, and to knowledge-intensive, value-added operations. The value-added dimension, moreover, will be the deciding source of comparative advantage required for industrial competitiveness. This shift in the basis of wealth formation is a major break with the past, a discontinuity that is driven by accelerating forces of change. One of these factors involves an explosion of technology that has created about 90 percent of all scientific knowledge over just the last 30 years.⁴⁶

Of course, economic outcomes and performance have always been greatly affected by those who had control over information and the networks that supported and channeled its circulation. Current technological advances, however, will have even greater effects. Much of the information that once was held personally is now embedded in electronic components and networks, where it can be used to support a wide range of economic activities. Information can now be programmed in software that performs work

pp. 40-47.

⁴⁵Flexible, decentralized production systems allow businesses to customize production without sacrificing economies of scope. Using such an approach businesses seek to control a particular market niche rather than maximize market size. As a result, scale economies are no longer such an important factor for success. See R. U. Ayers, "CIM: A Challenge to Technology Management," *International Journal of Technology Management*, December 1992, p. 21.

⁴⁶D. Bruce Merrifield, "Global Strategic alliances Among firms," *International Journal of Technology Management*,

routines; stored in databases where it can be updated, processed, and randomly accessed as needed; or even incorporated into information gateways or communication switches to provide network intelligence. To leverage information for economic advantage today, therefore, requires having some control over the access, uses, and even the design of the technologies in which it is embedded.

The enhanced economic value of information is attested to by the growing demand for global telecommunications and information-based networking. Communications is, today, one of the fastest growing sectors in the international marketplace, with expansion over the past decade outstripping gross national product.⁴⁷

The increasing need for value-added, information-based networking services is similarly evidenced by disproportionate growth. According to a study conducted by the Bureau of Economic Analysis, between 1989 and 1994, the distribution sector—which relies heavily on computerization to reduce the costs of ordering, shipping, and inventory holding—accounted for one-third of all US economic growth.⁴⁸ Manufacturing, in contrast, accounted for only 11 percent of all economic growth, considerably less than its 18 percent share in the total economy. Equally telling, almost all of the growth in manufacturing came from the two areas that includes computers and semiconductors—industrial machinery and electronic machinery.⁴⁹

The long-term impact of networking technologies on the economy will depend to a large degree on how businesses employ them to reduce rising transaction costs. To optimize their benefits, new ways of doing business are required; in the future, cooperation will likely prove more rewarding that

Special Issue on Strengthening corporate and National Competitiveness Through Technology, v. 7, 1992, p. 77.

⁴⁷“Telecommunications is the Measure of Economic Growth,” *Telecommunications Highlights International*, v. 15, n.49, October 6, 1992, p. 2.

⁴⁸Michael Mandel, “Don’t Cut Out the Middleman: He’s a High Tech Growth Leader,” *Business Week*, September 16, 1996, p. 30.

⁴⁹Ibid.

competition, and information-sharing more fruitful than information control. The businesses that succeed in this radically changed environment will be those who—like the railroad owners in their day--seize the opportunity to restructure their organizations and goals to take the best advantage of their situations.

Reducing Transaction Costs

Providing positive externalities and economies of agglomeration, networking technologies will be critical in helping businesses to maximize the value of their information resources. Already, there is a wide range of applications available for business use.

Consider, for example, electronic data interchange (EDI). EDI is a computer-based system that allows companies to order, invoice, and bill their products and services electronically. Common transactions, such as invoicing, shipping and billing—which traditionally have entailed human interaction and the transfer and processing of paper documents—are replaced by automatic electronic transfers between business computers. Prices, terms, and the conditions of a contract are all stored electronically. Allowing businesses to operate on the basis of a shared information system, EDI can greatly improve efficiency, triggering purchasing and distribution just when and where they are needed.⁵⁰

Sharing information and data in a networked fashion also allows businesses to employ production processes that shorten product cycles and adopt marketing strategies that are highly responsive to customers needs. For example, computer integrated manufacturing (CIM) improves efficiency and product quality because the data describing the engineering parameters of a product, once created and stored electronically, can be retrieved by any other member of a project team in a form most appropriate for his or her needs. Redundancies and discrepancies are avoided because everyone uses the same

