

The Filiere Electronique and Civil Society

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THE FILIERE ELECTRONIQUE AND CIVIL SOCIETY

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To phrase the question in the terms established by this research project -- "What do public networks have to offer private networks?" -- is to falsely suggest that there is a rigid distinction between public and private, and that the boundary remains stable. We live, instead, in a world in which telecommunications networks are better described as the "filiere electronique," a network of electronic production characterized by the growing unity and interdependence of previously distinct economic sectors, the polyvalence of new technologies, and multiple intertwinings of different networks.¹ This filiere generates an environment of bounded rationality, and uncertainty, and in which localized learning processes are particularly relevant. Harmonization of regulatory systems as well as of the infrastructure and development of the "network firm" and "network industries" are features of what is described here as the third stage of the information society. Cooperation and coordination join competition as motive economic forces; the emphasis on externalities makes clear the declining importance of the market per se. Network economics is coming to be the model for the entire economic system.²

While our interest in studying these impacts may be economic, the network society is also civil society, or "those areas of social life -- the domestic world, the economic sphere, cultural activities and political interaction -- which are organized by private or voluntary arrangements and groups outside the direct control of the state."³ This is one way of conceptualizing the private sector, doing so by distinguishing the exercise of power (state versus non-state) from the goals towards which the use of that power is directed. Within civil society, private sector actors address issues traditionally assumed to be "public" in nature because they are concerned with constituting and sustaining society. Civil society has upon occasion opposed the state -- leading in some historical cases to successful revolutions -- precisely because it is concerned with the building of community and retains an interest in social, cultural, and political ends as well as economic; successful governments are those in which the two come together. Today, as the very nature of the nation-state and effective definitions of the public and private are shifting, civil society is reaching new forms of accommodation to and interaction with the state. Much of the stimulus to this change came from the use of telecommunications networks, which have made new forms of organizational evolution possible.⁴

While we are in the habit, by now, of viewing ourselves as a society in change, in fact we may be nearing the end of our most turbulent period, reaching the conclusion of a transformation process in which it has become clear that "the information society" is not a unimodal concept, but one which refers to dynamic and multilinear social development processes. As the chaotic environment resolves itself into order again, we enter the third stage of the information society.

The question to which this paper is addressed might usefully be re-posed

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discover that "the public" and "the private" are being redefined, that telecommunications networks are both affected by and are critical to this process of redefinition, and that expanding our methodological and data collection toolkit may well serve our ability to direct the new forms of power that have become available to both "public" and "private" actors.

To understand the contributions of what are technically described as "public" networks within the United States to those that are categorized as "private" we must look beyond the networks themselves to the interdependent organizations that create and use those networks. Evaluation of the impact of networks must deal with effects upon the entire information production chain - including those things that happen outside the network -- as well as the effects of the information production chain. In doing so, we will find that many of the most significant impacts are qualitative, not quantitative, in nature, and involve causal processes rather than effects best described through capital indicators.

The domain of information policy, as bounded by any stage of the information production chain (creation [creation, generation, and collection], processing [algorithmic and cognitive], transportation, distribution, storage, destruction, and seeking),⁵ provides a particularly good example of what are today called "policy networks," referring to the interaction of public sector and private sector actors and cooperation between them.⁶ This approach goes beyond corporatism, in which the state retains its centrality, to describe a world in which the relative power of the nation-state is declining and the nature of its power undergoing change.⁷ In this aspect, too, decision-making regarding the filiere electronique may provide the most acute model for future public-private relationships in the third stage of the information society.

A Conceptual Groundwork

Research Methods, and the State

One of the earliest senses in which it was understood that "information is power" was in service of the classic forms of the nation-state. In addition to ancient uses of information collection, processing and flows for the purposes of exercising military power,⁸ the nation-state over the last few hundred years has with varying degrees of sophistication and self-consciousness theorized, conceptualized and operationalized research methodologies for the purpose of directly exerting state power; the very word "statistics" was born of efforts to quantify characteristics of the population after the French Revolution for the purpose of governing.⁹

The many difficulties of obtaining data for the purposes of telecommunications analysis have often been noted.¹⁰ Conceptual and theoretical problems in dealing with information flows within neoclassical economic models are exacerbated by the inability to get data once operationalized. The development of network economics is one effort to deal with these problems by shifting the unit of analysis and providing an opening

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infrastructure in much the same way that the cognitive "value" of information is much enriched by contextualizing it within notions of meaning.

These issues are arising in a context in which the general governmental interest in obtaining data in traditional forms is on the decline because, it is argued, it is "costly."¹¹ The cancellation of data collection efforts under federal agency aegis is a significant shift in what had been a central form of power for the bureaucratic welfare state. Whether through the tax system, welfare, or the educational system, federal and state data collection procedures in essence defined property rights and determined the spread and penetration of governmental activity. Shifts here are one of the least discussed but most significant aspects of the privatization process. While some information is no longer being collected -- and the possibility of generating new information flows through regulatory action denied for a lengthening period -- other kinds of information are being transferred to the private sector. In some cases this happens through direct privatization of previously governmental activities through contractual arrangements. In others, such as in the computerization of the patent office,¹² it occurs through aggressive private sector behavior seeking the high ground through definition of the operating rules of the pertinent competitive environment. In still others, the government directly asks for private sector cooperation, as in recent Department of Defense calls for corporate assistance in collecting information about "enemies" around the globe.¹³

A second significant shift in governmental information handling procedures is away from individualized data to algorithmic formulations, whether in dealing with governmental information flows to the public,¹⁴ development of sentencing guidelines based on statistical features of demographic characteristics rather than individual circumstances,¹⁵ or inclusion of those whose behaviors are not algorithmically predictable within the definition of the "enemy" within new security theory.¹⁶

These changes in the information collection processing environment are developing concurrently with a questioning of the nature and utility of existing decision-making processes, both in general and specifically within the field of communications policy.¹⁷ Again, even the Department of Defense is calling for development of new research methodologies in order to meet the needs of new security theory and today's rapidly changing geopolitical realities.¹⁸

Thus the emergence of questions about data collection procedures and research methodologies in telecommunications is not coincidental. It reflects the changing nature of the nation-state and the need to develop research methodologies appropriate for serving the decision-making procedures of new organizational forms, and to assist in the implementation of new forms of power. The use of networks is critical to the process of reconstituting society and the state. The period of reconstitution is necessarily one of change.

