17

From Hierarchies to Network Firms

FRANÇOIS BAR WITH CAROLINE SIMARD

Over the past quarter-century, organizations' growing reliance upon networking technologies has brought about a deep transformation of economic activities. Information networks, once considered merely a utility like water or natural gas systems, moved centre stage during that period to become strategic infrastructures. From a technological standpoint, digital convergence was the fundamental enabler of this transition. Telecommunications and computing became more alike: networks were built upon digital technologies and increasingly served to interconnect computers, while computers relied ever more upon networks to support their basic operations. Software, at the heart of the resulting digital networks, made it possible to create new communication applications for individuals or organizations to collaborate and compete. Software also came to define network configuration – the set of rules determining who can communicate with whom, to do what and under which conditions – so that ownership of the underlying hardware alone no longer guaranteed control of the network's uses. The result was a fast-evolving, software-defined, indispensable, and increasingly capable information infrastructure: the 'new media' of much economic activity, our focus in this chapter.

While the information networks born of digital convergence spread through all economic sectors in developed countries, their deployment and implementation have taken many forms. A range of factors, such as the nature of pre-existing economic arrangements, the state of the national communication infrastructure, or national telecom policy, have influenced and shaped the deployment of intra- and inter-organizational networks. As a result, while the new media share a common technological lineage, they have been put to a variety of uses in organizations, with diverse consequences. For example, digital networks have been used at times to reinforce central coordination and at others to enable decentralized power; to buttress existing organizations or to invent new ones; to strengthen long-term, stable economic partnerships or to support fluid, fast-changing virtual teams.

At the individual level, new media networks permit new work arrangements overcoming time and space constraints (Morton, 1991; Sproull and Kiesler, 1991; Wigand, 1997), allowing firms to cut costs associated with coordinating dispersed geographical facilities. These network-enabled work arrangements are said to result in increased job satisfaction and empowerment (Malone, 2004; Sproull and Kiesler, 1991), and provide access to a wider pool of potential employees, unlimited by geographical constraints (Cash et al., 1994).

At the firm level, new media networks make multiple kinds of reorganization possible.

They are said to yield faster response time to market changes (Lucas, 1996), better maintenance and access to organizational memory (Morton, 1991), improved leverage of organizational knowledge (Carayannis, 1998; Finholt et al., 2002), speedier and more efficient information flows, better coordination of group communication, greater employee participation, rapid scheduling, efficient task assignment and reporting, enhanced communication across hierarchical levels, and enhanced coordination of communication within dispersed groups (Sproull and Kiesler, 1991). They also help improve dispersed employees' organizational commitment by acting as a 'window on the corporation' and enabling better socialization of new organizational members.

In addition to improving existing organizations, the new media networks are said to permit entirely new organizational forms. First among such IT-enabled organizational forms is the networked organization where all participants are linked (Rockart and Short, 1991) and the organization flexibly reorganizes itself around each new task (Baker, 1992). Networks also play a crucial role in the establishment and maintenance of internal and external linkages, transforming hierarchies and markets. The network organization thus extends beyond the boundaries of individual firms to form a wider network of multiple organizations (Malone and Laubacher, 1998), increasing interdependence within industries (Rockart and Short, 1991). This state of increased communication between suppliers, distributors and business partners (Cash et al., 1994; Lucas, 1996) supports improved interorganizational arrangements such as strategic networks and the Japanese *keiretsu*, and timely cooperation forms such as joint ventures and consortia (Wigand, 1997). At the extreme, the network model leads to virtual organizations (Davidow and Malone, 1992; Malone, 2004), composed of a set of loosely coupled, self-organizing networked individuals in geographically dispersed locations. New media would thus usher in an 'e-lance' economy (Malone, 2004; Malone and Laubacher, 1998), where individuals or autonomous groups come together around specific projects.

The present survey of the new media impact on industrial organization is structured in three sections. It begins with a review of the economic hopes that were pinned on the technology, in particular on its potential to increase productivity. It then examines how the impact of new media on industrial organization has been analysed, through their impact on two organizational archetypes – markets and hierarchies – and their enabling of an alternative, the network organization. The final section looks at how this analysis fits with the facts in a few emblematic case studies.

NEW MEDIA AND ECONOMIC PROMISES

The convergence of computing and telecommunications into new communication media became clear in the mid 1970s. Observers coined new terms to describe this emerging information infrastructure, such as the French *télématique* (Nora and Minc, 1978) or its less euphonic English cousin 'compunications' (Oettinger and Weinhaus, 1979). The new networks promised to create a foundation for the emerging information economy (Porat and Rubin, 1977), an economic system that would rely increasingly on information-based processes as part of production and exchange activities. In this 'post-industrial' society (Bell, 1973), agriculture and manufacturing would no longer be the basis for economic power. Instead, knowledge workers would make the greater contribution to value creation. As a result, the new media network infrastructure would become the essential backbone of economic activity and control (Beniger, 1986). It would thus usher in new ways to organize economic and social life, leading to the emergence of the information economy (Porat and Rubin, 1977) and the network society (Castells, 1998).

One crucial expectation in these formative years was that reorganizing the economy around information technology and networks would yield tremendous productivity increases, which would more than justify the investments required. Yet, throughout the early years of

technology deployment, productivity gains proved elusive, prompting economist Robert Solow's (1987) quip that 'You can see the computer age everywhere but in the productivity statistics', the so-called *productivity paradox* (Brynjolfsson, 1993; David, 1990). In part, the sweeping claims inspired by information technology resulted from a propensity 'to suffer from a kind of "telescopic vision": the possible future appears both closer at hand and more vivid than the necessary intervening, temporally more proximate events on the path leading to that destination' (David, 1989: 5). Three broad categories of explanations have been offered to explain that situation: mismeasurement of real output growth, poor understanding of the true benefits of computers, and underestimation of the learning and adaptation required (David, 2000).

Brynjolfsson (1993) points out prevalent measurement errors in the formulation of the paradox. Productivity statistics do not account for the type of productivity gains that result from information technology deployment, such as increased quality, speed and responsiveness, and increased business scope. Increased scope in particular is problematic because it reduces economies of scale and often appears as a decrease in productivity despite the business's increased value to customers. Hitt and Brynjolfsson (1996) suggest that three questions should be asked: whether IT has increased productivity, whether it has improved business profitability, and whether it has created value for consumers. When separating these questions, they find that IT investment increased production output, failed to increase profitability, and significantly increased consumer value. Increased productivity leads to increased competition, which in turn leads to lower profitability. Productivity gains can also be achieved through Furthermore, some of the benefits of computing that may impact firm growth are intangible, such as employee satisfaction and increased consumer and investor confidence (Brynjolfsson et al., 2002). In more recent research, the authors find that the long-term benefits of computerization are much greater than the short-term impact on productivity (Brynjolfsson and Hitt, 2003).

Further, information technology alone doesn't guarantee productivity gains. Indeed, organizations can worsen their productivity if they simply deploy computer networks to automate old processes (Brown and Hagel, 2003; Brynjolfsson and Hitt, 1998; David, 1990). Once new organizational processes and skilled labour are combined with IT, productivity gains become apparent (Bresnahan et al., 2002). A more realistic view of IT's benefits is to recognize that technology is just one element, not a single determinant, of the thorough business transformation required to improve productivity (Brynjolfsson and Hitt, 1998). In addition, the new media constitute a complex interrelated system. Benefits in one part of that system often require compatibility and standardization with deployments in other parts of the system as well as previous systems deployments, and the overall infrastructure is highly dependent on network externalities (David, 1990). New media systems also require the presence of complementary assets, such as trained users, to be used effectively. As a result, 'the emergence of a new techno-economic regime based on computer and communications innovations will be a protracted and historically contingent affair' (1990: 356).

As the new media networks emerged, the traditional Fordist firm and the interorganization coordination mechanisms that went along with it began reaching their limits (Cohen and Zysman, 1987). Organizations required greater flexibility, both static and dynamic, to adjust to new competitive environments (Coriat, 1994). This prompted the emergence of new organizational forms, made possible by network technologies (Antonelli, 1992; Piore and Sabel, 1984). Overall, however, the emergence of the network society is not simply driven by the deployment of a new media infrastructure. Rather, it represents a broader transformation, made possible by the development of new ways to organize production and exchange activities. In this reorganization, the new media are a critically important element, but only one element. They support change as they enable the design and implementation of new organizational forms and permit a rearticulation of production processes. They also suggest further change, as

the digital network's increasing flexibility lets end users experiment directly with diverse communication configurations and the organizational arrangements they imply (Bar, 1990). In the end, the key to overcoming the productivity paradox resides in the ability to reorganize around the new media. The other chapters in this part explore this reorganization process within work groups and firms. We focus here on the broader reorganization of interactions between these entities and its implications for industrial organization.

UNDERSTANDING THE IMPACT OF NEW MEDIA ON INDUSTRIAL ORGANIZATION

An understanding of the impact of new media on the organization of economic activity starts with the fundamental theory that explores the reasons behind specific patterns of economic organization: transaction cost economics (TCE). Oliver Williamson (1975) formulated transaction cost theory, building on the work of Coase (1937), to identify the most efficient governance structure according to the varying nature of transactions between firms. He identified two extreme forms of organizations: markets and hierarchies. Markets provide a decentralized, self-governing structure within which firms can find partners and negotiate specific transactions, allowing for fluid changes in patterns of economic interaction. Hierarchies, by contrast, represent rigid, centrally governed structures within which economic actors interact in a stable and predictable fashion. According to transaction cost economics, the relative costs of setting up transactions between actors within these two extreme organizational structures leads to the choice of one over the other. Because digital networks increasingly support these interactions, they can affect the relative cost of market and hierarchical transactions, thereby resulting in changes in previous industrial organization.

Transaction cost theory is based on two key assumptions: bounded rationality and opportunism (Williamson, 1996). Actors engaged in transactions are rationally bounded and are therefore unable to process large amounts of information and consider all the alternative choices, leading to satisficing behaviour, or opting for a 'good enough' action (Simon, 1957). Applied to TCE, this means that 'all complex contracts are unavoidably incomplete' (Williamson, 1996: 37), with the risk that extra transaction costs can occur down the road because of missing information. Thus, a major purpose of organizing is the attempt to compensate for bounded rationality and to reduce opportunistic behaviour among the involved actors, establishing the relative stability necessary for long-term planning.

Hierarchies offer lower transaction costs, reduce opportunistic behaviour and mitigate the downsides of bounded rationality through a higher degree of administrative control (Williamson, 1975). Indeed, it is easier to resolve disputes internally and therefore transactions contracts can be left more incomplete than in the case of markets (Williamson, 1996). Markets by contrast, organized around spot contracts, reduce transaction costs in the case of products of a low degree of specificity, whereas hierarchies are appropriate for highly specific products (Williamson, 1975, 1996). When complexity, uncertainty and specificity increase, more information processing is needed. Hierarchies and centralized communication structures are more suited to the processing of such complex information.

Obviously, most of these transaction costs result from the acquisition, processing and transmission of information about products, production and work processes, or about the qualifications of economic partners. Therefore, because new media precisely aim at transforming information activities, they can be expected to have significant effects on these costs. Thus, transaction cost economics has been applied to understand the impacts of new media on economic organization. But if digital networks clearly have the potential to improve the functioning of both hierarchies and markets, their ultimate impact on economic organization is more controversial: will the new media result in more hierarchies, more markets, or new organizational forms?

Better Hierarchies

One effect of digital network technology on economic organization has been to promote the creation of 'electronic hierarchies' (Malone et al., 1987). Digital networks allow tighter coordination between organizations within the same value chain, leading to greater vertical integration (Clemons and Kleindorfer, 1992). This integration may be virtual (realized simply through tight interorganizational information networks), or formalized through corporate structures or cross-ownership. In either case, this leads to hierarchies where buyers work with stable, predetermined suppliers (Malone et al., 1987). Some analysts have described the electronic hierarchy as an 'electronic monopoly', reflecting the exclusive buying relationship established with a supplier (Chodhury, 1997). For example, Clemons and Row (1992) report the quasi-vertical integration enabled by network technology between Procter & Gamble and Wal-Mart. In this electronic hierarchy, P&G has electronic access to all sales data, and is able to deliver inventory to Wal-Mart as needed, enabling Wal-Mart to avoid the cost of holding inventory and order processing.