⁵⁰See Benn R. Konsynski and F. Warren McFarlan, "Information Partnerships—Shared Data, Shared Scale," *Harvard Business Review*, September-October, 1990, pp. 114-120; and Max Muday, "Buyer-Supplier Partnerships and Cost Data Disclosure," *Management Accounting*, September 1992, pp. 28-29.

information.⁵¹ Similarly, businesses can greatly improve customer service by employing distributed computing systems and relational databases to integrate, update, and deliver relevant customer information on demand at the point of sale or point of customer inquiry.⁵²

Worldwide networking technologies are also essential for conducting business on a global scale. To fully benefit from the availability of global resources and markets, businesses must have a truly transnational perspective that harmonizes operations in the service of a single corporate strategy. Transnational corporations must be able to balance their global operations with the requirements of local markets—such as the need to establish special sales channels, service contracts, and work relationships. Thus, as companies spread their corporate boundaries, they will need to make decisions that are far more complex based on information and data that reflect cultural and political disparities.

Networked information technologies will similarly be a prerequisite for enterprise restructuring and reengineering. In a highly complex and rapidly changing global economy, vertical businesses are being pushed to their limits. Businesses everywhere are rearranging their activities to carry them out in networks and teams. Some businesses, for example, are entering into highly integrated, long-term relationships with customers and suppliers; others are setting up short-term, ad hoc alliances to address a particular problem at hand. Many of these networks transcend national as well as organizational boundaries.

Networking technologies are necessary not only to support such activities; they can also serve as a catalyst for organizational change. For example, with advanced networking technologies and the growing number of business applications that they can support, buyers and sellers—regardless of their

⁵¹See Kevin Parker, "Reengineering the Auto Industry," *Manufacturing Systems*, January 1993, pp. 40-44' and Laura De Nardis and Marvin Chartoff, "CIM Users' Group Need for Flexible Net Underpinnings," *Network World*, Mar. 16, 1992, pp. 1, 29, 33, 38-40.

⁵²See Robert Janson, "How Reengineering Transforms Organizations to Satisfy Their Customers," *National Productivity Preview*, winter 1992/1993, pp. 45-53; and Regis McKenna, "Marketing is Everything," *Harvard Business Review*, January-February 1991, pp. 65-79.

geographic locations—can interact on-line in a virtual electronic space. Under such circumstances, the network will, in effect, become the marketplace. Linking buyers and sellers directly, the need for information—as well as for costly intermediaries to transport, process, and interpret it—can be reduced significantly.

The Importance of Organizational and Institutional Changes

Advanced information and communication technologies can help businesses thrive in a global, knowledge based economy. However, if the deployment of networking technologies is not accompanied by social and economic innovations to support electronic commerce, networking technologies will lead to even greater transaction costs.

Recent U.S. experience with information technologies is highly illustrative in this regard. Over the past two decades, American businesses have invested heavily in information and communication technologies to boost productivity. The results to date, however, have been disappointing. Productivity gains have been stagnant in services—the very sector in which information technology investment has been highest. Only very recently has this trend begun to reverse, with productivity gains in services averaging approximate 2.6 percent over the last two years.⁵³

Although analysts differ in their assessments of what they refer to as “the productivity paradox,” most agree that networking technologies will not yield substantial gains unless businesses use them to instigate major organizational change.⁵⁴ Embodying social relations and supporting social interactions,

⁵³See for example, Erik Brynjolfsson, “Is Information Systems Spending Productive: New Evidence and New Results,” MIT Sloan School, Working Paper #3571-93.

⁵⁴As Hayes and Jaikumar note, “Still, most US managers are having difficulty reaping these advantages. For years, manufacturers have acquired new equipment much in the way a family buys a new car. Drive out the old, drive in the new, enjoy the faster, smoother, more economical ride—and go on with life as before. With new technology, however,” as before” can mean disaster.” Robert H. Hayes and Ramchandran Jaikumar, “Manufacturing’s Crisis: New Technologies, Obsolete Organizations,” *Harvard Business Review*, September-October 1988, pp. 77-85.

these technologies are powerful forces for change. However, if they are to have their intended effect, they must change the mind-set of those working in business organizations, awakening them to the full range of new organizational possibilities.⁵⁵

One major challenge that businesses will face in an electronically networked environment is how—in the absence of continued face-to-face relationships and organizational sanctions—to establish trust. Without trust, transaction costs will continue to be high, and the benefits of networking diminished. Already, many businesses are finding it difficult to shift to a cooperative mentality after being steeped for so long in a mindset that is both bureaucratic and highly competitive. As a result, businesses often defeat the purposes of computer-integrated manufacturing and EDI by their reluctance to share proprietary product data, or to let their customers, or competing suppliers, share their cost data.⁵⁶ Failure to share information within firms also inhibits partnering, since effective inter-organizational relations require cooperation across all sectors of all related firms.