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The Study of Systems in Change

The growing field of network economics is an attempt to deal with systems that are clearly undergoing continuous and rapid change. Such attempts might be enriched by a cross-fertilization with other bodies of theory that seek to understand systems in change.

Second order cybernetics, which began to appear during the 1970s in the hard sciences with rapid application to the social sciences as well,¹⁹ differs from the original approach to cybernetics in that it seeks to understand systems undergoing constant change and accepts that change as normal, rather than seeing it as damaging to a desired equilibrium. Thus while in the 1960s survival was still defined as stability,²⁰ in the 1980s it came to be understood as transformation.²¹ When systems are self-conscious about the processes of change, they are called morphogenetic; the participation of the elements of a system in that system's transformation is autopoiesis. Rather than assuming a static and homogenous system oriented to a statistical mean, a morphogenetic system is understood to be dynamic, heterogeneous, and constantly evolving through processes of experimentation and amplification of deviation through causal loops. Models of such systems, which are undergoing extreme, continuous, and unpredictable change under conditions of constant, extreme, and unpredictable change map particularly well onto our most recent experience.

Second order cybernetics emphasizes positive feedback processes, as well as negative. It is striking to realize how much of our research up to this point has dealt only with the latter, though Babe points out that positive mechanisms were discussed theoretically around the turn of the century in economics, and then rejected largely because of the difficulty of coping with the complexity and lack of tidiness of the processes that become visible from this perspective.²² In another difference from earlier systems approaches, second order cybernetics focuses on the deviation-amplifying effects of causal processes; *ie*, the nature of causal processes is more important in determining outcomes than are initial conditions.²³ In telecommunications, Antonelli²⁴ describes such causal processes in the filiere electronique when he talks about the way in which random small events in networks can have significant and long-lasting effects.

From this perspective, healthy systems are organized not around specific objectives (products), but around the process of self-renewal, or autopoiesis. The relations of morphogenetic systems with their external environment, including other systems, are critical for survival and growth. Three characteristics of a successful system support healthy cross-boundary relations: adequate modes of information collection and processing; internal decision-making procedures designed to acquire and incorporate information collected from the environment; and the presence of all elements in the external environment in as structurally complex a manner within a system. When all three of these conditions are met, evolutionary developments within one system serve as stimuli for developments within other systems;

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between those that are private and those that are public, are increasingly co-evolutionary in nature.

Organization theory over the past couple of decades has also responded to changes in real-world conditions which have brought new types of problems and issues with a growing sensitivity to organizational complexities.²⁵ This body of theory has begun to converge with second order cybernetics in its emphasis on organizations as information systems,²⁶ and in increasing awareness of the paradoxical characteristics of organizations, which are both loose-coupling and tight-coupling, and incorporate both deviation-amplifying and -reducing processes.²⁷ There is a growing body of work that explores these changes in organizations from a telecommunications perspective.²⁸

New approaches to the study of organizational evolution are talking about what is called a punctuated equilibrium dissipative structure, meaning organizations that evolve through a series of transformations in which instability and structural fluctuation generate disequilibria, ultimately resolving, after some experimentation, into new equilibria.²⁹ Catastrophe theory, which focuses on discontinuities, and chaos theory, which explores the ways in which chaos comes out of order, and order out of chaos, similarly provide insights into the system change processes identified by second order cybernetics.³⁰

There are several types of disturbances to systems, each of which alone or synergistically could trigger a transformation. A fluctuation is "a seemingly sudden, spontaneous, and often unexpected variation from the average in a variable describing the state of a system."³¹ A perturbation is "a change in system structure or behavior imposed by an environmental stressor and associated with a weakening of linkages between subsystems."³² Noise is "the small ongoing, random variations at any system level."³³ A catastrophe occurs when "a continuously changing force yields an abruptly changing effect."³⁴

Gemill and Smith³⁵ describe four stages of change in dissipative structure systems:

(1) Disequilibrium. During disequilibrium, change becomes possible because of turbulence, environmental and/or internal.

(2) Symmetry breaking. In dissipative structures symmetries are broken when self-replicating or usual autopoietic functioning becomes ineffective or is purposefully suppressed in order that new possibilities might emerge. Unsuccessful replication increases the possibility of change by increasing the degrees of freedom within which change can take place.

(3) Experimentation. Through experimentation, the system creates new possible configurations around which it can eventually reformulate. Only through this process can true self-design emerge, for it is only then that there is patterned voluntary elaboration and complication of process where

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behavior that would be seemingly unrelated in a framework based on utilitarian values -- that is, "inefficient" action is required in order to produce the variants around which a system may realign. The systems that are best able to survive are those which are most open to experimentation, retention of deviants, and so on.³⁶ It has precisely been the goal of the last decade of telecommunications regulation to encourage such experimentation.

In addition to redundancy of resources and sufficient system energy needed to sustain it, experimentation requires causal loops that amplify what might be an insignificant or accidental initial kick but builds up deviation sufficient to diverge from the original condition and develop a deviant -- deviation-amplifying causal processes. Expectations play a role here, for the very conceptualization of a set of expectations enters the process both as a goal and as a set of possibilities.

(4) Reformulation. The final element of the transformative process is the emergence of a new configuration or organizing principle around which the system may reformulate out of the repertoire of possible new configurations developed during the experimentation phase. The "punctuated equilibrium model" focuses on these reorientation periods between periods of convergence, or equilibrium, in a dissipative structure. Ideally, convergent periods are relatively long; during them, change is incremental, involving elaboration of structures, systems, controls and resources towards increased coalignment. Reorientations would be relatively short periods in which all of these elements are transformed into a new alignment.³⁷

The application of these ideas to telecommunications networks is relatively easy. Technological change, regulatory shifts, and the rise of transnational players have generated significant perturbations to the network environment as well as internal structure. In the terms offered above, these forces have served to "break symmetries," permitting new forms to emerge. The turbulence of the 1970s and 1980s was marked by a wildly diverse range of experiments in network and organizational design and various modes of use of new information technologies. The inability of traditional legal and economic categories to adequately describe, analyze, and predict today's communications phenomena and processes are, from this point of view, indicators of the deviance of the variants emerging.

If we treat telecommunications networks as dissipative structure systems, we can see that we are well into the phase of experimentation and moving towards that of reformulation. Political scientist Rosenau, analyzing what he calls the "1980s puzzle," meaning "the perplexing globalization of patterns wherein the loci of authority were relocated and restructured,"³⁸ claims that the break with historical patterns is now complete, and we are in the 1990s arrived in an era characterized by new patterns. Despite this overall generalization, however, specific systems, such as telecommunications networks, are still taking shape. This new era, which is characterized by harmonization of systems, is the third stage of the information society.