This is an example of what Malone et al. call the 'electronic integration effect' of the new media, where companies articulate tightly coupled processes around information networks. The electronic integration effect is most typically produced in electronic hierarchies (Malone et al., 1987). Indeed, it permits a level of integration that is not possible with other interorganizational networks, enabling the optimization of the integration of the total value chain (Chodhury, 1997). The supplier, through this exclusive relationship, is able to collect a significant amount of information about the buyer's needs and integrate its processes to those of the buyer to better meet those needs. However, the buyer loses the potential advantage of being able to scan the market for the better offer, which is characteristic of the market form of network governance (Chodhury, 1997).

More Perfect Markets

The same digital networks can also serve to build electronic markets. These 'e-markets' are also said to lead to the elimination of intermediaries, acting as electronic brokers that put buyers in direct communication with sellers (Malone et al., 1987). The resulting disintermediation, combined with more intense, 'friction-free' price competition, could lead to more perfect markets (Bakos, 1996). However, as some analysts have speculated, while existing intermediaries may be eliminated or forced to adapt, new types of electronic intermediaries will emerge. Bakos (1998) foresees the emergence of intermediaries that will match buyers and sellers, provide product and customer information to interested parties, and manage physical delivery and payment functions.

Indeed, network technology has the potential to lead to an economy organized around constantly emerging electronic markets (Benjamin and Wigand, 1995; Keen, 1981; Malone et al., 1987). Malone et al. have formulated the 'electronic markets hypothesis', arguing that in addition to reducing production costs, IT will reduce coordination costs usually associated with markets. In that view, an electronic market is a multilateral interorganizational information system that, because of the scalability of the new media, can link a potentially unlimited number of buyers and suppliers (Choudhury et al., 1998). Hence, the digital network serves the function of market (Benjamin and Wigand, 1995). The network itself becomes the marketplace (Bar, 2001). This form offers price competition advantages, while offering little opportunity for electronic integration between buyer and supplier, since they engage in constantly reconfigured spot transactions rather than long-term relationships (Chodhury, 1997).

A firm will set up or join an electronic market if it assumes that the profits to be realized from a large volume of potential buyers are greater than the potential loss caused by lowering prices due to increased competition (Benjamin and Wigand, 1995). Malone et al. (1987) suggest that digital networks lead to an 'electronic brokerage effect', where electronic markets can act as brokers, resulting in an increase of possible quality alternative suppliers and buyers and a decrease in the cost of the

selection process (Bakos, 1998; Benjamin and Wigand, 1995; Malone et al., 1987). This will potentially have the effect of eliminating intermediaries between the manufacturer and the buyer (disintermediation), as the information superhighway will enable direct market contact between manufacturer and consumers (Benjamin and Wigand, 1995). Besides the reduction of coordination costs, the emergence of markets will result from IT's ability to simplify complex product descriptions for highly complex products that were usually traded through hierarchies.

While traditional intermediaries between manufacturers and sellers are disappearing, there is a significant cost to consumers in the electronic marketplace of acquiring all the information necessary to identify sellers and compare prices. Hence, new intermediaries are emerging. The number of firms that have positioned themselves as the intermediaries of electronic markets have grown substantially in recent years. Auction giant EBay, Amazon.com, Yahoo!, and Shopping.com are such firms positioning themselves as intermediaries where individual sellers and buyers meet and exchange goods. These intermediaries enable sellers of all sizes to access immense pools of consumers. These firms have found that profit-making in the electronic marketplace is more readily achieved by acting as the meeting place of a community of sellers and buyers rather than holding inventory themselves (Leschly et al., 2002; Yin, 2004).

Beyond Hierarchies and Markets: Network Organizations

As new media transform traditional markets and hierarchies, pure examples of these two forms become more elusive. Indeed, hierarchical organizations increasingly rely on network-based, market-like processes to coordinate the work of their employees and work groups, or to conduct business with the clients, suppliers and subcontractors that constitute their extended hierarchy. Likewise, many network-based markets depend on features traditionally associated with hierarchical organizations, combining the market's arm's-length dealings with tighter longer-term relationships among market partners, including for example the pre-qualification of buyers and sellers who become part of the market's inner circle, or the establishment of a hierarchy of markets for the governance of subtasks. Confronted with such evolution, transaction cost economics tends to view these new organizational forms as hybrids of market and hierarchy.

However, others argue that we are witnessing not simply the combination of traditional markets and hierarchies, but the emergence of a distinctly new form of economic governance, the network organization (Antonelli, 1992; Jarillo, 1988). Because networks allow a distinct form of economic governance, transaction cost economics and its focus on dyadic relationships (Williamson, 1996) is ill-suited to the study of network organizations (Powell, 1990). The main distinction they identify between the new network form and the traditional markets and hierarchies is the nature of relationships between actors. In a network, independent actors cooperate on a long-term basis, and the relationship is based on trust and goodwill. In a hierarchy, relations can be long term, but a specific authority is identified as having the ability to resolve arising disputes. In a market, relationships are episodic, and last only for the duration of a specific transaction (Poldony and Page, 1998).

Network organizations existed before the emergence of the new media (such as, for example, in northern Italy's textile industry: Piore and Sabel, 1984). Digital networks, however, have proven essential to the more widespread adoption of new network forms of organizations. Castells suggests that digital networks favour a distinct form of organization, the network enterprise, which he defines as 'that specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals' (1998: 171). This organizational form is characterized by long-term exchange relations, but with the absence of an ultimate authority to arbitrate possible disputes (Poldony and Page, 1998). By reducing transaction costs (Ciborra, 1983; Jarillo, 1988), and more specifically coordination costs, digital

networks 'can facilitate the development of stable, tightly coupled relationships among firms' (Clemons and Kleindorfer, 1992: 10). Involved in a network relationship based on long-term trust, a firm does not have to worry about opportunistic behaviour on the part of other firms in its network. The use of network technology to support the network form can further reduce transaction costs through a fast and tight coupling of the participating firm's processes.

Various strands of the literature analysing new media's impact on industrial organization tend to adopt a deterministic approach. Extrapolating from the characteristics of the new media technology they investigate, they predict corresponding characteristics of the organizations that use them. Individually, when looking at particular economic sectors or at specific organizational arrangements, these studies have assessed how the new communication technologies affect the prior balance between market and hierarchy, or promote the development of new network forms of organizations. They diverge in their assessments, some concluding that new media result in better hierarchies, some finding that new media lead to greater reliance on market processes, others showing that new media bring about entirely new organizational forms. Taken together, however, they offer a different picture. They show that new media technologies do not determine organizational form, but can in fact support a variety of different approaches to reorganization. They suggest that the resulting organizational form will be determined less by new media technology than by other characteristics of the firm's internal processes and external competitive environment. In fact, in several industries, similar communications technologies have supported different organizational outcomes in different periods, as in the cases explored below.

CASE STUDIES

This section reviews some of the classic case studies of the establishment of new media networks between economic entities and their effect on the resulting economic organization. We review some of the literature on electronic data interchange (EDI), airline computerized reservation systems, and strategic information systems. These show how similar new media systems and technologies, deployed in various circumstances or at different times, entail different organizational implications. The important variables include the competitive environment within which they are deployed, and the relative positions of the actors engaged in network-mediated interaction.

Better Hierarchies? Electronic Data Interchange

Electronic data interchange (EDI) systems were one of the earliest new media technologies aimed at enhancing interorganization interactions. First deployed in the mid 1970s, their main purpose was to facilitate the exchange of formatted information between firms (rather than free-form communication). EDI technology has diffused in certain industries and its adoption is no longer limited to large companies (Jackson and Sloane, 2003; Lee et al., 2005). Once two business partners agree to use a common EDI standard, they can electronically exchange highly specified messages such as parts orders, invoices or payments. The EDI standards define precise formats for data fields containing codified information including parts numbers, prices, quantities, delivery locations, shipment times or account numbers. EDI systems have made possible the automation and standardization of interorganizational communication networks (Brousseau, 1994).

The initial development of EDI standards was a laborious process, requiring painstaking definition of the information required for many diverse transactions. As a result, EDI was initially aimed at improving existing bilateral or multilateral business relationships between buyers and sellers engaged in sustained, long-term relationships. Sets of EDI standards emerged in individual industries, most notably manufacturing (principally automotive), retail and distribution (including transportation), and

banking. The high specificity of interactions between members of the related value chains made them good candidates for that technology. Early EDI deployments thus aimed to rationalize existing supply chains and impose on them a coherent governance. In so doing, EDI implementations were not meant to stop at the strict automation of individual economic relationships, but intended to reorganize broad cross-firm production and exchange processes within existing supply chains. Their goal was to create an extended hierarchy that reached beyond individual firms to include their long-term business partners. A variety of EDI standards emerged in different industry sectors, each associated with the articulation of a particular electronic hierarchy.

Over time, however, a different analysis of EDI networks would emerge. EDI systems, like all communication technologies, are associated with strong network externalities (Katz and Shapiro, 1985). Therefore, companies within one industry have economic incentives to adopt common standards in order to be able to do business with each other electronically. As a result, one would expect the different EDI standards to merge, at least within industries, creating conditions for the support of a more fluid organizational structure. Common EDI standards would enable the rapid establishment of bilateral electronic dyads or their swift dissolution, where a buyer or seller uses EDI technology to sustain links with a selected number of sellers or buyers (Chodhury, 1997). Rather than supporting extended hierarchies, EDI would then enable network forms of economic organization and could even, in extreme cases, support electronic markets.

In reality, a variety of configurations emerged in different industries, in different countries and at different times. For example in the North American automotive manufacturing industry, EDI standardization was driven primarily by the large auto-makers. Industry-wide standardization efforts were limited as each promoted a distinct EDI implementation, partly for strategic reasons (to better control their respective supply chains) and partly for lack of traditions or policies encouraging coordination. While each auto-maker was able to force its preferred system on its parts suppliers, individual suppliers who sold to multiple auto-makers had to support multiple EDI standards and incur the related costs. The result was a series of Balkanized electronic hierarchies (Bar, 1990, 1995). By contrast in the European auto industry, a combination of policy incentives for coordination, stronger industry institutions and the greater relative strength of parts suppliers led to much greater industry-wide standardization, supporting an arrangement closer to the network form of organization (Brousseau, 1996).

These examples show how one technology, EDI, can be implemented in very different ways and lead to remarkably different organizational results. Brousseau (1994) further points out that organizational stability will also play an important role in the implementation of such technologies. In particular, EDI is unlikely to be successfully implemented in highly certain environments (because it would then be obsolete) or highly uncertain environments (because EDI implementation assumes some knowledge of what future communication needs will be) (1994: 337). In industries where the environment is uncertain and the business relationships must remain flexible, highly standardized EDI implementation could become detrimental by reducing network flexibility. In a case study of EDI implementation in Singapore, Teo et al. (1997) have shown that network technology can lead to a transformation of organizational structure, business networks, business scope and competitiveness. Hence, the real benefits of EDI systems reside not in the technology itself but in the restructuring of business processes and the establishment of new network partnerships (Gottardi and Bolisani, 1996). It remains to be seen whether EDI will eventually be uprooted by Internet-based interorganizational systems (Soliman and Janz, 2004).