Trust can only be established over time, and through a process of repeated successful transactions.⁵⁷ Hence, an increasingly prevalent way of reinforcing trust in an electronic environment is to establish closer social ties and alliances much like the merchant networks of earlier times, or the Japanese “Kerietu” or the Italian “Impannatore” of today.⁵⁸ In contrast to the market, which is characterized by atomistic relationships and intense competition; and vertically integrated firms, which

⁵⁵See William Lzonick, *op cit.*, footnote 32.

⁵⁶See Morris M. Kleiner and Marvin L. Bouillon, “Information Sharing of Sensitive Business Data With Employees,” *Industrial Relations*, v. 30, 1991, pp. 480-491.

⁵⁷As described by Ring and Van den Ven, “Reliance on trust by organizations can be expected to emerge between business partners only when they have successfully completed transaction in the past and they perceive one another as complying with norms and equity. The more frequently the parties have successfully transacted, the more likely they will bring higher levels of trust to subsequent transactions. As the level of trust increases, greater reliance may be placed on the actions of the trusted party.” Peter Smith Ring and Andrew H. Van de Ven, “Structuring Cooperative Relationships Between Organizations,” *Strategic Management Journal*, v. 13, 1992, pp. 483-498.

⁵⁸See, for instance, Gernot Grabher, “Rediscovering the Social in the Economics of Interfirm Relations,” in Gernot Grabher, *The Embedded Firm: On the Socioeconomics of Industrial Networks* (New York, NY: Routledge, 1993).

are highly structured and authoritative in nature; networks comprise indefinite, loosely coupled relationships, which exhibit strong patterns of reciprocity.⁵⁹ Transaction costs are likely to be reduced, given such arrangements, because the need for costly contracts and elaborate bidding procedures is eliminated. Close communication will also foster high quality production.⁶⁰

New ways of establishing trust and loyalty between management and the workforce will also be required. Today's workers are increasingly fragmented from the workplace. Throughout the industrial era, employees worked in a bureaucracy, in what was a predictable and—somewhat—committed relationship, exchanging loyalty of service for salary, benefits, and career mobility. Today, more and more people work in a variety of settings—home, satellite offices, rented or temporary offices, or the offices of suppliers, partners, or competitors—and through different arrangements with their employers—part time, contractual, temporary, or other individually negotiated arrangements. Without new social and organizational mechanisms for assuring loyalty and compliance under these circumstances, the transaction costs entailed in orchestrating flexible processes, assuring quality, and monitoring performance will be exceedingly high.⁶¹

To reduce these new types of transaction costs, many businesses are now renouncing traditional management techniques in favor of new approaches that are based less on deskilling and adversarial behavior, and more on knowledge enhancement and cooperation. Thus, to provide greater motivation, workers—now valued more for their cognitive than their manual skills—are being educated on the job

⁵⁹Comparing markets to networks, Powell notes, for example, “In markets the standard strategy is to drive the hardest possible bargain in the immediate exchange. In networks, the preferred option is one of creating indebtedness and reliance over the long haul.” W.W.Powell, “Neither Market Nor Hierarchy: Network Forms of Organization,” *Research in Organizational Behavior*, v. 12, p. 303.

⁶⁰See Leon N. Lindberg, John L. Campbell, and J. Rogers Hollingsworth, “Economic Governance and the Analysis of Structural Changes in the American Economy,” in Lindberg et.al, Eds. Op cit.