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The Third Stage of the Information Society

The first stage of the information society -- characterized by electrification of communications -- emerged in the mid-nineteenth century with the invention of the telegraph. The many impacts of the telegraph tended to stimulate the existing tendencies of industrialization; firms could get bigger and have more branches. As Chandler seminally noted, the automation of manufacturing and distribution functions also began to alter the structure of the firm by transferring significant control capabilities out of the hands of owners and into professional management teams and the automated equipment of the businesses themselves.³⁹

Beginning in the 1960s, the second stage of the information society, characterized by globalization of communication systems, saw a proliferation of experimentation with many varieties of new information technologies. Numerous kinds of communication systems expanded beyond nation-state boundaries to become global in nature. Multinational corporations multiplied, and a new organizational form, the transnational corporation, began to emerge.

With the 1990s, we are entering the third stage of the information society, characterized by the harmonization of communications systems. National telecommunications systems are becoming harmonized with each other through the physical linkage of the infrastructure, through the building of national systems with products from vendors of other nations, and through increasing harmonization of pertinent regulatory and accounting systems. Communications is also, significantly, becoming harmonized with other systems, such as banking and manufacturing (as in just-in-time production and distribution systems). Most importantly, we are finding that a number of information policy tools are being used in common across various international policy arenas. Many elements of services agreements being discussed within the General Agreements on Tariffs and Trade (GATT), for example, are also found within arms control agreements;⁴⁰ the substance of the latter now deals more with mandated information flows than with weapons themselves.

These harmonization processes, however, themselves often constitute breaks with systems that had been in equilibrium previously. The proliferation of new information technologies; the expansion of capacity, reach, and intelligence of the networks; privatization; and other processes generated the turbulence and occasionally chaos in systems that had been relatively stable, and served to launch society, as a system with a punctuated equilibrium, into the third stage of the information society.

It is important to note that to describe this era as one of harmonization is not to suggest that this process is unilinear any more than development itself is necessarily unilinear. Rather, various configurations are possible, and it is precisely the clash amongst the different ways of organizing a harmonized society that limns the boundaries between the three regional blocs of our new geopolitical arrangements. That is, it is over the ~~difference~~ differences between possible configurations that are the substance of disputes

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Contributions of Networks to Each Other

Privatization processes have not -- nor will they -- lead to the demise of the nation-state. Rather, they have led to a movement of the boundary between public and private and a redefinition of relationships between the sectors. The interdependence of public and private forms of power is manifested concretely in the interweaving of public and private networks. In both dimensions -- and between the two dimensions -- interactions are recursive, self-reflexive, and deviation-amplifying. Such movements are fundamentally constitutive in nature.

From this conceptual platform, we can examine the contributions of public networks to the filiere electronique. There are several dimensions along which this examination can take place, both economic and non-economic. The latter include:

- The use of public networks facilitates and stimulates shifts in the legal and regulatory environment that are radically changing the environment in which private networks operate.

- Public networks make possible the evolution of organizational form.

- Use of the public network accelerates deviation-amplifying causal processes that are social in nature -- including those that are economic.

Among the economic contributions of public networks to private networks are:

- Support for the use of increasingly important intermediate information products.

- Expansion of the range of potential final products, both material and informational.

- Expansion of the potential market for those products.

- Provision of an environment supportive of experimentation.

Affecting both economic and non-economic dimensions, it has become clear that the consequences of the use of the public network has led to:

- The necessity to develop new research methodologies in order to understand and make policy for the development of the filiere electronique.

Non-economic Contributions

- Reshaping of the legal environment. The legal environment is changing -- partially as a consequence of the use of new information technologies -- in ways that affect development and use of networks.⁴¹

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First, the constitutional focus itself is shifting to the international arena. Processes supporting this move include the decline in the ability of national legal systems to cope with the effects of the use of new information technologies, leading to the development of new bodies of law -- often international in nature -- and to the importance of contract law in maneuvering within the global information economy. Legal firms and lawyers follow their transnational clients beyond the nation-state in these efforts.⁴² Theoretically, the argument is being made that international trade agreements in fact better serve today the constitutional function than do national constitutions.⁴³ This re-examination of legal and regulatory concepts and procedures runs throughout the legal system, with concepts and techniques being questioned at every level.⁴⁴

Second, we are beginning to see more substitution of algorithmic decision-making procedures for the type of detail orientation that historically has characterized the development of case law; there has been experimentation, for example, with things like procedures for sentencing by computer assessment of the demographics and other characteristics of the case, rather than through a human judge's assessment based upon exposure to the evidence and to the person involved. This convergence toward the mean runs directly counter to what are understood to be the processes of a healthy morphogenetic society.

Third, and simplest, the use of computerized data bases vastly eases the process through which new lines of precedent may be discovered and developed.⁴⁵

In the long term, the largest contribution of public networks to private networks may be here, for it is here that the use of public networks provides the flux through which and from which private networks variously resolve themselves as they constitute and reconstitute themselves within the changing societal and legal context. On this macro level, together the public and private networks of the filiere undergo transformative processes, each contributing in a constantly shifting mix to the processes of change. By participating in the processes of legal change, private sector organizations, as part of the policy network, participate autopoietically in the reconstitution of the system.

Evolution of organizational form. While it has been possible for both public and private entities to take advantage of the use of new information technologies as organizational forms, up to this point clearly corporations have moved far quickly than nation-states and other political units in doing so, providing much of the explanation for the rise of the transnational corporate power relative to that of the nation-state.

Among the changes we are seeing in the nature of organizational form are new possibilities for combinations of centralization and decentralization of decision-making abilities.⁴⁶ There is an increased capacity for colocation -- the combination of decision-making power with sites of knowledge, both general and specific.⁴⁷ This is expected to be critical in a number of ways.

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particular detail -- into planning and decision-making processes, as well as general, or scientific (or algorithmic) knowledge. It is possible to coordinate affairs to a higher level of complexity and with finer articulation. Organizations can respond more quickly to changes in either internal or environmental conditions, and have far more flexibility in defining relationships between internally differentiated elements of structure, including geographically.