Better Markets? Airline Computerized Reservation Systems

The airline industry provides another interesting illustration of the new media's consequences

for the organization of economic activity. Successive waves of digital network deployment have led the organization of airline reservations from hierarchy, to biased market, to less biased market, to a network organization around Internet-based systems and disintermediation. With the deployment of the first computerized reservation systems (CRSs), American Airlines' SABRE in particular, airlines controlled an electronic hierarchy that extended to travel agencies. In time, that system became more open to competing airlines and other travel service providers and came to resemble more closely an electronic market, within which travel agents could access offers from all suppliers on an equal footing. The Internet pushed the industry closer to a perfect market, where travellers are in direct contact with airlines, negotiating for prices and conditions within a more perfect market.

A closer look at airline reservation systems shows that network technology didn't drive that transition alone. Airlines encouraged the shift from hierarchy to market, hoping for greater profits by ensuring that their reservation system offered tickets from all airlines, thus making it more attractive to the customer (Dang-Nguyen, 1996). However, research suggests that even organizations which possess significant market share can suffer profit losses when joining an electronic market. Indeed, the price reductions forced on them by competitive markets reduce their profit margins, such as has been the case for the airline carriers who joined SABRE and APOLLO (American and United's respective CRSs). Here as in other cases, however, the critical mass of other joiners leaves little choice to an organization but to join the electronic market. Even dominant players such as United and American reportedly suffered a loss as a result of having to share SABRE and APOLLO with other suppliers (Benjamin and Wigand, 1995).

Competitive incentives and the pursuit of critical mass did not alone result in the creation of a (more) open market for airline reservations. Government policy provided additional inducement, when the Department of Justice's antitrust department showed that the hierarchical airline reservation systems such as the first-generation SABRE were biased toward their owner airline company (Dang-Nguyen, 1996). Overall, this evolution suggests that networking technology, while it creates opportunities for reorganization, doesn't alone determine the economic organization of a particular activity: depending on the strategic priorities of the dominant participants, and on external factors such as antitrust policy, the application of new media can lead to tighter hierarchy as well as a more perfect market as it did in the airlines case.

American Airlines generated revenues by selling their system and know-how to other companies spanning numerous industries, while still hoping to be the best at using the information strategically (Hopper, 1990). This is consistent with the proposition that in an electronic market, the profits of the market-maker and network designer will remain higher than those of other companies participating in the market (Benjamin and Wigand, 1995); the network maker benefits from 'co-specialized assets' giving it the ability to appropriate more benefits from the electronic market (Duliba et al., 2001). SABRE became an 'electronic travel supermarket', a 'computerized middleman' (Hopper, 1990), linking suppliers and buyers of the travel and tourism industry through network technology. Benjamin and Wigand (1995) argue that policy-makers must set guidelines to regulate electronic organizations to ensure that a market-maker refrains from creating network bias in favour of a specific supplier (as was the case with SABRE).

SABRE and APOLLO have been replaced by the Internet as the electronic marketplace. The Internet has led to further disintermediation in the airline industry and a more perfect market, eliminating the role of the travel agent as airlines sell directly to consumers on websites. While some intermediaries have disappeared, new ones have emerged as new companies position themselves in the marketplace for a wider array of services. Hence, while users can buy airline tickets directly from the airlines' websites, they also enjoy the benefits of lower search costs associated with centralizing their travel purchases within a single intermediary. Travelocity.com, Expedia.com and other sites

that offer not only airline reservations but also hotel, car and other services, have emerged as the new middle-men of the travel industry.

Strategic Use of Information Technology

An important aspect of the story becomes apparent through these various examples. When companies deploy new media infrastructure and applications, they will strive to enhance their own strategic position. In some cases, this may motivate them to sponsor a sweeping rearticulation of their supply chain or a reorganization of the marketplaces they participate in. In other cases, they may encourage the formation of alliances to foster the deployment of standardized systems. Or they may choose instead to pursue isolated, proprietary technologies precisely because such lack of interoperability creates entry barriers for their competitors. In the end, their strategic response to the particular competitive challenges they face, more than intrinsic characteristics of the new media technologies they choose to deploy, will determine the organizational consequences.

There are many examples of these strategic uses of information technologies. Companies have used information systems strategically to gain information from markets and gain a competitive advantage over other firms in the market, shifting the competitive position of organizations within industries. Cash and Konsynski (1985) give the example of an automotive manufacturer who uses network technology to scan the market for the lowest possible bid for a product, thus increasing the market position of the manufacturer by driving down prices. Clemons et al. (1996) provide several cases of dominant firms losing their most profitable customers to aggressive new entrants relying on IT. Indeed, flexible new entrants rely on IT to get information from the market, to identify and target the most profitable customers of an industry.

By providing lower costs and more effective distribution channels to customers through the use of IT, these new entrants are 'cream-skimming', attracting the most profitable customers away from established firms (Clemons et al., 1996). For example, Clemons and Weber (1994) cite the example of new entrants in the airline industry who threaten the market shares of American Airlines and United Airlines, by gathering information from the marketplace, identifying the most profitable customers, and offering them lower-cost, specific point-to-point services on the most travelled routes. Indeed, digital networks dramatically reduce the cost of capturing, storing and analysing information from the marketplace. Hence, using interorganizational networks, the Inter-Continental Hotel chain is able to target its most profitable customers by capturing very detailed information on their needs and wants and sharing it within network hotels. The Inter-Continental profitable customer will therefore obtain highly catered service, whether staying in New York or London (Clemons and Weber, 1994). Similarly, following the deregulation of the London Stock Exchange, Barclays de Zoete Wedd securities firm reacted to increased competitive pressure by using an information system named Beatrice which enabled it to identify, rank and project the growth potential of its most profitable customers. The firm was then able to target the most profitable customers and offer them new tailored services, while dropping less profitable customers (Clemons and Weber, 1990, 1994). Another possible strategy is price discrimination, in which different customers are charged different prices (Bakos, 1998). Hence, an organization can ask more from the less profitable customer, while lowering prices for the most desirable customer, and increasing profits.

This process is not necessarily at the expense of the customer since it enables organizations to serve customers that would otherwise be priced out of the market (Bakos, 1998). This is another example of digital networks being used for competitive advantage, moving from a 'one size fits all' strategy to a tailored, market segmentation strategy (Clemons and Weber, 1994). With digital networks becoming increasingly ubiquitous, organizations are becoming less system builders than system architects,

trying to gain competitive advantage from existing network structures rather than building one anew. The goal for organizations then becomes to outsmart each other in using the information network strategically (Hopper, 1990).

CONCLUSION

Our overview of the new media's impact on industrial organization shows that a diversity of outcomes can be expected. The application of digital networking technologies to economic processes of production and exchange, under different circumstances, has served to support and improve hierarchies, markets or new network forms of organization. In the effort to understand the mechanisms at work, one characteristic of new media networks is fundamental. Because the new media are built upon digital technologies, their architecture and the applications they support are defined in software. Control over their configuration is therefore flexibly separable from ownership of the underlying network infrastructure. This creates opportunities for the many actors using these networks to shape them in ways that further their competitive goals.

For the organizations involved, this ultimately boils down to an essential challenge: their ability to create relative advantage through the combination of economies of scale and economies of scope, reconciling standardized processes with rapidly changing, differentiated products and services. The resulting economic regime, which some have called 'mass variety' (Coriat, 1993), combines the search for static flexibility through adaptation to short-term market variations with the more enduring benefits stemming from dynamic flexibility. Meeting this challenge requires smart choices of technologies and work organization methods. The production systems developed around new media play an essential role in promoting better production and exchange processes, the only way to improve overall productivity, and greater flexibility in programming and reprogramming these processes.

However, new media do not dictate the outcome, nor is their implementation preordained by the technology's characteristics. Rather, they serve to suggest, supplement and support a sweeping organizational transformation of production and exchange activities, from product and service design to production methods, from marketing techniques to exchange mechanisms. For the organizations involved, this is precisely what makes the new media 'strategic'.

REFERENCES

Antonelli, C. (1992) 'Information economics and industrial organization', *Human Systems Management*, 53–60.

Baker, W.E. (1992) 'The network organization in theory and practice', in N.N.R.G. Eccles (ed.), *Networks and Organizations*. Boston: Harvard Business School Press. pp. 397–429.

Bakos, Y.J. (1996) 'Reducing buyer search costs: implications for electronic marketplaces', *Management Science*, 43 (12): 1676–92.

Bakos, Y.J. (1998) 'The emerging role of electronic marketplaces on the Internet', *Communications of the ACM*, 41 (8): 35–42.

Bar, F. (1990) 'Configuring the telecommunications infrastructure for the computer age: the economics of network control'. Working Paper 43, Berkeley Roundtable on the International Economy, University of California Berkeley Institute of International Studies.

Bar, F. (1995) 'Intelligent manufacturing in the global information economy', in W. Drake (ed.), *The New Information Infrastructure: Strategies for U.S. Policy*. New York: 20th Century Fund. pp. 55–74.

Bar, F. (2001) 'The construction of marketplace architecture', in *Tracking a Transformation: E-commerce and the Terms of Competition in Industries*. The BRIE-IGCC E-conomy Project Task Force on the Internet (eds), Washington, DC: Brookings Institution Press.

Bell, D. (1973) *The Coming of Post-industrial Society: A Venture in Social Forecasting*. New York: Basic.

Beniger, J.R. (1986) *The Control Revolution: Technological and Economic Origins of the Information Society*. Cambridge, MA: Harvard University Press.

Benjamin, R. and Wigand, R. (1995) 'Electronic markets and virtual value chains on the information

superhighway', *Sloan Management Review*, 36 (2): 62.

Brousseau, E. (1994) 'EDI and inter-firm relationships', *Information Economics & Policy*, 6 (3, 4): 319–47.

Brousseau, E. (1996) 'Intermédiation par les réseaux: quelles institutions?', in E. Brousseau, P. Petit and D. Phan (eds), *Mutations des télécommunications, des industries et des marches*. Paris: Economica. pp. 171–229.

Bresnahan, T., Brynjolfsson, E. and Hitt, L. (2002) 'Information technology, workplace organization, and the demand for skilled labor: firm-level evidence', *Quarterly Journal of Economics*, 117: 339–76.

Brown, J.S. and Hagel, J., III (2003) 'Does IT matter? An HBR debate', *Harvard Business Review*, June 2003: 2–4.

Brynjolfsson, E. (1993) 'The productivity paradox of information technology', *Communications of the ACM*, 36 (12): 67–77.

Brynjolfsson, E. and Hitt, L.M. (1998) 'Beyond the productivity paradox: computers are the catalyst for bigger changes', *Communications of the ACM*, 41 (8): 49–55.

Brynjolfsson, E. and Hitt, L. (2003) 'Computing productivity: firm-level evidence', *Review of Economics and Statistics*, 85 (4): 793–808.

Brynjolfsson, Erik, Hitt, Lorin M. and Shinkyu, Yang (2002) 'Intangible assets: computers and organizational capital', *Brookings Papers on Economic Activity*: Macroeconomics (1): 137–99.

Carayannis, E.G. (1998) 'The strategic management of technological learning in project/program management: the role of extranets, intranets, and intelligent agents in knowledge generation, diffusion, and leveraging', *Technovation*, 18 (11): 697–703.

Cash, J.I., Jr, and Kosynski, B.R. (1985) 'IS redraws competitive boundaries', *Harvard Business Review*, 63 (2): 134–42.

Cash, J.I., Jr, Eccles, R.G., Nohria, N. and Nolan, R. (1994) *Building the Information-age Organization: Structure, Control, and Information Technologies*. Boston: Irwin.

Castells, M. (1998) *The Rise of the Network Society*. Cambridge, MA: Blackwell.

Chodhury, V. (1997) 'Strategic choices in the development of interorganizational information systems', *Information Systems Research*, 8 (1): 1–24.

Chodhury, V., Hartzel, K.S. and Kosynski, B.R. (1998) 'Uses and consequences of electronic markets: an empirical investigation in the aircraft parts industry', *MIS Quarterly*, 22 (4): 471–507.

Ciborra, C.U. (1983) 'Markets, bureaucracies and groups in the information society: an institutional appraisal of the impacts of information technology', *Information Economics and Policy*, 1: 145–60.