⁶¹See L. Lynne Pullman, “Temporary Employees: What Are An Employer’s EEO Responsibilities?” *Employee Relations Law Journal*, v. 18, n.3, winter 1992, pp. 533-538. See also, G. Pascal Zachary and Bob Ortega, “Workplace Revolution Boosts Productivity at Cost of Job Security,” *Wall Street Journal*, March 19, 1993.

and reorganized into teams and quality circles. At the same time, managers are spending less time directly supervising, and more time making strategic choices and orchestrating and evaluating overall enterprise activities.⁶²

Not all businesses, however, are so enlightened, or capable of organizational change. In fact, many businesses are using networking technologies to perpetuate the vestiges of the work-flow-control model typical of the industrial era. Employing networks, for example, businesses are downsizing and shifting to contingent workers, thereby avoiding the risks of economic downturns and the need to provide fringe benefits. Similarly, networked technologies are often used to monitor worker's performance--by accessing their e-mail and scanning their inventories.⁶³

The Importance of Network Architecture

Information and communication technologies will not only make new demands on business organizations; they will also give rise to new criteria for evaluating the functioning of the market. Because exchange transactions will increasingly be carried out electronically and on-line, the network will in many instances serve as the market. Where this occurs, economic outcomes will depend not only on the relationship among firms. Equally, if not more, important will be the network's architecture, and the type of economic incentives that network service providers face in a knowledge-based, global economy.

The "architecture" of electronic business networks will be critical in determining their economic impacts. Like a sculpture that is fashioned from Tinker Toys, a network's structure is determined by the connections and linkages that give it shape. How these networks are formed and ultimately joined

⁶²Howard E. Dolenga, "Management Paradigms and Practices for the Information Age, *SAM Advanced Management Journal*, winter 1992, pp. 25-29.

⁶³Paul Attewell, "Big Brother and the Sweatshop: Computer Surveillance in the Automated Office," *Sociological Theory*, v, 5, 1987, pp. 47-69.

together to comprise a global infrastructure will greatly influence the cost of doing business. Their design will also affect the overall efficiency of the economy, the size and scope of markets and the ability to conduct trade, the distribution of economic costs and benefits throughout the economy, and the nature of work and the quality of jobs.

To serve both business needs and the nation's needs, the network architecture will need to be flexible and open. Without such versatility, businesses will be unable to rapidly reconfigure their networks to respond to changing circumstances and market demand. Nor will they have the leeway needed to customize applications and networks to support changing business processes and flexible working relationships. Moreover, without the freedom to mix and match a wide variety of network components, businesses will be less able to add value and develop new products and services.

To fully reap the benefits of communication technology networks and network components will also need to be interoperable and open for interconnection. Proprietary systems with closed standards increase the cost of doing business and create significant barriers to market entry. Interoperable components provide greater network flexibility, greater ease of use, and reduced network costs. Technology diffusion will occur more quickly and more broadly, and the equity of access will be encouraged as a result. Interoperable systems also provide a standard platform for the innovation of new components and applications.

The requirements for access will thus need to be reconsidered with the advent of electronic commerce. To operate on a level playing field in such an economic environment, it will not be enough for a business to be able to access information from a variety of sources or to transmit it from one point to others. Rather, businesses must be able to interconnect in a timely fashion to the entire interactive network of buyers and sellers, together with the information that constitutes an electronic marketplace. Only by operating within such a networked environment are transaction costs minimized and "economies of agglomeration" achieved.

Incentives for Network Providers

In the absence of government regulation, network providers—responding to the signals of the market—will determine the design and evolution of the global network infrastructure. Although network providers are likely to provide an integrated platform for economic commerce, they may be much less inclined to offer their networking services on an open, and ubiquitous, basis.

In contrast to the downsizing trend characteristic in other types of industries, network service providers have little incentives to break up and outsource their operations. To the contrary, by integrating infrastructure services and applications, network providers benefit not only from economies of scale and scope, but also from the many positive externalities associated with networked technologies.⁶⁴ These externalities stem from the fact that the value of any network will generally increase—up to a certain point—as more and more users and applications are joined together.⁶⁵

Equally important, integrated networks will command higher service prices than non-integrated networks in the marketplace. To minimize transaction costs, businesses need “one-stop shopping” and a seamless networking platform to link their operations. Furthermore, without access to a common platform, companies will be forced to make networking decisions based on technological criteria rather

⁶⁴See for discussions of these benefits, Cristiano Antonelli, “The Economics of Information Networks,” in Cristiano Antonelli, *The Economics of Information Networks* (Amsterdam: North Holland, 1992), chapter 1; and Michael S. Scott Morton, ed., *The Corporation of the 1990s; Information Technology and Organizational Transformation* (New York, NY: Oxford University Press, 1991), chapter 4.