Here again public networks provide the transformative medium through which private networks are able to resolve themselves. Increasingly, a sensitivity to local issues is being incorporated into telecommunications policy-making processes,⁴⁸ (and into our understanding of the nature of policy-making processes as well.⁴⁹ Certainly this history replicates the development of the telecommunications network itself as it increasingly turns to the local as the site of the most interest.⁵⁰ On the theoretical side, it is interesting to note that efforts to understand the local are to date largely cross-disciplinary in nature -- even, in fact, arguing that the use of a variety of research methods is necessary in order to understand what is both objectively and subjectively true about the local.⁵¹ The actual difficulties in combining different types of data onto one geographic map are myriad.⁵²

Acceleration of deviation-amplifying causal processes. Both of the above -- transformation of organizational form and a reworking of the legal and regulatory environment -- are deviation-amplifying causal processes. In both, each step of change has ripple effects throughout the economy and throughout society. In some aspects, networks make possible directions of change not otherwise conceivable. In others, the use of networks accelerates processes that might otherwise be underway, but much more slowly; this change in speed is significant enough in and of itself that it generates a qualitative shift in the processes of change themselves.

Economic Contributions

Support for use of intermediate information products. As information and information processing become ever more significant as intermediate inputs into manufacturing processes, dependence upon public telecommunications networks allows flexibility in the acquisition, processing, and use of information in this way. While a number of high value-added types of information processing are being internalized in firms, not all are. Ubiquitous and universally accessible broadband networks thus make it possible to acquire necessary information through contractual and cooperative arrangements. By extending the range of usable information providers and processors beyond those reachable through the private network, the class of potential vendors is expanded. Additionally, public networks permit use of information as an intermediate input in geographic areas where activities may be sporadic or important only on a one-time basis, making extension of private networks in these situations impracticable.

Expansion of the range of potential products and services. Use of

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increasingly sophisticated information products, by stimulating the emergence of complementary information products, and by permitting interactions among information products that stimulates consumption of each.

Expansion of the market. Through the use of public networks, the market for information products and services offered by entities using private networks is expanded both geographically and in terms of penetration.

Provision of an environment supportive of experimentation. The most important types of economic contributions of public networks to private networks are the ways in which public networks offer flexibility regarding externalizing or internalizing network costs, by fulfilling overflow functions for private networks, and by providing sufficient infrastructural support to permit take-off for new firms or ventures. In the terms of second order cybernetics, this aspect of public network support for private networks can be understood as providing the kinds of resources, redundancy, and system energy required for the experimentation characteristic of and needed during periods of turbulence in order to permit successful transformation to a new equilibrium state. Historians of technological development note the importance of the environment's receptivity to and support for technological experimentation as key to progress.⁵³ It is this -- the provision of what might be described as an undifferentiated infrastructural matrix out of which myriad variations may emerge -- that provides the most significant contribution of public networks to private networks today. By providing this support, the use of telecommunications networks allows civil society to reconstitute itself and the state.

Research Methods for Analysis of the Filiere Electronique

In order to understand the kinds of contributions of public networks to private networks mentioned above, it is clear that there are demands on our research methodologies.

- We need to deepen our understanding of deviation-amplifying causal processes, since these constitute the most significant of contributions. In particular, we need to develop the tools with which we can learn to distinguish mutually beneficial deviation-amplifying causal processes from those that are harmful.

- We need to widen the range of variables included within our analyses. Rather than permitting "externalities" to outweigh the elements of the systems studied themselves, the dimensions through which we understand those systems should come to include those elements that clearly are critical for system functioning, whether or not they were historically treated as outside the systems being analyzed.

- Among the variables that we need to include is complexity itself, increasingly understood by both natural and social scientists to be not just a

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in a co-evolutionary manner may reduce the tension over shifting system boundaries.

- The global aspect of systems being studied demands a globalization of research methodologies as well. The study of telecommunications needs to follow the lead of sociology, which has for several years been self-consciously adapting itself to the changes in approach demanded by globalization.⁵⁴

- And whether conceptualized as Antonelli's insistence upon analysis of system change at the local level, Jensen's colocation, or the autopoiesis of second order cybernetics, we need to develop the tools that will permit us to perceive and understand those elements of networks that are uniquely local, what anthropologist Clifford Geertz has described as "local knowledge."⁵⁵ Recognition of the importance of the local in understanding the impact of the use of telecommunications networks is demonstrated by the spate of recent work on new information technologies and cities.⁵⁶

Conclusions

We must leave behind yesterday's question -- What do public networks contribute to private networks? -- and ask instead about the nature of the interdependent networks of the filiere electronique, and about the impact of new forms of social and economic organization on our shifting definitions of the public and private. Shared responsibilities in provision and maintenance of the infrastructure at the physical level both echoes the development of mixed public/private policy networks and to a significant degree contributed to transformations at the political level. Theoretical developments in the ways we are coming to appreciate and understand turbulence and its resolution provide ways of conceptualizing conditions during this third stage of the information society.

As we move out of chaos and complete one sequence of transformation, the equilibrrious state towards which we are now moving is characterized by harmonization among communication systems and between communication and the other systems of the social structure. The relative decline of the nation-state within this conceptual framework is in a sense harmonization of political systems, clearly yielding tensions among the three global blocs that run along the fault lines that demark organizational boundaries.

While it is true that activities, including decision-making procedures, are increasingly international it is also true that that is so because of profound changes at the local level. The Sony/counterculture mandate to "Think globally, act locally," identifies the two sets of geographic boundaries that mark realms in which power is meaningfully exercised today, but fails to be specific about the types of power involved. The reinvigoration of the ever-recurring desire to retain ethnic diversity and struggles toward statehood around the globe demonstrate the way in which those

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to focus action at the local level is to yield the more effective domains to economic, and international, players.

Telecommunications networks are central to the processes through which society has been transforming itself.⁵⁷ These processes have been and are truly constitutive in nature, making the design of telecommunications networks inherently and centrally political. This exploration of the role of networks suggests we may need to acknowledge the merging of the public and private, and in our policy networks "Think locally, act globally."

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Endnotes

1. The term "filiere electronique" comes from the 1982 Farnoux report to the French government. It has come into general use, forming a conceptual basis for analysis of telecommunications processes by authors such as Cristiano Antonelli, _____; Kenneth Dyson & Peter Humphreys (Eds.), The Politics of the Communications Revolution in Western Europe (London: Frank Cass, 1986); and Armand Mattelart & Yves Stourdeza Cesta, Technology, Culture and Communication, trans. D. Buxton (Amsterdam: North-Holland, 1985).