Clemons, E.K. and Kleindorfer, P.R. (1992) 'An economic analysis of interorganizational information technology', *Decision Support Systems*, 8: 431–46.

Clemons, E.K. and Row, M.C. (1992) 'Information technology and industrial cooperation: the changing economics of coordination and ownership', *Journal of Management Information Systems*, 9 (2): 9.

Clemons, E.K. and Weber, B.W. (1990) 'London's big bang: a case study of information technology, competitive impact, and organizational change', *Journal of Management Information Systems*, 6 (4): 41–59.

Clemons, E.K. and Weber, B.W. (1994) 'Segmentation, differentiation, and flexible pricing: experiences with information technology and segment-tailored strategies', *Journal of Management of Information Systems*, 11 (2): 9.

Clemons, E.K., Croson, D.C. and Weber, B.W. (1996) 'Market dominance as a precursor of a firm's failure: emerging technologies and the competitive advantage of new entrants', *Journal of Management Information Systems*, 13 (2): 59–75.

Coase, R.H. (1937) 'The nature of the firm', *Economica*, 4: 386–405.

Cohen, S.S. and Zysman, J. (1987) *Manufacturing Matters: The Myth of the Post-industrial Economy*. New York: Basic.

Coriat, B. (1993) *Globalization, Variety and Mass Production: The Metamorphosis of Mass Production in the New Competitive Age*. Paris: CREI, Université Paris XIII.

Coriat, B. (1994) *L'Atelier et le robot: essai sur le fordisme et la production de masse à l'âge de l'électronique*. Mesnil-sur-l'Estrée: Firmin-Didot for C. Bourgeois.

Dang-Nguyen, G. (1996) 'Les systèmes de réservation aerienne et l'économie des réseaux', in E. Brousseau, P. Petit and D. Phan (eds), *Mutations des télécommunications, des industries et des marches*. Paris: Economica. pp. 231–62.

David, P.A. (1989) 'Computer and dynamo: the modern productivity paradox in a not-too-distant mirror'. CEPR Publication 172, Stanford University, Stanford, CA.

David, P.A. (1990) 'The dynamo and the computer: an historical perspective on the modern productivity paradox', *The American Economic Review*, Papers and Proceedings of the Annual Meeting of the American Economic Association, May, 80 (2): 355–61.

David, P.A. (2000) 'Understanding digital technology's evolutions and the path of measured productivity growth: present and future in the mirror of the past', in E. Brynjolfsson and B. Kahin (eds), *Understanding the Digital Economy*. Cambridge, MA: MIT Press.

Davidow, W.H. and Malone, M.S. (1992) *The Virtual Corporation: Structuring and Re-vitalizing the Corporation for the 21st century*. New York: HarperCollins.

Duliba, K.A., Kauffman, R.J. and Lucas, H.C. (2001) 'Appropriating value from computerized reservation system ownership in the airline industry', *Organization Science*, 12 (6): 702–28.

Finholt, T., Sproull, L. and Kiesler, S. (2002) 'Outsiders on the inside: sharing know-how across space and time', in P. Hinds and S. Kiesler, *Distributed Work*, Cambridge, MA: MIT press.

Gottardi, G. and Bolisani, E. (1996) 'A critical perspective on information technology management: the case of electronic data interchange', *International Journal of Technology Management*, 12 (4): 369–90.

Hitt, L.M. and Brynjolfsson, E. (1996) 'Productivity, business profitability, and consumer surplues: three different measures of information technology value', *MIS Quarterly*, 20 (2): 121.

Hopper, M.D. (1990) 'Rattling SABRE – new ways to compete on information', *Harvard Business Review*, May–June: 118–25.

Jackson, M. and Sloane, A. (2003) 'Modelling information and communication technology in business: A case study in electronic data interchange (EDI)', *Business Process Management Journal*, 9 (1): 81–113.

Jarillo, J.C. (1988) 'On strategic networks', *Strategic Management Journal*, 9: 3–41.

Katz, M.L. and Shapiro, C. (1985) 'Network externalities, competition, and compatibility', *The American Economic Review*, 75 (3): 424–40.

Keen, P.G.W. (1981) 'Communications in the 21st century: telecommunications and business policy', *Organizational Dynamics*, 10 (2): 54–67.

Lee, S., Lee, K. and Kang, I.W. (2005) 'Efficiency analysis of controls in EDI applications', *Information & Management*, 42 (3): 425.

Leschly, S., Roberts, M.J., Sahlman, W.A. and Thedinga, T. (2002) 'Amazon.com', *Harvard Business Review*, Case Study.

Lucas, H.C., Jr (1996) *The T-form Organization*. San Francisco: Jossey-Bass.

Malone, T.W. (2004) *The Future of Work: How the New Order of Business Will Shape Your Organization, Your Management Style, and Your Life*. Cambridge, MA: Harvard Business School Press.

Malone, T.W. and Laubacher, R.J. (1998) 'The dawn of the e-lance economy', *Harvard Business Review*, Sept.–Oct.: 145–52.

Malone, T.W., Yates, J. and Benjamin, R.I. (1987) 'Electronic markets and electronic hierarchies', *Communications of the ACM*, 30 (6): 484–97.

Morton, M.S.S. (1991) 'Introduction', in M.S.S. Morton (ed.), *The Corporation of the 1990s: Information Technology and Organizational Transformation*. New York: Oxford University Press.

Nora, S. and Minc, A. (1978) *L'informatisation de la société: rapport à M. le Président de la République*. Paris: La Documentation Française.

Oettinger, A.G. and Weinhaus, C.L. (1979) 'National stakes in the compunications revolution: jurisdictional cost separations'. Working Paper w-79-2, Harvard University Program on Information Resources Policy, Harvard University, Cambridge, MA.

Piore, M.J. and Sabel, C.F. (1984) *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic.

Poldony, J.M. and Page, K.L. (1998) 'Network forms of organization', *Annual Review of Sociology*, 24: 57–76.

Porat, M.U. and Rubin, M.R. (1977) *The Information Economy*. Washington, DC: US Government Printing Office.

Powell, W.W. (1990) 'Neither market nor hierarchy: network forms of organization', in B.M. Staw and L.L. Cummings (eds), *Research in Organizational Behavior*, vol. 12. Greenwich, CT: JAI. pp. 295–336.

Rockart, J.F. and Short, J.E. (1991) 'The networked organization and the management of interdependence', in M.S.S. Morton (ed.), *The Corporation of the 1990s: Information Technology and Organizational Transformation*. New York: Oxford University Press. pp. 189–219.

Simon, H. (1957) *Models of the Man*. New York: Wiley.

Soliman, K.S. and Janz, B.D. (2004) 'An exploratory study to identify the critical factors affecting the decision to establish Internet-based interorganizational information systems', *Information and Management*, 41 (6): 697.

Solow, R.M. (1987) 'We'd better watch out', *New York Review of Books*, 12 July: 36.

Sproull, L. and Kiesler, S. (1991) *Connections: New Ways of Working in the Networked Organization*. Cambridge, MA: MIT Press.

Teo, H., Tan, B.C.Y. and Wei, K. (1997) 'Organizational transformation with electronic data interchange: the case of TradeNet in Singapore', *Journal of Management Information Systems*, 13 (4): 139–65.

Wigand, R. (1997) 'Electronic commerce: definition, theory and context', *Information Society*, 13 (1): 1–16.

Wigand, R., Picot, A. and Reichwald, R. (1997) *Information, Organization, and Management: Expanding Markets and Corporate Boundaries*. New York: Wiley.

Williamson, O.E. (1975) *Markets and Hierarchies, Analysis and Antitrust Implications: A Study in the Economics of Internal Organization*. New York: Free Press.

Williamson, O.E. (1996) *The Mechanism of Governance*. New York: Oxford University Press.

Yin, P.L. (2004) 'Online auction markets', *Harvard Business Review*, Note, August 23, 2004.

18

New Media and the Economics of Information

DON LAMBERTON

The economics of information is not a tidy, separate small part of economics for some reason of special interest in media matters. The information perspective is a significant challenge to the whole corpus of economics, with destructive implications for mainstream economic theory and its analytical and policy outcomes, yet holding great potential for new theory, new approaches to organization, and new solutions to decision and policy problems. Information, which includes knowledge or 'information of indefinite tenure' (Machlup, 1982: 9), is multifaceted: a resource, a commodity, a perception of pattern, a constitutive force in society (Braman, 1989). It is central to the making of decisions by consumers, business and governments and so plays a key role in the way the economic system works.

For the most part, the economy is envisaged or modelled as predominantly a market system in which business and households are the basic sectors.[1] The business sector employs workers and makes the decisions to invest in plant and equipment that enable the production of goods and services. Purchasing power flows from business to households in the form of wages, rent, interest and dividends that fund household spending. More reality is achieved in the model by adding government, financial institutions and the rest of the world. Business subdivides into industries, each of which produces some widely identified good or service: wheat, beer, motor cars, food, chemicals, computers, software, media. These goods and services are purchased by households, governments and other firms or by the rest of the world. Such market systems function within a wider social framework and require elaborate, durable and costly institutions.

Industrial change is pervasive (Mokyr, 2002) A complete catalogue would be very lengthy; major items would be new products and services, new technologies, new forms of organization, new policy initiatives including regulatory changes, new institutions, new standards, innovation, substitution of new for old, demand shifts, cost reductions and cost increases, outsourcing, downsizing, restructuring, mergers, takeovers, alliances, new images, new theories. It is important to appreciate that from an industrial change perspective, media and multimedia have some special characteristics but share basic involvement in information activities with industry at large. Much recent debate has focused on what has been regarded as special, whereas this chapter seeks to restore the balance. A review (Wildman, 1998) of media and multimedia listed the

following research matters: advances in IT, revised regulatory philosophy, economies of scope and scale, programme choice, the public good character of media content, advertising, multimedia as integration for delivery by a single medium of different types of content, despecialization of transmission technologies, and integrated packages of media and telecommunications services. It is hoped that this chapter will provide a framework for analysis of the role of information in industrial change that extends beyond the media context.

AN INFORMATION PERSPECTIVE

The economics of information looks through the economist's lens at the information activities in all parts and all processes of the economy. It would be easy to assume that an economics of information is now being created in response to recent changes: computerization, satellites, mobile phones, ATMs and the like (Shapiro and Varian, 1999). These developments have spawned a naming flurry with a surfeit of adjectives: new, information, knowledge based, digital, online, Internet, attention (because information consumes the scarce resource of attention), administrative, nude (transparent and exposed), Cisco (in the image of the giant networking equipment firm). Each in its own way attempts to highlight the feature perceived as central to the contemporary economy; and each runs the risk of overemphasizing some part of the new at the expense of the old. Consider, for example, the online version which sees online business activity as a separate *economy* and makes comparison with national economies. Online activity is not a separate economy, nor are NASDAQ businesses as a group. They are part of a larger whole, using and building upon the labour force, the knowledge base, public assets, the legal framework, other institutions, and the entire social capital of the society.

Nor is the information economy new. A perceptive 1960 paper by Richard Meier speculated about 'probably the most significant category of developments in natural science, engineering and psychology over the last decade. *Information theory* and *information technology* are', he said, 'bringing about striking changes in the organization of production and, through their influences upon institutions and professions, have been adding to our understanding of the properties of economic growth' (1960: 98). The following year, Stigler saw information as still in 'a slum dwelling in the town of economics' but with prospects of moving to a better location (1961: 61); and only one year later Fritz Machlup's (1962) major empirical effort delineated in rich detail for the first time the dimensions of the US knowledge-based economy in which knowledge production and distribution accounted for 29 per cent of GNP.