⁶⁵Consider, for instance, an electronic catalog. It may be very useful, but its value will be considerably enhanced if it is put on-line. It is then accessible to more users and can be updated in real time. Additional value can be added if this network is linked to both an intelligent communication network that offers 1-800 services and a credit card authorization system. By connecting all of these services, an actual exchange can take place. Further benefits can be derived by connecting to an electronic funds transfer system and/or an automated clearinghouse. If multiple buyers and sellers are linked together on a network, true electronic commerce can occur and transaction costs will be minimized.

than business strategy.⁶⁶

By offering an integrated platform for electronic commerce, providers can also gain a first mover advantage, using the network as a barrier to entry. Given the large up-front investments required for infrastructure facilities, latecomers may be unable to generate the critical mass of users and services required to cover their costs. Latecomers will also be disadvantaged because business networking requires extensive expertise as well as considerable “learning by doing.” By offering a wide range of business services, integrated network providers can also better position themselves to collect, and make optimum use of, transactional data.

Providers have much less incentive to provide open, ubiquitous services, however. Given sufficient demand, network providers will maximize the return on their investments if they restrict network access to a limited number of users. These users will likely be willing to pay a premium for exclusive network access to gain in two important ways. First, they will have greater control over their customers or suppliers, as well as privileged access to market information. Second, they will benefit from the economies of agglomeration that stem from a significant reduction in transaction costs. The benefits of reduced transaction costs will, moreover, become increasingly important with the proliferation of independent electronic markets, as products become more customized and complex, and markets are extended further across time and space.

Network providers are scurrying to take advantage of the lucrative opportunities afforded by electronic commerce. Even before the passage of the 1996 telecom reform legislation, a number of companies—including among them Microsoft, Netscape, Oracle, MCI, and IBM—announced their intentions to develop the winning “platform” of network applications for electronic commerce. To this end, network providers are aggressively setting up far ranging partnerships, consortia, and joint ventures. In 1996 alone, for example, as many as 206 transactions—valued at \$57 billion—were announced. Most

⁶⁶D. Linda Garcia, “A New Role for Government in Standard Setting,” *StandardView*, v.1, n.1, 1994.

notable—from a global perspective—were the mergers of MCI and British Telecom, and that of WorldCom and MFS. The local exchange carriers were party to five major mergers.⁶⁷

Why this rush? Despite the present high rates of investment and merger activity, many analysts believe that, over the long term, there will not be enough money or markets to go around.⁶⁸ They estimate that, when the inevitable shakeout does occur only three to five global conglomerates will be able to survive. So time is short, and the competition for partners fierce. As one participant-observer has aptly described:

We are at the stage of [the game of] Monopoly where you buy. . . everything that is available. The next stage is to form consortia with other players as the initial opportunities become limited. The last phase, yet to come, could be some form of cash-flow race for the finish line.⁶⁹

Intermediaries and Bottlenecks

Many people hoped that, given its low-cost service and non-hierarchical architecture, the global Internet might resolve all future information access problems. In the early days of the Internet, for example, a small business could rent advertising space on the World Wide Web from an Internet service provider at a cost (in addition to that of the computer, software and modem) of approximately \$50 per month. This website, which served jointly as a search tool, advertising mechanism, and storefront would allowed a small business to receive and answer inquires about it products and service from computer users.⁷⁰

With the evolution of the Internet, however, an alternative—and less egalitarian—scenario has

⁶⁷B.H. Thrasher and Robert McNamara, “How Merger Mania Has Redefined the Communications Landscape,” *Telecommunications*, October 1996; “More High-Tech Firms Tying the Knot, Spurred by a Buy-Not-Build Strategy,” *Wall Street Journal*, January 3, 1996, p. A 3; and “Global Alliances Span New International Private Networks,” *Data Communications*, September 1996, pp. 47-48.

⁶⁸Paul Strauss, “The Struggle for Global Networks,” *Datamation*, v. 39. n. 8, September 15, 1993, p. 26.