2. See Cristiano Antonelli (Ed.), The Economics of Information Networks (Amsterdam: North-Holland, 1992); Martin C. J. Elton (Ed.), Integrated Broadband Networks: The Public Policy Issues (Amsterdam: North-Holland, 1991); Margaret E. Guerin-Calvert & Steven S. Wildman (Eds.), Electronic Services Networks: A Business and Public Policy Challenge (Washington, DC: Annenberg, 1991); Jill Hillis, with Stylianos Papathanassopoulos, The Democracy Gap: The Politics of Information and Communication Technologies in the United States and Europe (New York: Greenwood Press, 1991); Harvey M. Sapolsky, Rhonda J. Crane, W. Russell Neuman & Eli M. Noam, The Telecommunications Revolution: Past, Present and Future (New York: Routledge, 1992); Indu B. Singh & Jarice Hanson (Eds.), Advances in Telematics: Vol. 1 (Norwood, NJ: Ablex, 1991).

3. David Held, 1989, p. 6; Colin Spariks, "Civil Society and Information Society as the Guarantors of Progress," in Skavko SPlichal, Andrew Calabrese & Colin Sparks (Eds.), Civil Society and Information Society (Norwood, NJ: Ablex, in press).

4. Now vulnerabilities paper.

5. This model of an information production chain is adapted from models offered by Fritz Machlup, Knowledge and Knowledge Production (Princeton, NJ: Princeton University Press, 1980) and Kenneth Boulding, "The Economics of Knowledge and the Knowledge of Economics," American Economic Review, 56(2), 1966, pp. 1-13. In this model, communication is a combination of any of the elements of the information production chain. Peter Monk, in his article "Innovation in Information Economy" in the 1992 Antonelli anthology (op. cit., pp. 35-50) offers another version of a causal chain between the physical embodiment of information and its eventual use in the economy: stored information sets (embodied in physical medium), transformational communication, processing mechanisms, access communication, primary users of information resources, transactional communication, and secondary users of information resources. In this model, communication performs a different function in the transformational, access, and transactional phases.

6. Grant Jordan & Klaus Schubert, "A Preliminary Ordering of Policy Network Labels," European Journal of Political Research, 21, 1992, pp. 7-27; Frans van Waarden, "Dimensions and Types of Policy Networks," European Journal of Political Research, 21, 1992, pp. 29-52.

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7. Michael G. Huelshoff, "Corporatist Bargaining and International Politics," Comparative Political Studies, 25(1), 1992, pp. 3-25.
8. Daniel Headrick's The Invisible Weapon (New York: Oxford University Press, 1990) discusses the relationship between telecommunications and military power historically. A classical expression of this aspect of state power can be found in Carl von Clausewitz, On War, trans. & ed. by Michael Howard & Peter Paret (Princeton: Princeton University Press, 1976). Analyses of the historical role of the exercise of military power in stimulating development of research methodologies can be found in Gareth Morgan, "Toward Self-organization: Organizations as Brains," in Images of Organizations, pp. 77-109 (Beverly Hills: Sage, 1986); Nowotny, 1983; and Vincent Mosco, "Critical Thinking about the Military Information Society: How Star Wars is Working," in Marc Raboy & Peter A. Bruck (Eds.), Communication For and Against Democracy, pp. 37-57 (Montreal: Black Rose Books). Discussion of the role of the military in shaping research over the last few decades can be found in Kosta Tsipis, David W. Hafemeister & Penny Janeway (Eds.), Arms Control Verification: The Technologies that Make It Possible (McLean, VA: Pergamon-Brassey's International Defense Publishers, 1986); and Michael Krepon & Mary Umberger (Eds.), Verification and Compliance: A Problem-solving Approach (Cambridge: Ballinger, 1988).
9. Glenn R. Fong, "State Strength, Industry Structure, and Industrial Policy: American and Japanese Experiences in Microelectronics," Comparative Politics, 22(3), 1990, pp. 273-299; Vincent Ostrom, "Language, Theory, and Empirical Research in Policy Analysis," in Phillip M. Gregg (Ed.), Problems of Theory in Policy Analysis, pp. 9-18 (Lexington, MA: Lexington Books, 1976); Woodruff D. Smith, Politics and the Science of Culture in Germany, 1840-1920 (New York: Oxford University Press, 1991); Peter Wagner, "Social Sciences and Political Projects: Reform Coalitions between Social Scientists and Policy-makers in France, Italy and West Germany," in Blume, 1987, pp. 277-306; Bonaventura de Sousa, "Law and Community: The Changing Nature of State Power in Late Capitalism," International Journal of the Sociology of Law, 8, 1980, pp. 379-397; Bjorn Wittrock and Peter Wagner, "Social Science and State Developments: The Structuration of Discourse in the Social Sciences," presented to the American Political Science Association, Washington, DC. September, 1988.
10. For a typical expression of frustration with current data collection methodologies as applied to telecommunications, see Gregory C. Staple & Mark Mullins, "Telecommunications Traffic Statistics -- MITT Matter: Improving Economic Forecasting and Regulatory Policy," Telecommunications Policy, 13(2), 1989, pp. 105-128.
11. Beginning with the Paperwork Reduction Act of the late 1970s, through Office of Management and Budget cost-benefit analyses of information collection, processing and distribution by federal agencies of the 1980s and subsequent abolition of much of this activity, the reduction of government informational activities has been one of the most significant areas of