A reviewer of Machlup's book judged it to contain enough dynamite to blast traditional economics into orbit (Boulding, 1963: 36). His judgement was correct but – changing the metaphor – economists rolled with the punches, took on board some of the questions and some of the jargon, and evaded the need to get down to the fundamentals. With the millennium approaching, a leading practitioner of the economics of information could state that 'standard economic theory has little to say about the efficiency of the knowledge based economy' (Stiglitz, 1999: 19, n. 14).[2]

It is important to consider why the economics discipline has been unable or unwilling to change. Of course, the pressure can be seen either as a problem in keeping up with industrial change – the change from economies dominated by steel, manufacturing, chemicals, textiles and shipping to a world in which the most important firms are in telecommunications, computers, software, education and tourism; from the days of US Steel and DuPont to the emergence of global firms like Microsoft and Cisco – or an internal matter of obsolescence of the discipline. Economics Nobel winner Kenneth Arrow (1974) has mounted a good case for all successful organizations being subject to organizational obsolescence or lock-in. This is inherent, he argues, in the economic characteristics of information: 'the combination of uncertainty, indivisibility, and capital intensity associated with information channels

and their use imply (a) that the actual structure and behaviour of an organization may depend heavily upon random events, in other words on history, and (b) the very pursuit of efficiency may lead to rigidity and unresponsiveness to further change' (1974: 49). If the economics discipline itself is viewed as an organization, rigidity and unresponsiveness are only to be expected.

This critique is strengthened by the likelihood of distorted images. Cost considerations plus management practices leave the analyst dependent upon incomplete, inappropriate and outdated statistics collected by national and international agencies. Even if the data did not suffer from these deficiencies, it is likely the analyst is wearing faulty lenses. Having studied two provincial towns, one in South East Asia and one in North Africa, every now and again over four decades, anthropologist Clifford Geertz (1995) posed the question of how the goings-on in those towns had changed. He had telling words about what actually takes place in this attempt to provide answers and the implications for objectivity and science.

> Floundering through mere happenings and then concocting accounts of how they hang together is what knowledge and illusion alike consist in. The accounts are concocted out of available notions, cultural equipment ready to hand. But like any equipment it is brought to the task; value added, not extracted. If objectivity, rightness, and science are to be had it is not by pretending they run free of the exertions which make or unmake them. (1995: 3)

These cautions have special application to attempts to make sense of industrial change in the information economy. Uncertainty is the complement of knowledge; information activities constitute the major claim on resources; and the limitations of the information and information handling capabilities of each individual create social interdependence.

MARKET AND TECHNOLOGY BIASES

Two elements of bias have to be emphasized. First, there is the tyranny of the market. Economics has been reluctant to become involved in the study of what happens inside organizations (Simon, 1991); it did not take an active interest in either psychology or organization science and it tried to keep aloof from management and marketing. This situation is changing; and while there is some deliberate and systematic crossing of borders (Boisot and Canals, 2004; Crampton, 2003; Dow and Earl, 1999; Droege, 1997; Eliasson, forthcoming; Hodgson, 1999; Lamberton, 1996a, forthcoming; Lazaric and Lorenz, 1998; Macdonald, 1998; Macdonald and Nightingale, 1999), there are still major deficiencies in theoretical and empirical research and official statistical collections. There were major consequences for economic theory because it had taken 'on a character belonging to the manipulable, calculable, external world of things, not the world of the conscious mind in its eternal stations on the edge of the void of time, the conscious mind whose being consists precisely in the endless gaining of knowledge' (Shackle, 1972: 3).

'Things' could easily include plant and machinery and buildings but could not cope with intangible assets. An important consequence is that an economic statistic that is crucial for the economic modelling and storytelling, investment, excludes the very things that are thought to be of increasing importance in the information economy. The old questions such as 'What is investment?', 'What is capital?' have come to the surface again. Should expenditure on information be treated as investment? Is information capital? Like other forms of capital, information is structured (Lamberton, 1999); its parts complement each other, imposing sequences or lags, and there are interactions with other 'assets'. For example, a reputation for consistent behaviour can reduce information costs. It is now recognized that significant elements of investment – education, R&D, computers, software, organizational capital, institution building – ought to be included on a systematic basis (Kirova and Lipsey, 1998; Webster 1999).

Because 'things' were easier to handle, the second bias – a sharp focus on technology in a hardware sense – shaped efforts to make sense of the information revolution by focusing on information and communication technologies (ICT) rather than information. Machlup's

(1962) pioneering work and later research had adopted a wide coverage and, by capturing both the information activities that happened in markets and those that happened inside organizations, had sought to deal in a comprehensive way with the role of information. This led to the development of concepts of both a primary information sector for goods and services sold on established markets, and a secondary information sector to record the value added of information activities used in producing non-information goods and services. Some influential reports adopted a different approach. For example, Miles and associates (1990) emphasized the convergence of computing and communications. Some process was leading to the convergence and, to the extent computers and telecommunications had been transformed by that process, they were said to be the core of IT. Because that process was facilitating transformations in the whole economy – the information economy – they believed the interesting issue was the extent to which products and services were ICT intensive. As a final step, the factor promoting convergence was identified: the microelectronics revolution.

The process of informatization was, from this perspective, to be seen as the progressive application of information and communication technologies. Official documents acquired an ITEC (Information Technology, Electronics and Communications) label. A United Kingdom Green Paper (Hawkins et al., 1997), for example, was given a quite specific title: *Mapping and Measuring the ITEC Sector in the United Kingdom.* There was scant recognition of the profound role of information as explored, on an interdisciplinary basis, in a major conference in the 1980s (Machlup and Mansfield, 1983). Historical research could, of course, exercise a corrective influence. Is it reasonable to assume that the information economy began with microelectronics? Organizational development is reported to have been the main form of technological progress during the eighteenth century (Groenewegen, 1977). Changes that led to the growth of clerical occupations to such an extent that they became the dominant occupational group (Schement and Curtis, 1995: 71–101) suggest an earlier date for the onset of the information revolution. What of a future in which it is conceivable that electronics might merge with or be supplanted by biotechnology?

What lies behind this promotion of ITEC primacy which was accorded priority status in growth and development plans and has a great deal to do with the observed patterns of industrial change? Governments and those responsible for policy rhetoric have had a key role. But as Mathias warned, 'Some present day governments … like some economic historians and contemporary tourists, have been too impressed by dramatic instances of the latest technology when making judgments about the sources of productivity' (1983: 18). A cursory study of economic history shows how these iconic industries rise and fall, for example, steel, textiles, motor vehicles, aerospace and, recently, the more general 'high-tech' category. Of course, some new industries may prove long-lasting because they reach to fundamental aspects of the human experience. The genome project may be a good illustration. The decoding and dissemination of the human genome fits into 'a vastly larger landscape of legal, ethical and political issues', is 'certainly part of the information economy', and 'probably has more far-reaching implications for the human species than any other aspect of the "information revolution" ' (Tyler, 1999: 518).

As implied earlier, the tyranny of the market has complemented the technological determinism. A strong case can be made (Simon, 1991) for viewing the economy, not as a market system, but as an organizational economy, with market relations among organizations. Those promoting the ITEC view seem unwilling to recognize that the market, with its imperfections, is 'the largest and most effective information system in existence' (Machlup, 1979: 113). It seems a reasonable approach to say that when bureaucracy, both private and public, is combined with the market the resulting aggregate is the information economy. The primary and secondary information sector concepts emerged from attempts, working with very limited statistical data, to show that such an economy functioned through the combined roles of market and administrative decision. Analysis of the linkages within and

between industry sectors and between information and non-information sectors involved a great deal more than the information component that Miles et al. conceded had been a feature of all societies. A solution to these difficulties is to treat bureaucracy or organization generally as technology.[3]

The notion that markets can always, in principle, deliver better outcomes than states and the law, i.e. neoliberal economic rationalism, as a basis for economic policy with respect to industrial change, has distinct weaknesses. First, as mentioned earlier, mainstream economics of the non-information economics variety has little to say about the efficiency of the information economy. Second, the private enterprise component makes rather simplistic assumptions about administrative efficiency, responsiveness and innovativeness (Nelson, 1981: 60). These assumptions are in effect judgements about information processes which have been subjected to research. While that research (Grigorovici et al., 2004; Macdonald, 1996, 1998; Macdonald and Nightingale, 1999) has not managed to provide simple models of industrial change, it has established the complexity involved and effectively undermined the sweeping claims of the privatization approach.[4] This is an important stage in the development of ideas about industrial development because it challenges the strong presumption that has held sway ever since Adam Smith's *Wealth of Nations*, that the industrialist knows best how to conduct his own business.

ECONOMIC CHARACTERISTICS OF INFORMATION

Asking questions about efficiency in the modern information economy raises issues, not just about IT and telecommunications, but about capabilities (Loasby, 1998), information stocks, organizational capital and learning. This is a far cry from the old economics with its firms that were given units of coordinating ability, reading best practice resource combinations from a recipe book (see Lamberton, 1965), and it points to the policy vacuum that has been created by the information revolution. For example, should policy address not only education in school but also education of industrialists (Pandit et al., 1997)? And if the effectiveness of such 'messages' depends upon the state of readiness of the recipients, is monitoring of learning and performance desirable? Some will respond by invoking the economic rationalist market view but there are quite fundamental difficulties. Information can be a commodity, as is readily apparent from the wide range of information industries, but only to a limited extent (Arrow, 1984: 142). Therefore, it is not permissible to simply treat information as the n+1th commodity and then proceed with the analysis as if nothing else had changed. A market system with information elements cannot lead to the traditional efficient allocation of resources. First, information is indivisible in use: the same information is not bought twice in ordinary circumstances; and 'how to' information about production is independent of the scale of production. Therefore, it pays a business planning large-scale operations to buy better information than a small firm. A consequence is that information creates economies of scale throughout the economy and this causes a departure from what is expected of the competitive economy. It seems reasonable to think that the more information-intensive the economy as a whole, the greater the likelihood that this is a significant departure.

Second, information is inappropriable. The possessor does not lose information when it is transmitted. Also, the cost of transmitting information is normally much lower than the initial cost of production. Add to this the facts that information has the characteristics of a public good[5] and that intellectual property rights cannot give absolute security of benefits. The consequence of this combination of circumstances is that investment in uncertain activities like R&D will be less than optimal from a social point of view.

This general viewpoint, shaped by Arrow's classic 1962 paper, was welcomed by vested interests because it justified subsidization of those activities. Politically, it was welcomed in a Cold War setting. Industry stood to benefit,

as did both universities and research centres and their employees. Thinking based on this modelling of the process of R&D, innovation and development has remained a powerful influence. There are, however, several flaws in the modelling.

The Arrovian analysis tends to be somewhat supply based. For example, looking to the demand side, it is apparent that there is often no public ready and eager to utilize information. This emerges on closer scrutiny of the characteristics of information. Arrow, in his original analysis, was aware of this (Lamberton, 1999) and he acknowledged:

- difficulties arose in defining an item of information and differentiating it from other items;
- information purchases were often made largely in ignorance of their value;
- some generators of information had advantages of special knowledge and skills;
- intellectual property rights could never provide complete protection;
- information items in use are interdependent.

These qualifications to the reasoning seem to have slipped out of sight in subsequent debate and policy formulations. It is therefore necessary to resurrect the complexity of information structures, the continuous nature of information processes, and the time dimensions involved. Two comments serve this purpose. First, 'Knowledge is not a pile of homogeneous material, but a complex structure of heterogeneous thoughts, each available at zero marginal cost but usable only together with resources available only at positive and often very high cost' (Machlup, 1982: 10). Second, there is need for modelling of the economy, or of its parts, 'in which information is continuously being collected and processed and in which decisions, based on that information, are continuously being made' (Stiglitz, 1985: 23).

Considerations of structure and flow provide scope for strategic behaviour and modify conclusions about divisibility and appropriability. The scope of indivisibilities may be extended and appropriability may be enhanced. There may then be opportunities for organizational experiment, e.g. alliances. The scope of competition may well be diminished. From an analytical perspective, there is a shift from modelling of optimizing to study of historical processes. Sequences of experiment, learning, decision and innovation become important. This shift has major implications for management, innovation and policy and the industrial change they generate. Information in its diverse combinations of characteristics, structured forms and sequences contrasts sharply with information as an all-purpose lubricant in the economic system.