⁶⁹Richard House, “Global mating Game,” *Institutional Investor*, September 1993, p. 65/

⁷⁰“Internet Facts,” *Telecommunications*, July 1995, p. 18.

begun to unfold. Internet service providers, for example, are finding that they must be more exclusive in the future, if only to maintain their bottom lines. The proliferation of access providers, browsing and directory services, and websites has yielded intense competition and limited the prices that providers can charge. To differentiate their products and lock-in their customers, service providers are already beginning to offer a much more customized fare. Some on-line publishers, for example, provide narrow cast information services based on client-server, “push technology.” These services may be specifically tailored to the needs of the user, or provided via a “channel,” which receivers access much like cable television.⁷¹

Recent developments suggest, moreover, that even in an Internet environment, new intermediaries will appear—just as they did in the past—to reduce the costs of transacting in cyberspace. On the Internet, it is not access that is at a premium; rather, it is visibility. Given the Internet’s very loose (some claim anarchical) management structure and its exponential growth, the major problem faced by small firms trying to sell on the Internet is one of making themselves known and differentiating themselves from others. Already, a wide array of intermediaries has emerged to support Internet business users in this regard. For what can be a hefty fee, these value-added network service providers offer consulting services on how best to develop and maintain websites, as well as software to provide browsing, billing, directories, mail hubs, and encryption services. Others serving as real estate developers, are establishing “electronic malls,” where websites can be rented. For a business to get a good spot in a well-known and respected mall can, however, be costly.

As commerce increases on the web, intermediaries are likely to emerge not only to reduce information search costs and to facilitate exchange, but also to reduce the economic risks associated with an inchoate market as uncertain and underdeveloped as the World Wide Web. Such intermediaries might

⁷¹See Kevin Kelly and Gary Wolf, “Push! Kiss Your Browsers Goodbye,” *Wired*, March 1997, p. 13; Karin Littington, “When Push Comes to Shove,” *The Guardian Online Pages*, February 27, 1997, p. 11; and Amy Cortese, “The Way Out of the Web,” *Business Week*, February 24, 1997.

function, for example, as “trusted third parties,” by vouching for products and trade agreements, protecting consumer privacy, authenticating transactions, and/or securing /the means of exchange.⁷²

Over the long run—given adequate demand—the functions that these intermediaries perform are likely to be bundled together by the network service providers themselves, who will customize their networks for different communities of users. Already, many content providers have found that they can earn more profit, and lock-in their customers more effectively, by selling access to “communities” rather than mere information.⁷³ By offering “exclusive” networks that not only guarantee a certain kind of clientele, but also provide electronic commerce support and a secure payment system, network service providers can both reduce their costs and increase their profits. As described by Spar and Bussgang:

The companies managing the on-line transactions of their users would have created privately ruled communities, just as developers in some urban areas have built private "towns," complete with strict rules, security forces, and gates to keep outsiders away. To build these communities, service providers would employ encryption, fire walls and other evolving technologies to control access in the same way as developers control it in physical communities.⁷⁴

Nor can the Internet, as it exists today, survive the onslaught of big players who are just beginning to catch on to the opportunities that await them.

Having belatedly recognized the Internet’s central role in providing a platform for the National Information Infrastructure, they are frantically strategizing to get into the act before it is too late. Thus, Microsoft, AT&T, MCI, Sprint, Tele-Communications, Inc., and the seven Regional Bell Operating Companies are now among the key players seeking to share the Internet access market, which is expected to total \$4 billion by the year 2000.⁷⁵

Given their deep pockets, these large companies pose a considerable threat to the more than 1200 small

⁷²See P. Resnick, R. Zeckhauser, and C. Avery, “Roles for Electronic Brokers,” in G.W. Brock, ed., *Toward a Competitive Telecommunication Industry: Selected Papers from the 1994 Telecommunications Policy Research Conference* (New York, Mahwah, Lawrence Erlbaum Associates, 1995), pp. 289-306; and A. M. Fromkin, “The Essential Role of Trusted Third Parties in Electronic Commerce,” *Oregon Law Review*, v. 75, n. 1, 1996, pp. 49-116.

⁷³Amy Cortese, “Internet Communities: Forget surfers. A new class of netizen is setting in.” *Business Week*, May 5, 1997.

⁷⁴Debora Spar and Jeffery J. Bussgang, "Ruling the Net," *Harvard Business Review*, May-June 1996, p. 632.

companies that have typically provided Internet access in the past. For example, to lock up customers, Microsoft has bundled Internet access in Windows 95. Similarly, AT&T—although a latecomer to the game—now seeks to capture a major share of the market by offering its long-distance customers 5 months of free Internet access.