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12. Glen D. Self & Donna K. Love, "Policy Issues Arising out of EDS' Research," presented to the Telecommunications Policy Research Conference, Solomons, Maryland, September 1991.
13. Discussion of the "new security theory," including exploration of various types of interactions between the government and the private sector, can be found in Daniel B. Sibbet, "Intelligence and Verification," American Intelligence Journal, 12(3), 1991, pp. 47-52; Daniel B. Steele, "MASINT: Intelligence for the 1990s," American Intelligence Journal, 11(3), 1990, pp. 23-26; Robert D. Steele, "Applying the New Paradigm: How to Avoid Strategic Intelligence Failures in the Future," American Intelligence Journal, 12(3), 1991, pp. 43-46; Robert D. Steele, "Intelligence in the 1990's: Recasting National Security in a Changing World," American Intelligence Journal, 11(3), 1990, pp. 29-36. The history of the development of the new security theory over the past few years is documented in some fascinating detail in the Arms Control Reporter, which has offered daily reports of arms control negotiations since 1982.
14. In Atkins v Parker, 472 US 115 (1985), the Supreme Court decided that the government did not have a constitutional responsibility to provide recipients of welfare with individualized notice of the effects of a change in the law on the amount of money they would receive, despite the relative ease of providing such computerized information. It was argued, essentially, that it is a citizen's responsibility to be sophisticated enough as a cognitive information processor to be able to use information provided by the government in any form.
15. William A. Hamilton, "Computer-induced Improvements in the Administration of Justice," Computer/Law Journal, 4, 1983, pp. 55-76; Richard V. De Mulder & Helen M. Gubby, "Legal Decision Making by Computer: An Experiment with Sentencing," Computer/Law Journal, 4, 1983, pp. 243-303.
16. Steele, for example, in his 1990 piece, describes conventional threats as linear and predictable in their development and deployment. In contrast, "The emerging threat . . . is non-governmental, non-conventional, dynamic or random, non-linear, with no constraints or predictable doctrine, almost impossible to detect in advance, and supported by an unlimited 5th column of criminals and drug addicts" (op. cit., p. 29). It is precisely the unpredictability of the new threats that calls for development of new research methodologies in his eyes.
17. Some examples of such discussions regarding communications policy-making in particular include John H. Barton, "Negotiation Patterns for Liberalizing International Trade in Professional Services," presented to the University of Chicago Law Forum on Barriers to International Trade in Services, Chicago, 1976; Stuart N. Brotman, Communications Policymaking by Negotiation at the Federal Communications Commission: A Preliminary Inquiry (Washington, DC: American Bar Association, 1987); Jeffrey E. Cohen, "The Extent and Influence of Bureaucratic

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University of Illinois, Working Paper #4); George A. Coddling, Jr., "The Changing Nature of the ITU Plenipotentiary," Telecommunications Policy, 7(4), 1983, pp. 317-325; Lisa J. Damon, "Freedom of Information versus National Sovereignty: The Need for a New Global Forum for the Resolution of Transborder Data Flow Problems," Fordham International Law Journal, 10, 1986, pp. 262-287; Robert M. Entman & Steven S. Wildman, _____ J of C piece; Parkman, "The FCC's Allocation of Television Licenses: Regulation with Inadequate Information," Albany Law Review, 46, 1981, pp. 22-58; Willard D. Rowland, Jr., "The Process of Reification: Recent Trends in Communications Legislation and Policy-making," Journal of Communication, 32(4), 1982, pp. 114-136; A. M. Rutkowski, "Deformalizing the International Radio Arrangements," Telecommunications Policy, 7(4), 1983, pp. 309-316; and Jonathan Solomon, "The Future Role of International Telecommunications Institutes," Telecommunications Policy, 8(3), 1984, pp. 213-221.

18. See, eg, Ken Booth, "New challenges and Old Mind-sets: Ten Rules for Empirical Realists," in Carl G. Jacobsen (Ed.), The Uncertain Course: New Weapons, Strategies and Mind-sets, pp. 39-67 (New York: Oxford University Press, 1987); Peter F. Kalitka, "Competitor Intelligence," American Intelligence Journal, 12(3), 1991, pp. 53-55; Robert David Staele, "Intelligence in the 1990's: Recasting National Security in a Changing World," American Intelligence Journal, 11(3), 1990, pp. 29-36.

19. For an application of these ideas directly to telecommunications policy, see Sandra Braman, "Telecommunications Policy Principles for a Morphogenetic and Co-evolutionary State," presented to the Telecommunications Policy Research Conference, Solomons, MD, September, 1991. Other specific applications of second order cybernetics within the social sciences include those by General discussion of second order cybernetics within the social sciences include those by B. W. Arthur, "Positive Feedbacks within the Economy," Scientific American, February 1990, pp. 92-99; P. M. Allen, "Self-organization in the Urban System," in C. Schieve & P. M. Allen (Eds.), Self-organization and Dissipative Structures, pp. 132-158 (Austin: University of Texas Press, 1982); and W. T. Powers, "The Cybernetic Revolution in Psychology," Cybernetics Forum, 8, 1976, pp. 72-86. General discussion of second order cybernetics within the social sciences include such works as H. von Foerster, "Principles of Self-organization -- in a Socio-managerial Context," in H. Ulrich & G. J. B. Probst (Eds.), Self-organization and Management of Social Systems: Insights, Promises, Doubts, and Questions, pp. 2-24 (Berlin: Springer-Verlag, 1984); P. M. Hejl, "Toward a Theory of Social Systems: Self-organization and Self-maintenance, Self-reference and Syn-reference," in Ulrich & Probst, op cit., pp. 60-79; and Humberto R. Maturana, "Man and Society," in F. Benseler, P. M. Heil & W. F. Kock (Eds.), Autopoiesis, Communication and Society (Frankfurt: Campus Verlag, 1980).

20. W. Ross Ashby, An Introduction to Cybernetics (London: Chapman and Hall, 1956); W. Ross Ashby, "Constraint Analysis of Many-dimensional Relations," General Systems Yearbook, 9, 1964, pp. 99-105.

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21. E. Jantsch, The Self-organizing Universe (New York: Pergamon Press, 1989); E. Jantsch, "The Unifying Paradigm behind Autopoiesis, Dissipative Structures, Hyper- and Ultracycles," in M. Zeleny (Ed.), Autopoiesis, Dissipative Structures, and Spontaneous Social Orders, pp. 81-87 (Boulder, CO: AAAS Selected Symposium, 1980).
22. Robert E. Babe, "On Political Economy," in Kosta Gouliamos & William Anselm (Eds.), Mediating Culture: The Politics of Representation (Montreal: Guernica, 1991).
23. M. Archer, "Morphogenesis versus Structuration: On Combining Structure and Action," British Journal of Sociology, 33(4), 1982, pp. 472-477; M. Archer, "Toward Theoretical Unification: Structure, Culture and Morphogenesis," in Culture and Agency: The Place of Culture in Social Theory, pp. 272-307 (Cambridge: Cambridge University Press, 1988); K. B. DeGreene, "Emergence," in The Adaptive Organization: Anticipation and Management of Crises, pp. 167-204 (New York: Wiley Interscience, 1982); Klaus Krippendorff, "Information, Information Society and Some Marxian Propositions," presented to the International Communication Association, San Francisco, May, 1984; F. J. Varela, "Autopoiesis as the Organization of Living Systems," and "A Tesselation Example of Autopoiesis," Chapters 2 & 3 in Principles of Biological Autonomy (New York: North-Holland, 1979).
24. Antonelli, 1992, op. cit.
25. Colin Crouch, "Sharing Public Space: States and Organized Interests in Western Europe," in John A. Hall (Ed.), States in History, pp. 177-210 (Oxford: Basil Blackwell, 1986); David Held, Political theory and the Modern State (Stanford: Stanford University Press, 1989); A. D. Meyer, G. R. Brooks & J. B. Goes, "Environmental Jolts and Industry Revolutions: Organizational Responses to Discontinuous Change," Strategic Management Journal, 11, 1990, pp. 93-110; K. Weick, "Organizational Design: Organizations as Self-designign Systems," Organizational Dynamics, Autumn 1977, pp. 31-46.
26. Richard Harvey Brown, "Bureaucracy as Praxis: Toward a Political Phenomenology of Formal Organizations," Administrative Science Quarterly, 23, 1978, pp. 365-382; Ernst B. Haas, When Knowledge is Power: Three Models of Change in International Organizations (Berkeley: University of California Press, 1990); Gareth Morgan, op. cit.; Arthur L. Stinchcombe, Information and Organizations (Berkeley: University of California Press, 1990).
27. K. S. Cameron & R. E. Quinn (Eds.), Paradox and Transformation: Toward a Theory of Change in Organization and Management (Cambridge, MA: Ballinger/Harper & Row, 1988).
28. Antonelli, 1981, 1984, 1988, 1990?. Other work which has explored the impact of the use of new information technologies on organizational form includes that by Barley, 1990, and Hill, 1988, and a series of studies by the UNCTC, eg. 1981a, 1981b, 1983, 1989.