RESEARCH

The scope of research in the economics of information is so wide that this context permits only a highly selective coverage under each of the topics selected. A short summary is given along with appropriate and up-to-date references to permit fuller exploration.

Property Rights

Intellectual property 'is a broad term that is used to describe the wide range of rights that are conferred by the legal system in relation to discrete items of information that have resulted from some form of human intellectual activity' (Ricketson, 1992: 54), such as inventions, scientific discoveries, literary and artistic works, trademarks, industrial designs. Traditional categories devised centuries ago have been found inadequate. 'Patents' and 'copyright' became overloaded but provision had to be made for items as diverse as integrated circuits, software, plant varieties, genetic materials, personal images, cultural works, business methods, and surgical techniques. This has been achieved through wider interpretations of the old categories or through new, specific pieces of legislation, e.g. for plant varieties.

The importance of economic considerations has been widely acknowledged (Drahos, 1998, 2000; Lamberton, 1994). However, the definition quoted above is a lawyer's definition and it ignores the impossibility of items of information being discrete. Their complementarity is

what gives them meaning and economic significance; and those complementarities build sequences and create lags that affect choices. There are legal disputes over property rights where, for example, it has been argued that a sculpture might have been created as a 'response' to a photograph. This points to wide-ranging possibilities of complex learning and response in the production and dissemination of information (Towse, 2001).

Industrial change in a knowledge-based economy is leading to growing tension between the system of legal relations and economic determinants. Continuation of this trend seems highly probable if economic activity becomes even more information intensive. 'Information is the basis of production, production is carried on in discrete legal entities, and yet information is a fugitive resource, with limited property rights' (Arrow, 1996: 651). Several consequences are already apparent. First, legal activity is increased. A good illustration is the use of meta-tags, one of the associational tools essential to the operation of the World Wide Web. Their function as indices of websites which search engines read and rely upon in looking for appropriate content in response to queries submitted to them generated controversies as meta-tag use impacts on the property rights of website owners (Ramiscal, 2000). Second, costs are raised in the settling and anticipation of legal conflicts. Markets for protective strategies and technologies are fostered, both domestically and internationally; and impetus is given to attempts to further develop protective technologies. Other consequences will include: internal efforts by firms to improve their assessment of the value of information assets; business efforts to cope with intellectual property problems by forming alliances; and calls for an expanded role on the part of governments and international organizations.

A related element in the industrial change process is the establishment of standards among those having an economic incentive to be concerned with the technical basis of product networks (Temple and Williams, 2002; Todd, 2004). Where the numbers involved are large, there are coordination problems. Some become locked into their alternative, and knowledge of alternatives may be imperfect. Diversity may undermine very real long-run opportunities for better systems. A firm's business strategy often aims to have its alternative adopted as the industry standard – and such dominance is a regulatory matter. Various outcomes for innovation emerge: on the one hand, there can be encouragement of R&D and improvement of goods and services, or, on the other hand, the activities can be made more rigid and can hinder innovation. The outcomes in particular circumstances will depend upon 'the market structure, chance historical events, and the costs of technical alternatives' (Greenstein, 1992). As in the case of intellectual property rights, better understanding of these alternative outcomes might come from adoption of an information perspective with special attention to learning.

Market Structure

Industrial economics and industrial organization research has adopted market structure as a major focus of analysis. Sutton (1998) synthesizes the two major approaches in terms of (1) industry characteristics and (2) evolution of the size distribution of firms in a 'typical' industry. He provides systematic statistical evidence and detailed case studies, gives attention to both the telecommunications and computer industries, and treats the issues and analysis so comprehensively as to be an effective antidote to the excessive hype and wild projections of the development of information-related industries of recent times.

For decades, market structure research has been dominated by the seemingly simple notion of barriers to new competition. Sutton explains that 'a proper understanding of market structure requires a meshing of two ideas: strategic interaction between groups of close substitute products and (approximate) independence across clusters of such products' (1998: 495). His analysis builds on the old idea of a gap in the chain of substitutes using three principles: first, firms do not pursue loss-making strategies; second, if a profitable opportunity

exists, some firm will take it; and, third, in markets consisting of independent submarkets, a 'symmetry' principle excludes the possibility that a firm enjoy some advantage over its rivals in entering a submarket by virtue of earlier experience in other submarkets. His objective is to limit the number of outcomes that could be expected to show up in empirical data. He acknowledges real-world complexity: 'Any adequate story of why, within the limits set by these few constraints, structure takes this form or that, must come to grips with the influence of history. If we track down, industry by industry, the events that caused things to go one way or another, we rapidly find ourselves immersed in the historian's domain of accident and personality' (1998: xv). The choice is posed as between richer theory and statistical regularity.

Has there been some major omission in this approach? The information perspective would seem to be a candidate. Each of Sutton's principles turns on what assumptions are made about what firms know. The first two imply knowledge of future losses and profits; and the symmetry principle denies the role of the informational asymmetries flowing from prior experience. In the knowledge-based economy, information costs loom large in the costs structures of firms (Eliasson et al., 1990). Should not these information mechanisms somehow be made part of the central analysis rather than be tucked away in the residual 'domain of accident and personality'? Information is a resource, albeit intangible; and changes in information costs and information technology shape organizational forms and the expectations of decision-makers. Of course, this change would have other consequences. It would require an even more complicated picture of the market, theory that is only now beginning to be built, and propositions that do not fit easily with conventional industry data.

The information perspective must be integral to industrial change. Just as it has been recognized that there is no catalogue of alternative technologies, so too there is awareness that firms find or create their profitable opportunities. They are obliged to learn and to seek comparative advantage through learning. Those processes seem so important in the knowledge-based economy that they ought to be part of the search for statistical regularity and not treated as exceptions.

The firm as the unit would seem to warrant further consideration. Some industries, especially information-intensive ones, show a marked tendency to resort to alliances, e.g. telecommunications, basic research and airlines. The alliances development lacks good theory. In this context, it seems clear that the firm is not a clearly defined entity and changes in organizational form have implications for the modelling of market structure.

Demand Studies

The major concern about demand studies relevant to the information economy is that they relate to demand for IT, access, advertising but only indirectly to information itself. Telecommunication has received a good deal of attention. Here the classic work is Taylor's *Telecommunications Demand in Theory and Practice* (1994), complemented by a Special Issue of *Information Economics and Policy* (1989) and more recently by Loomis and Taylor's *The Future of the Telecommunications Industry: Forecasting and Demand Analysis* (1999). These studies suffer from the limitation that they are very largely based on North American data and there is need for similar studies in other economic and social conditions, with different patterns of consumption, different income levels, different regulatory arrangements, and generally different stages of technological development (e.g. Das and Srinivasan, 1999; Karikari and Gyimah-Brempong, 1999).

Topics that have been clarified include residential access, business demand, price and income elasticities, cross-price elasticities between services, and demand for custom-calling features. Externalities had been seen as important for toll-to-local subsidy reasons but now attention has been given to the ways in which calls 'give rise to further calls, quite independently of price and income' in a process labelled 'the dynamics of information exchange' (Taylor, 1994: 259). This marks an all-too-rare

event when the narrower 'telecom economics' is brought into an analytical partnership with the wider economics of information.

Research priorities were: business demand, residential cross-price elasticities, the relationship between telecommunications and other goods and services in household budgets, the dynamics of information exchange, and firm-specific elasticities (as monopoly suppliers have been replaced by duopoly or oligopoly). As Taylor saw the research agenda:

> The challenge for demand analysis in the telephone companies … is to forge links with marketing departments and to become integrated into company budgeting and forecasting processes. Applied demand analysis has a strategic role to play in a competitive environment, ranging from the conventional types of elasticity estimation in traditional markets to the identification of new markets. The possibilities are vast. It only requires imagination, hard work – and some humility – on the part of economists and demand analysts. (1994: 270)

Such research has been hampered by the deregulation and restructuring of telecommunications, and reflects both a high degree of specialization and business interests. The most productive research might prove to be on the dynamics of information exchange theme. For example, how do communities of interest form (1994: 268, n. 19)? Worthwhile questions include: how do such communities cohere and disintegrate? how are new information goods and services adopted? How do calls create need for further calls? How are business (and more generally organizational) needs for information shaped and managed? Findings from such research might throw some light upon a wide range of phenomena and processes, e.g. changing urban patterns of cooperation and conflict; intercountry relationships; and the formation of regional patterns (Madden, 1999).

Two further topics serve to illustrate the potential of demand studies. First, a RAND report addresses the question, 'What are the opportunities for and the obstacles to increased use of the Internet and electronic mail to facilitate communication between government agencies and the citizen clients?' (Neu et al., 1999: iii). The communication envisaged is citizen–government personal communication rather than the downloading of forms. Surveys indicated that such usage had barely begun. Security issues loomed large. Trends were reported as 'not encouraging … [and] many gaps in the availability of a computer at home were major in both [1993 and 1997] and had *widened* in the four-year interval' (1999: xxi). Operational concerns were acknowledged but the Internet was nevertheless judged appropriate for the purpose, allowing improved service. The conclusion was an expression of faith: 'Citizens will eventually insist on communication with government agencies by e-mail' (1999: xxiii).

It may seem reasonable to ask why, if large numbers of interactive transactions are taking place on the Internet, there is no demand for citizen–government communication. However, nearly half the US population did not then have the necessary access, and operation of a dual system would add to cost. Even if security problems were all solved, the nature of the communication involved may present major difficulties. The full costs have not been assessed, especially in respect of legal aspects, and citizens may well want and feel entitled to time to reflect. At the heart of the report's optimism is a failure to appreciate that homogeneous goods account for the bulk of trade on the Internet. Even lowering of cost and provision of facilities may not offset the consequences of intermittent communication about diverse, specific matters. Not even the hoped-for extension of agent technology (Vulkan, 1999) will present an immediate solution to these content difficulties.

A second topic points to the barriers to demand for information in a developing country context, where 'downloading' proves inappropriate (Stiglitz, 1999: 4). This is a major issue for development policy and programmes:

> Logic dictates that information is an essential resource for the social and economic development of Third World countries, but how can this be demonstrated? How tangible is the linkage between information investments and the achievement of specific development goals? The limited status accorded to information in most developing countries suggests that its potential value is not self-evident. (Menou, 1993: ix)

It is a valid response by those accountable for policies and decisions, when faced with reports of growing numbers of computers, telephone lines and databases, to ask, 'So what?'

A research programme of the International Development Research Centre (IRDC) in Canada (McConnell, 1995; Menou, 1993) has pursued case studies of the impact of *information* in different geographical and information environments (e.g. Africa, Asia, the Caribbean and Latin America). There are lessons to be learned here as a similar approach is needed in many other situations. The real issues arise from the limitations of the resources and capabilities available and the perceptions of the value of information; and these issues cannot be addressed if the focus is on IT in a narrow sense. A wide range of outcomes between the extremes of stagnation and information cascades[6] (Geroski, 2000) is possible.

The IT Productivity Paradox

The IT productivity paradox has been debated for a long time and is not resolved: the ubiquitous computer is seen as a source of great productivity gains and profits, bringing a golden age of growth, and yet it remains difficult to detect the impact. Some observers highlight technical support, new software and retraining, concluding there are substantial hidden costs. Others point to such indicators as the massive outlays on new IT, stock market booms in new technology stocks, business and policy hype, and IT skill shortages in developed and undeveloped countries alike. They offer various explanations, e.g. the measurements are defective; the payoff is still in the pipeline. Care has to be taken to sort out the elements of truth in both sides of the argument.