Unwilling to be left behind, MCI quickly followed suit.

No matter how large their size, however, few companies can go it alone. Recognizing their limitations, communication and information providers are trying to shore up their marketing prospects by acquiring or partnering with the many burgeoning start-up companies providing Internet tools and software applications.⁷⁶ To cut off their competitors, they are bending over backward to acquire, and lock-in, the best strategic partners. As one business journalist has described these frenetic endeavors, “Headlines about the Internet industry are beginning to sound an awful lot like nighttime soap opera Melrose place in which no player sleeps alone and no back goes unstabbed.”⁷⁷

Governing Electronic Commerce

When viewed through the lens of history or the course of recent events, electronic commerce networks appear to be much less autonomous than they seem at first glance. Like all markets in the past, these networks will be deeply embedded in social relationships and institutional norms, as well as structured by economic and political forces. New governance mechanisms to support electronic commerce will evolve over time—not in any predetermined fashion, but rather in response to pressure from economic and political actors who are dissatisfied with rising transaction costs and/or their inability

⁷⁵John Verity, “Everyone’s Rushing the Net,” *Business Week*, June 5, 1995.

⁷⁶As described by *Business Week*, “Dozens of Internet startups are quickly gobbling up newcomers. American On-Line Inc. alone has bought up a half-dozen promising software startups in the past year, including the \$30 million acquisition of Web browser developer BookLink Technologies and the \$4 million purchase of Navisoft, Inc., which makes programs for publishing on the Net. And Netscape, flush with cash, on September 21 shelled out \$109 for Collabra Software Inc., a fledgling maker of document-sharing software.” “Software: Looking for the Next Netscape,” *Business Week*, October 21, 1995.

⁷⁷Janet Sandberg, “American On-line Stars in Soap-Opera-Like Internet Action: Entangled Relationships Thrive as Companies Dally in Alliances and Breakups,” *The Wall Street Journal*, March 18, 1996, p. B4.

to gain access to electronic networks and market information that afford them control over the terms of exchange.⁷⁸ If private sector actors—competing among themselves—are unable to arrive at a new form of market governance, their only recourse will be to shift the contest to the political arena, where they can call on Government to redefine and enforce a new system of property rights.⁷⁹

History makes clear, moreover, that private sector success in establishing governance regimes for the market has been the exception rather than the rule. In fact, from the first appearance of the market in the town-square, the only time when it might be said that the private sector successfully ruled the public sphere was during the period when the city-state of Amsterdam dominated world trade. Describing the highly unusual relationship between Dutch merchants and the State, one Frenchman of the day noted, for example,

In Holland, the interest of the State in matters of commerce serves that of the private individual, they go hand in hand. Commerce is absolutely free, absolutely nothing is forbidden the merchants, they have no rules to follow except their own interests; this is an established maxim which the state regards a thing essential to itself.⁸⁰

Achieving this kind of *modus operandi* in Amsterdam was greatly facilitated, however, not only by the city state's limited geographic size, common culture, and dense merchant population, but also by the total dependence of its citizens on trade for their livelihoods.

Instituting a private governance structure for electronic markets today, in a global environment,

⁷⁸As described by Lindberg, et. al. "...in addition to simply acquiring the resources and information they need at the lowest possible cost, actors may also be concerned with *controlling the terms of exchange* under which they make these acquisitions—a strategic concern insofar as power, rather than just the ability to procure resources, is at stake. In this sense, the arrangement of governance mechanisms is undesirable and worth changing from an actor's point of view if it systematically restricts the actor's control over the terms of exchange relative to that of the exchange partner." Lindberg et al. footnote---, p. 10.

⁷⁹Property rights, according to Lindberg, et. al. "are comprised of systems of rules, procedures, and norms that define ownership and control of the means of production, government, and determine the efficiency with which resources and information are allocated. Furthermore, although property rights structures vary historically and are determined in part by the efforts of transacting parties to increase the efficiency of their exchanges, they are also determined by actors within the state who are trying to maximize their revenues and maintain the support of their constituents." Ibid. p. 11.