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29. K. B. DeGreene, The Adaptive Organization: Anticipation and Management of Crises (New York: Wiley Interscience, 1982); Gary Gemill & Charles Smith, "A Dissipative Structure Model of Organization Transformation," Human Relations, 38(8), 1985, pp. 751-766; R. Leifer, "Understanding Organizational Transformation Using a Dissipative Structure Model," Human Relations, 42, 1989, pp. 899-916; Michael L. Tushman & Elaine Romanelli, "Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation," Research in Organizational Behavior, 7, 1985, pp. 171-222.
30. D. F. Andersen, "Chaos in System Dynamic Models," System Dynamics Review, 4, 1988, pp. 1-13; James Gleick, Chaos: Making a New Science (New York: Penguin Books, 1987); N. Katherine Hayles (Ed.), Chaos and Order: Complex Dynamics in Literature and Science (Chicago: University of Chicago Press, 1991).
31. DeGreene, 1982, p. 175.
32. Id.
33. Id.
34. Id., p. 183.
35. Gary Gemill & Charles Smith, "A Dissipative Structure Model of Organization Transformation," Human Relations, 38(8), 1985, pp. 751-55.
36. Bastien (1988) and Eisenberg (1990) offer the process of jamming in jazz as a model of successful experimentation.
37. Tushman & Romanelli, 1985, op. cit.
38. James N. Rosenau, "The Relocation of Authority in a Shrinking World," Comparative Politics, 24(3), 1992, pp. 253-272, at 253.
39. Alfred Chandler, Jr., The Visible Hand: The Managerial Revolution in American Business (Cambridge: Belknap Press, 1977).
40. For more detailed discussion of this point, see the following by Sandra Braman: "Trade and Information Policy," Media, Culture & Society, 12, 1990, pp. 361-385; "Contradictions in Brilliant Eyes," Gazette, 47(3), 1991, pp. 177-194; "The CSCE and Information Policy for the New Europe," presented to the Second Conference, Europe Speaks to Europe, Moscow, December, 1990; and "Defense and Information Policy: Harmonization in the Third Stage of the Information Society," presented to Eighth International Conference of Europeanists, Chicago, March, 1992.
41. Jon Bine. "IT and the Rule of Law," Transnational Data and Communications

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Burkert, "Theories of Information in Law," Journal of Law and Information Science, 1(2), 1982, pp. 120-130; Jorgen Karpf, "Competition between Types of Regulation: The Impact of Computerization of Law," Jurimetrics, 1, 1989; M. Ethan Katsh, The Electronic Media and the Transformation of the Law (New York: Oxford University Press, 1989); M. D. Kirby, "Informatics and Law Reform," Journal of Law and Information Science, 1(1), 1981, pp. 1-22; Niklas Luhmann, A Sociological Theory of Law (London: Routledge & Kegan Paul, 1985); Andras Sajo & Ferenc B. Petrik (Eds.), High-technology and Law: A Critical Approach (Budapest: Hungarian Academy of Sciences, 1989).

42. Yves Dezalay, "The Big Bang and the Law: The Internationalization and Restructuration of the Legal Field," Theory, Culture & Society, 7, 1990, pp. 279-293; Yves Dezalay, "Putting Justice 'Into Play' on the Global Market: Law, Lawyers, Accountants and the Competition for Legal Services," Tidskrift fur Rattssociologi, 6(1-2), 1989, pp. 9-67.

43. Ronald A. Cass, "The Perils of Positive Thinking: Constitutional Interpretation and Negative First Amendment Thinking," UCLA Law Review, 34(5-6), 1987, pp. 1405-1491; John H. Jackson, "Perspectives on the Jurisprudence of International Trade: Costs and Benefits of Legal Procedures in the US," Michigan Law Review, 82, 1984, pp. 1570-1583; Ernst-Ulrich Petersmann, Constitutional Functions and Constitutional Problems of International Economic Law (Fribourg, Switzerland: University Press, 1991).

44. Among those who have begun to examine the relationships among variations and changes in legal techniques and other aspects of social and legal cultures are Phillip J. Cooper, "Acquisition, Use and Dissemination of Information: A Consideration and Critique of the Public Law Perspective," Administrative Law Review, ee, 1981, pp. 81-107; Philip J. Harter & George C. Eads, "Policy Instruments, Institutions and Objectives: An Analytical Framework for Assessing 'Alternatives' to Regulation," Administrative Law Review, ey, 1985, pp. 221-258; Barry M. Mitnick, The Political Economy of Regulation: Creating, Designing and Removing Regulatory Forms (New York: Columbia University Press, 1980); and Alexander H. Pekelis, "Legal Techniques and Political Ideologies: A Comparative Study," in Reinhard Bendix (Ed.), State and Society: A Reader in Comparative Political Sociology, pp. 355-377 (Boston: Little, Brown & Co.).

45. Katsh, op. cit., drives this point into the ground.

46. Peter Huber, The Geodesic Network: 1987 Report on Competition in the Telephone Industry (Washington, DC: Department of Justice, 1987).