Is there an authoritative evaluation? US research by leading productivity analysts reports that

> computer-related gains, large returns to the production and use of computers, and network effects are fundamentally changing the US economy. However, they are not ushering in a period of faster growth of output and total factor productivity. Rather, returns to investment in IT equipment have been successfully internalized by computer producers and computer users. These economic agents are reaping extraordinary rewards for mobilizing investment resources and restructuring economic activities. The rewards are large because of the swift pace of technical change and the rapid deployment of IT equipment through substitution, not because of spillovers to third parties standing on the sidelines of the computer revolution. (Jorgenson and Stiroh, 1999: 114)

A companion study puts this into historical perspective:

> Much of what we are seeing now is 'second order', for example the VCR which combines TV and movies but does not have the fundamental impact of either, and much of the use of the Internet which substitutes one form of entertainment for another. Enthusiasts might note that the computer has not created the paperless office, but rather a duplication of electronic activities, all of which generate paper. (Gordon, 1999: 127)

Much in these debates has to be discounted heavily. Stock market valuations of new technology stock are notoriously optimistic and, like the business 'strategies' that inspire them, overly influenced by technological possibilities that take little account of social and economic conditions that affect outcomes.

The Jorgenson and Stiroh analysis emphasizes substitution of IT for other types of capital and labour: 'the massive substitution towards computers in both business and household sectors as the price of computers fell dramatically in the 1980s and 1990s' (1999: 109). The technical change residual in their analysis is the growth spillover after allowing for the growth of all other inputs, including IT equipment – also labelled the growth of total factor productivity. Contrary to the expectations of what they call a Computer Cargo Cult among economists and economic historians, there has been no flood of spillovers after the deployment of IT equipment: 'the story of the computer revolution is one of relatively swift price declines, huge investment in IT equipment, and rapid substitution of this equipment for other inputs' (1999: 110).

Some parts of this analysis can be challenged. The knowledge-based economy calls for a wider definition of measured investment. Education and learning are not to be measured only in terms of schools and universities, as business, official agencies and households are engaged in a continuous process of learning. Knowledge production should take in both R&D and other expenditures that achieve the same ends. Surely software qualifies for inclusion? What of organizational capital and institution building? In separating out expenditure

on computers, it seems desirable to take account of the pervasive nature of computers. Jorgenson and Stiroh concede that they

> have substantially understated the impact of IT equipment, since we have focused specifically on computers and do not include closely related high-technology products. For example, much telecommunications gear is indistinguishable from IT equipment. Also, computers and semiconductors are now routinely embedded in automobiles and machinery, but we exclude these intermediate inputs from the aggregate production function. (1999: 113)

But just as computers find their way to distant places through processes of change, so too do changes in knowledge, organizational form, new behaviour patterns, new languages and new capabilities. How do these figure in the measured growth of inputs and TFP calculations (Lee et al., 2000; Preissl, 1997; Shin, 2000)?

There is a view that the modern human capacity emerged with *H. sapiens* and that the crucial innovation may have been the invention of language.

> For language is not simply the medium by which we express our ideas and experiences to each other. Rather it is fundamental to the thought process itself. It involves categorizing and naming objects and sensations in the outer and inner worlds and making associations between resulting mental symbols. It is, in effect, impossible for us to conceive of thought (as we are familiar with it) in the absence of language, and it is the ability to form mental symbols that is the fount of our creativity, for only once we create such symbols can we recombine them and ask such questions as 'What if …?' (Tattersall and Matternes, 2000: 44)

Suppose 'computerization' as it progresses involves a change equally fundamental. What might be the social and economic manifestations?

Two matters would seem to be related to this query. The first is coordination – a concept not by any means fully explored in economics but one that has loomed larger since the development of the economics of information. In many applications, IT effects coordination and this leads to substitution of equipment for labour. As the perceived cost of coordination declines, more coordination is put into use. Given more time, potential for infrastructure changes in not only equipment but also organization is detected, and internal reorganization and industry restructuring take place in ways deemed appropriate to the coordination capabilities. Perhaps there is a case for asking whether some of the technological change is demand induced. It would be necessary to include abstract improvements such as organizational and attitudinal changes under the technological change heading.

These thoughts can be brought to bear on the impact of new media. Dudley (1999) asks the question: what has been the relationship, if any, between Europe's communications technology and its rate of economic growth over the past millennium? In the tradition of Innis, his analysis is framed in terms of relative changes in decoding, transmission and storage information costs. This permits a plausible account of history through changes in technology and capabilities – an account that makes use of the characteristics of languages and changes in relative component costs. It points to the possibility that the productivity failure reported by Jorgenson and Stiroh occurred because the new technologies were not yet sufficiently cost-effective to displace those whose positions of strength were established in the previous cycle of cost changes. If so, the Computer Cargo Cult adherents can take heart.

Information and Organization

Organizational change issues have been raised under other headings. One topic, already mentioned, will expose some of the issues involved. The firm, no longer a mathematical point as it was in classical economic theory, is now an imperfect network of information flows. The information it requires comes from outside sources as well as being generated internally. Just as the firm's product was made a variable by the development of monopolistic and imperfect competition theory, so the organization has been made a variable through the development of the economics of information.

This has opened up a great new territory for management, for those seeking to provide management services and for disciplines like management studies and organization science. Much of the literature reflects preoccupation with the new technologies and their possibilities. The

prime purpose of obtaining information remains control, but a great deal of management effort in the new economy assumes that there are known ways of collating information and achieving control. Information can be identified, obtained, put to use, and stored away until the next time it is needed. This is an industrial model of information utilization, e.g. data warehousing, but for the most part lacking in cost analysis. Psuedo-measurement has generated strange units and calculations. One encounters references to 'shelf-kilometres' of documents; and, in a strange mix of ingenuity and ingenuousness, one study of the productivity of space telescopes conjures up the number of research papers using observations from a particular station per square metre of telescope lens (Trimble, 1996: 237–46)! Tacit knowledge is defined as what cannot be articulated, but this has not prevented plans to create electronic databases of tacit knowledge. While all this reflects some sense of the value and importance of information, there is a failure to address the real management issues. What information is needed? Is it obtainable within the organization? What are the likely external sources? Do internal and external flows mix easily? What costs are involved? What skills are required? If organizational obsolescence is taken to be a normal experience because of the economic characteristics of information, are there remedies?[6]

A belief that the needed information can be obtained and applied seems often to serve as a barrier to good management.

> [A]dvocates of change … encourage change as they acknowledge information, as something contained within a system … This is change which is sufficiently ordered to be studied, to be modelled, to be learnt and taught, to fit into existing policy and strategy … This is the change of mission statements and vision statements. (Macdonald, 1998: 283)

The simple, inescapable truth is that managers do not face 'an endless examination in arithmetic', nor is there 'an algebra of business which only needs to be supplied with a sufficiency of information to guarantee success' (Shackle, 1968: 3). New technology can do much to create, store and make available information but it cannot ensure such a sufficiency. The new managerialism that focuses on control and performance is responding to the inappropriateness of time worked as a measure but has confidence that the relevant activities can be measured. 'There is little consideration for the intangible, the unmeasurable, the indirect, the long term; flexibility is sacrificed to technical efficiency. Rather than reconciling themselves with living with uncertainty, managers are provided with the comfortable delusion that method will eliminate uncertainty' (Macdonald, 2002).

Space does not permit exploration of the entire management empire, but one industrial change can illustrate the relevance of the economics of information. Alliances between firms have become more prominent, e.g. in telecommunications, airlines and media. In the case of telecommunications, by the 1990s, well over 50 per cent of all international phone calls were handled by the four major alliances. Globalization has created pressures to expand, but why has this been done through alliances rather than by mergers and takeovers? To date there are no adequate theories of alliances and there has been an inclination to attribute their growth to deregulation, including a more permissive antitrust policy towards interfirm collaboration, e.g. in respect to basic research. If, however, alliances are entered into both to fill the gaps left by deregulation and to effect information sharing and coordination, then this latter influence obviously falls within the economics of information. In so far as a new organizational form is involved, this is to be shared with organization science and management (Engelbrecht, 1997: 19–42; Noam and Singhal, 1996).

Some sense of the complexity of administrative and institutional processes emerges from an examination of the potentially productive but sadly neglected role of the subversive, not the machine-breaking Luddite, dobber or whistleblower, but the thinking person who persists in asking 'Why?' and challenges orthodoxy, whether it be in the boardroom, on the factory floor, in interdepartmental meetings, or in the community at large. In contrast to most of the other resources that have to be used with information, the services of the subversive may well be low cost but highly productive.

A market element in the provision of additional information precludes genuine dissent. Life is easier and the pay better in a climate of consensus. The consequence is that there is failure to address the unwillingness or inability of executives to consider what they deem irrelevant – or threatening – once their organizations have become obsolete or are victims of lock-in. The economical use of information supposedly effected by the market system may not really be a virtue; executives may be using as much information as they are capable of or willing to use, in which case there is little to be gained from pressing upon them the services of more and more knowledge officers, gatekeepers, mentors, part-time board members and consultants. What is needed are 'reality instructors' – an invention of novelist Saul Bellow – and some way of ensuring that their message is heard and understood. Meantime, a company float with dissent as its chief or only product would not be looked upon with favour in the stock market. Can new organizational design influence the demand side and achieve optimum use of information? Possibly, but it will require keeping clear of technological fundamentalism, plus both thoroughgoing innovation in organizational design and the backing of new social sanctions.

Economics of Language

If language is fundamental to the thought process itself, there ought to be an economics of language in the knowledge-based economy (Lamberton, 1998, 2002b; Snow, 1998: 159–72). It seems a logical extension of concern with information. One of the pioneering papers expressed the belief that enquiring into language and communication systems was dealing with 'the essential stuff of economics' and hoped there would be 'a future economics of the most developed and most fully studied system of communication within human organizations: the language, spoken or written' (Marschak, 1965: 523).

As noted in discussing the IT productivity paradox, machine languages may play a similar role to that of natural languages. Researchers should be alive to the potential for machine languages to affect and effect mental symbols and influence organization (Pelikan, 1969: 625–31; Ryan, 1993).

Economic Development

The great bulk of literature dealing with communications and development focuses on telecommunications and IT equipment. This technological infrastructure has had attributed to it almost magical powers. But do telecommunications and equipment investment promote economic development, or does economic development create the demand for more telecommunications services? A strong case can be made (see 'Demand studies' earlier) for approaching this question from a different perspective and asking what is the role of information in the development process. Information capabilities are such that a telecommunications infrastructure is not an information infrastructure (Lamberton, 1996b: 31–8).

Attention should focus on the perceptions, aspirations and policies of industries and governments in their choice of technologies and patterns of socioeconomic development. What factors shape the perceptions of prospects? First, there are cost expectations – e.g. specific costs of modernization of old networks and provision of new networks; costs of infrastructure to make the system as a whole work – and these can be interpreted narrowly as information infrastructure, or much more widely, recognizing that the demand for telecommunications is very largely a derived demand and so a function of the entire process of economic growth. Second, there are some quite deep-seated notions. The causality notion may be the most important. Are telecommunications the linchpin – the 'driver' that leads development? Another notion is globalization; and here it may be that there has been global thinking to excess and too little heard about regionalization (Madden, 1999). Convergence is a third notion. Many studies fail to define this basic concept and list so many paradigms that convergence lacks useful meaning as all these elements are said to be

fusing together. For example, communications, information, entertainment, publishing, retailing, financial services, information and Internet paradigms have been proclaimed (Adler, 1995). Then there is coordination, which raises the question whether the market can provide all that is needed. So the building of the infrastructure that is needed for an effective information economy requires organization and institutions as well as markets and technology.

Telephone lines without conversations and data flows do little to generate development. Investment, growth of income and cultural change may do much more, creating, in due course, greater demand for communications. In this way the potential of information as 'a powerful and reusable resource for development' (McConnell, 1995: 2) may be realized.