⁸⁰As cited in Braudel, *The Perspective of the World*, op cit.

presents a much more formidable challenge. Notwithstanding the demise of the Soviet Union, and the worldwide trend towards privatization and market liberalization, economic actors from different areas of the world continue to operate in accordance with diverse cultural norms and political rules of the game. Thus, for example, some western firms have found it difficult to enter foreign markets for lack of an understanding of the unwritten rules or informal codes of conduct.⁸¹ Equally, significant, to overcome these institutional trade barriers, or to negotiate a way around them, these businesses are turning not to their counterparts in other countries but rather to their own national governments.

Especially problematic for the private sector are conflicting perspectives—both domestically and worldwide—about the nature of information. Some people view information as a commodity to be bought and sold in the marketplace; others perceive it as a public good, to be widely shared; while still others consider information to be potentially dangerous and/or vulnerable, requiring that it be secured and protected. These conflicts about information—although always latent—have become intensified in a knowledge-based global economy, in which the value of information is greatly enhanced. These conflicts have, moreover, given rise to a number of market disputes, which cut across fundamental societal issues—such as freedom of speech, privacy protection, cultural integrity, and national security—making it hardly likely that the private sector can effectively govern the knowledge economy acting solely on its own.

As in the earlier case of the railroad owners, exceedingly high economic stakes and intense competition among network providers are likely to greatly hinder any private sector efforts to come to terms. To appreciate the problem, one need only consider the events that have unfolded in the United States since the passage of the 1996 Telecommunications Act. The new industry free-for-all continues to be acted out in the political arena as well as in the marketplace. Eager to stave off competition in their

⁸¹M. Orru, G.G. Hamilton, and M. Suzuki, “Patterns of Inter-Firm Control in Japanese Businesses,” *Organizational Studies*, v. 10, n.4, 1989, pp. 549-74.

own markets, industry players are resorting to many of their old regulatory maneuvers and machinations. When not dragging their feet in fulfilling new competitive requirements, they are filing complaints against their competitors with the FCC.⁸² Their behavior illustrates—albeit somewhat ironically—how deregulation of a networked industry may ultimately lead to more, not less, government.⁸³

Businesses, moreover, will not go unchallenged in their efforts to redefine property rights; Governments, representing a broader citizenry, have their own—and at times competing—interests in securing a new governance regime, especially in the area of national security and defense. Although the global expansion of electronic commerce will yield numerous economic benefits, it will also serve to undermine existing international mores and accepted rules of behavior, creating new sources of political and economic vulnerability—such as terrorism, drug-trafficking, electronic fraud, and money-laundering—forcing government to ultimately intervene. Moreover, as proved true in the heated U.S. debate about encryption technologies, the property rights regime proffered by the Government and that sought by industry are not likely to always coincide.

Electronic commerce cannot exist without some form of governance—the transaction costs are simply too high. Acting solely on their own, however, multinational corporations are unlikely to be able to devise a viable scheme. Instead, the governance structure for global electronic commerce will most likely be the product of the intense political and economic struggles about information and communication technologies, which are presently taking place both nationally and internationally. As a result, choices about these technologies—their design, architecture and structure, or the rules and

⁸²Thus, for example, no sooner had the Act been passed when AT&T petitioned the FCC to bar the Bell companies from sharing marketing data with their out-of-region, long distance companies; Ameritech complained that Time-Warner's Home Box Office had refused to provide it with cable programming; long-distance companies called on the FCC to regulate voice and video on the Internet; competitive access providers complained that the RBOCs are holding up negotiations on access charges, and the Bell companies contended that their competitors were using the regulatory process to block their entry into the long-distance market. Ibid.

⁸³D. Linda Garcia, "The Failure of Telecom Reform," *Telecommunications*, September 1996, pp. 43-48.

regulations governing their availability and use—will have far-reaching social and economic consequences.

The outcome is not predetermined; nor will it necessarily be efficient. Many of these choices, moreover, will be irreversible at least in the short and medium terms. Once a decision is made, technology tends to become firmly fixed to a given trajectory. This pattern is especially evident with networked information technologies, which require vast capital and social investment.

Thus, periods of rapid technology advance, such as we are witnessing today, provide a rare opportunity for reassessing and redirecting both the nature of a particular technology, and the economic and social relationships that are structured around it. Given the significance of the moment, and the potential consequences for winners and losers, consideration must be given not only to what technology choices are being made, but also to the process of how, and by whom these choices might best be made in a global, knowledge based society. Above all else, it would—under the circumstances—be totally irresponsible to assume a lack of control.