47. Michael C. Jensen William H. Meckling, "Specific and General Knowledge, and Organizational Structure" in Lars Werin & Hans Wijkander (Eds.), Main Currents in Contract Economics (Oxford: Blackwell, 1991).

48. Though there were some explorations of the relationships between telecommunications systems and the nature of the local in the 1960s, such as

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Minneapolis, Diss. Abs. 68-326, 1968) and by Sanford Labovitz & Jack P. Gibbs, "Urbanization, Technology, and the Division of Labor: Further Evidence," The Pacific Sociological Review, 7(1), 1964, pp. 3ff, it largely waited until the 1980s for geographic analysis of telecommunications systems. See I. J. Boeckhout & W. T. M. Molle, Technological Change, Location Patterns and Regional Development (Brussels: Commission of the European Communities, FAST Occasional Paper #16, 1982); Andrew Gillespie & Kevin Robins, "Geographical Inequalities: The Spatial Bias of the New Communications Technologies," Journal of Communication, 39(3), 1990, pp. 7-18; Mark Hepworth, Geography of the Information Economy (New York: Guilford Press, 1989); J. J. Howells, Technological Innovation, Industrial Organisation and Location of Services in the European Community: Regional Development Prospects and the Role of Information Services (Brussels: CEE, FAST Report #142, XII-26-87, 1987); Ian Miles & Jonathan Gershuny, "The Social Economics of Information Technology," in Marjorie Ferguson (Ed.), New Communication Technologies and the Public Interest: Comparative Perspectives on Policy and Research, pp. 18-36 (Newbury Park: Sage, 1986); C. K. Ward (Ed.), The New Technologies and Local Development (Brussels: Commission of the European Communities, FAST Report #21, Eur 10938 EN, 1987). Works such as those by J. Allan Moyer, "Urban Growth and the Development of the Telephone: Some Relationships at the Turn of the Century," in Ithiel de Sola Pool (Ed.), Social Impact of the Telephone, pp. 342-369, (Cambridge: MIT, 1977); and Leonard M. Dudley, The Word and the Sword: How Techniques of Information and Violence have Shaped Our World (Cambridge, MA: Basil Blackwell, 1991) demonstrate that communication systems have always been importantly local in nature.

49. Helga Novotny, "Marienthal and After: Local Historicity and the Road to Policy Relevance," Knowledge, 5, 1983, pp. 169-192.

50. Martin G. J. Elton (Ed.), Integrated Broadband Networks: The Public Policy Issues (Amsterdam: North-Holland, 1991); David Shorrock, "The Evolution of Optical Fibre: Broadband to Local Loop," in European Communications: Technologies and Regulations of the Single Market, pp. 41-48 (London: Blenheim Online, 1989).

51. J. Nicholas Entrikin, The Betweenness of Place: Towards a Geography of Modernity (Baltimore: The Johns Hopkins Press, 1991); Clifford Geertz, Local Knowledge; Anthony Giddens, The Constitution of Society (Berkeley: University of California Press, 1984).

52. David Martin, Geographic Information Systems and their Socioeconomic Applications (New York: Routledge, 1991).

53. See, eg, Joel Mokyr, The Lever of Riches: Technological Creativity and Economic Progress (Oxford: Oxford University Press, 1990).

54. See, eg, Margaret S. Archer, "Sociology for One World: Unity and Diversity," International Sociology, 6(2), 1991, pp. 131-147; Pierre Bourdieu & James S. Coleman (Ed.), Social Theory for a Changing Society (New York:

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55. Clifford Geertz, Local Knowledge: Further Essays in Interpretive Anthropology (New York: Basic Books, 1983).

56. John Brotchie, Michael Batty, Peter Hall & Peter Newton (Eds.), Cities of the 21st Century: New Technologies and Spatial Systems (New York: Halsted Press, 1991); P. W. Daniels (Ed.), Services and Metropolitan Development: International Perspectives (New York: Routledge, 1991); Saskie Sassen, The Global City: New York, London, Tokyo (Princeton: Princeton University Press, 1991).

57. While we have been focusing on telecommunications networks today, the processes being discussed inform other dimensions as well. The current blurring of genre lines that previously divided narrative forms -- the newspaper from the novel, the memoir from anthropology, fact from fiction -- is evidence, for example, of shifts in the use of "fact" as a boundary-defining technique.

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(please feel free to forward to other members of your organization if appropriate)

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PACIFIC ECONOMIC COOPERATION CONFERENCE

MEMORANDUM

Date: May 11, 1992

To: New Invitees to the APEC/PECC Telecommunications Task Force
(See attached list)

From: Janet Pearce
Deputy Director, US-PECC

Subject: Next Meeting of the APEC/PECC Telecommunications Task Force in
Washington DC, June 12.

Dear Professor Noam,

I understand from Dick Beard that you have agreed to help us in our review of the APEC document on Telecommunications and look forward to your participation in our group next month. As you may already know, the PECC is a private non-profit multilateral organization that sponsors working group meetings and policy-oriented roundtables around the Pacific Rim. One of our strongest sectoral interests groups in the U.S. is concerned with Pacific telecommunications development; hence, we have organized a series of meetings for the remainder of 1992 that we think may be of interest to you. The next of such meetings will be with our APEC/PECC Telecommunications Task Force on June 12 between 9:30 a.m. to 2:00 p.m. in Washington, D.C. at the National Academy of Sciences.

In cooperation with the State Department's Bureau of International Communications and Information Policy (CIP), our purpose will be to develop recommendations concerning next steps in the APEC Working Group on Telecommunications and to lay the groundwork for several PECC telecom-related activities.

The meeting will begin at 9:30 a.m. when Dick Beard, Deputy Coordinator, CIP, will bring us up to date on developments and plans in APEC. We will then interact with a number of invited experts concerning the survey of telecommunications environments in the region, published by the Working Group. At the end of the morning, the Task Force will be asked to collectively define views and recommendations to the Department of State concerning future directions for APEC in this area.



**APEC/PECC (U.S.)
Telecommunications Workshop
Preliminary Registration Form
for June 12, 1992**

1) Participant Data

Name (Surname first) _____

Title _____

Company/Affiliation _____

Mailing Address _____

Telephone (Business) _____ Telephone (fax) _____

Please indicate if you will be attending the workshop with other members of your organization by listing any such persons below.

2) SITE

The meeting will be held at

The National Academy of Sciences
Conference Room 180
2101 Constitution Avenue
Washington, D.C.

3) PLEASE REPLY TO:

APEC/PECC Telecommunications Workshop

U.S. National Committee for Pacific Economic Cooperation