Policy

Why is it that standard economic theory has little to say about the efficiency of the knowledge-based economy? (See the introduction paragraphs to this chapter.) This can be answered on several levels. If all decision-makers are well informed and new information flow can be ignored, efficient outcomes can be defined. But once the insufficiency of information is admitted, there are problems. As Fritz Machlup suggested, the aim can be 'to act intelligently, with full consideration of the pertinent knowledge at hand and of the pertinent knowledge available at reasonable cost'. This is not the same as seeking 'optimization in making use of the totality of knowledge' and 'requires little argumentation'. Taking cost-effective action falls short of being Pareto efficient. The latter, however, 'invites speculations that may again widen the focus to include choices among alternative actions on different fronts, actions for which different batches of knowledge are used; in this case, we may easily slip again into the sea of undecidability' (1982: 10).

The traditional justifications for intervention in market outcomes are externalities, informational asymmetry and increasing returns. Information phenomena are the trouble spots in economics so it is not altogether unexpected that each of these justifications proves to have informational aspects. It has long been argued that information is very largely a public good. The second justification needs no comment. As for increasing returns, as Samuelson reasoned long ago, they are 'the prime case of deviations from perfect competition … Universal constant returns to scale (in everything, including effective acquisition and communication of knowledge) is practically certain to convert *laissez-faire* or free enterprise into perfect competition' (1967: 117). These hopes are dashed in the knowledge-based economy where the importance of information ensures there are pervasive economies of scale.

Taken together, these considerations are a powerful critique of policy approaches based on mainstream economics. However, awareness of these difficulties has yet to be reflected in policy action – and, for that matter, in much of the modelling and analysis of both researchers and consultants. Both new policy initiatives and modification of existing policies are needed. For example, the focus should shift from short-term allocative efficiency to 'a set of long-term policies aimed at enhancing the knowledge base … through increased investment in the knowledge infrastructure, the knowledge distribution system, and the human knowledge component (human resources, education, training and organisational change)' (Soete, 1996: 387). An excellent illustration of the need for modification arises in the regulatory area. Given the characteristics of information and the new technological capabilities, the knowledge-based economy affords 'greater scope for the suppression of competition' (Stiglitz, 1999: 8). A consistent approach needs to be developed in intellectual property systems where administrative simplicity has hampered efforts to 'fine tune' the term and strength of the rights by taking account of the diversity of inventions and innovations.

In summary, the knowledge-based economy offers opportunity for an enhanced public role in the provision of information, 'invention' of new institutions, establishment of systems of remuneration more appropriate to 'information

work', and many ways of effecting greater coordination. This last is a matter for macro- as well as microeconomic policy (Earl, 1998: 331–42).

Distorted Images

There is perennial complaint that official statistics provide distorted images of what is happening in the economy. Costs, administrative inertia and outdated lenses result in a failure to catch up with the industrial and social change that is taking place. The most familiar problem is highlighted by 'shadow' economy studies showing that quite a large part of conventionally defined activity is not captured in official statistics and suggesting that their scope should be extended to take in some elements of non-market activity.

Decisions have to be made about what is important in understanding events in the economy. The emerging focus on the role of knowledge is creating major problems for those responsible for official collections. How is knowledge to be measured? Must all knowledge be measured or just new knowledge? Is new knowledge to be captured in R&D or are there other components that are also important? What should be included in investment – both in knowledge itself and in effecting change (Kirova and Lipsey, 1998)?

A new social accounting is needed, with 'a new paradigm: new models, new variables. This will mean new measures … New approaches, perhaps grounded in other disciplines [than economics], must be developed to quantify knowledge variables like firm learning, know-how, adaptation' (Carter, 1996: 67). All this flows from recognition not just that economic theory, research and policy have to catch up with contemporary conditions but that the failure of the discipline to devise a central role for knowledge has always been a fundamental flaw.

WHAT IS NOT KNOWN

Perhaps Geertz-style narratives will always need to be rewritten; perhaps Shackle's 'endless gaining of knowledge' implies that the tenure of all knowledge expires because the lenses being used are changed as new conceptual frameworks are imagined. This may be an uncomfortable thought for those dominating present academic gatherings, just as contemplating the demise of dominant firms or governments in office makes business leaders and ministers uneasy. Such contemplations link to the unwillingness of governments and industry to support the more challenging social science research.

In terms of research, there is a need to ask what 'not known' implies. Does not listing items in this category imply some knowledge about them? It might be useful here to invoke two categories. First, there are questions sufficiently well defined to be outlined in research funding proposals and acceptable to research councils because they fall within the current paradigms, fads and fashions.[7] The researchers became the prey of endorsed questions. Second, there are confessions of ignorance and expressions of hope and willingness to search for central questions that challenge orthodoxy; to search for new lenses through which to view the economy. Fritz Machlup did so with his 1962 book *The Production and Distribution of Knowledge in the United States*, and it has been widely acknowledged that the impact has been profound even if somewhat less than Kenneth Boulding had hoped.

This overview of the contribution that the economics of information is making to the study of industrial change has been cast in terms of two 'econ' tribes: mainstream economics and the economics of information. A more comprehensive effort to cope with the complexity of the real-world processes of change must acknowledge the many other tribes and disciplines and will require multi-tribal and interdisciplinary work. The shaping of an information science or information studies needs to take guidance from the existing limited understanding of the relationships between the economy in the mainstream sense and the meshing of conventions, knowledge, culture and institutions that makes up society. Hopefully, the joint ventures, alliances and possible mergers among the econ tribes would

reflect similar senses of direction in multidisciplinary research, so yielding questions for the second, challenging category. This chapter ends with some speculations about some such potential lines of enquiry.

It has been argued that 'there is a *prima facie* case for regarding the evolution of economic systems as an entropic phenomenon but with information rather than energy providing the main propagating role' (Clark, 1991: 102). Hodgson responded, stressing the difficulty: 'Although tantalizing, this suggestion must overcome the difficult problem of the definition of "information" and the distinction between different types of information or knowledge' (1993: 300, n. 8). The primary information and secondary information sector approach was an attempt to structure the complex information activities and was modified so that it fits into an input–output framework (Stäglin, 1989). The next stage might be to shift the focus to the demand side; to seek out the mix of characteristics that underlies the demands depicted in such modelling and their relationships with the capabilities and resources of the information users and the constraints on their decisions. For example, attention is now said to be one of the scarce resources. It is not enough to recognize that information is multifaceted; a richer taxonomy is needed (Lamberton, 1999).

The recent focus on telepistemology, the study of knowledge acquired at a distance by means of e.g. the telephone, television and now the Internet, hints at the potential but also shows the difficulties involved. Leo Marx comments on a recent book: 'As the electronic revolution gains momentum, the boundary between humanity's manufactured andits flesh-and-blood bodily experience is rapidly shifting … All the contributors recognize its extent and its import, but most of them … reject the popular delusion that the boundary is about to be erased' (Goldberg, 2000: blurb). Economists studying the demand for Internet services, management experts trying to devise optimal business organizations and all those concerned, especially policy-makers, about the messy philosophical and social problems should pay heed.

Given such awareness, study of the ongoing processes of information provision, learning, decision, organizational change and growth – in short, industrial change – has potential for collaboration. Can, for example, current initiatives in the economics of information (Lamberton, 1998) come together with related efforts in organizational science (Brousseau, 2000; Ciborra and associates, 2000; Macdonald, 1998; Nonaka et al., 1998; Oniki, 1999), evolutionary economics (Eliasson and Taymaz, 2000), cognitive economics (Paquet, 1999) and endogeneous growth theory (Adams, 2000; Engelbrecht, 1999; Romer, 1986)? The complexities become even greater if the spatial dimension is accorded the importance it probably deserves (Droege, 1997; Gaspar and Glaeser, 1998; Wilson and Corey, 2000). But where is the funding organization to provide the support for what could be a momentous occasion?

The potential outcomes have major implications for policy (*The Economist*, 2000). Increasingly in the knowledge-based economy, conventional thought about efficient choices is proving inadequate to the task. There is reason to reject the policy of 'trust the market' on knowledge issues. This may initiate, on the one hand, the pendulum swing back towards intervention; and on the other, a return to mercantilistic initiatives and reliance upon 'trickle-down' to the key issue, poverty. The information revolution has not and will not in some miraculous way eliminate the scarcities and inequities that characterize society and its industrial organization.

FUTURE DEVELOPMENTS

The future will bring more new media and more industrial change but will it bring an appropriate new economics? As the economics of information, broadly interpreted, embraces most of the major changes in both economic theory and policy over the last three or four decades, there might seem to be some cause for optimism but the opposing pressures are powerful. As Martin Shubik reasoned, 'The rational utilitarian man, the Invisible Hand, and the

democratic vote may be regarded as a trinity for economics and political faith in a free-enterprise democracy' (1967, in Lamberton, 1971: 357).

Cyberspace is no mere virtual reality but a rich geography of practices and power relations (Crampton, 2003). The Internet is not inherently democratic. Kalathil and Boas (2003) have examined the full range of Internet use under eight authoritarian regimes: China, Cuba, Singapore, Vietnam, Burma, United Arab Emirates, Saudi Arabia and Egypt. As Jennifer Windsor of Freedom House says on Kalathil and Boas' book's cover, 'the Internet is by no means a guaranteed "silver-bullet" in eluding, and indeed defeating, the control of authoritarian rulers'.

However, the economics of information has failed to tackle some core issues. Its analysis and basic assumptions still reflect the Shubik trinity. In ways that have suited the powerful, the key to the future was deemed to be access – to new technology. What was neglected were the capabilities which required so much more than a typewriter, a telephone, or a computer. They required knowledge, incentives, skills to make the access effective, and above all time to learn. Capital was much more than land, buildings and machines.

This complexity favoured and generated coalitions: as investors, business alliances, and government. The Galbraithian military–industrial complex is well-known but the pervasiveness of such coalitions is not fully appreciated. Haber et al. (2003) present a fascinating account of Mexican experience, concluding that property rights are not a public good but are enforced selectively as private goods, with the payoffs shared by the participating groups and government. Going digital does not ensure democratic processes nor does access to technology and the entire information resources of nations ensure changes in income distribution.

In such situations information sharing is very much in vogue (Helmstadter, 2003). The playing field is far from level. While focusing on access, researchers have neglected the participants' capabilities of using information. These capabilities are the product of education and past experience. They fit with mindsets which override tidy optimization calculations (Lamberton, forthcoming).

To speak of assumptions would suggest reasoning which could be revised, but mindsets are less flexible. Business schools foster the myth of the entrepreneur floating from one venture to the another in a world of optimization. The reality may be a lack of imagination and tunnel vision that makes information collecting and its interpretation ever more selective. These paths lead eventually to the decline of empires, the fall of governments, business failures and inward-looking research.

These patterns have long been recognized. Adam Smith wrote about the prejudices of education. We often overlook that schools of thought do seem to outlive their usefulness. Nevertheless, we fail to recognize that mindsets are part of our capabilities – initially productive of creativity and innovation but later a restraining influence. We tend to assume they are tamed, managed and retired through education. We neglect their time dimensions and we neglect the ways in which they are helped and hindered by the very division of labour with its specialization that we believe fundamental to productivity and growth.

For both analysis and policy purposes we need to probe more deeply and disaggregate more minutely. Curiously, the Lessig message (2001) with the added 'Remix Me' refrain seems to have much in common with Hofstadter who wrote that 'metaknowledge and knowledge are simmering together in a singuler stew, totally fused and flavouring each other richly' (1986: 538). Each of us comprehends some part of this 'stew' and comes to the table with individual capabilities and mindsets. These are tools and resources with both limitations and potentials, fashioned basically by the division of labour and the education system.

NOTES

This chapter builds on and extends Lamberton (1971, 1984, 1996a, 1997, 2002a, 2002b). See also Macdonald and Nightingale (1999). Perhaps an explanatory note on 'economics' is permissible. In the context of media and

communication literature, one meets frequently the claim that information has been commoditized. Those making this claim should ponder carefully the extent to which major contributors have, as has been done in this chapter, laid stress on the fact that information can be a commodity but only to a limited extent. Similarly, there is an almost standard claim that information for the economist, perhaps defined as what reduces uncertainty, is devoid of content. This is more or less true of the Shannon treatment but that was an engineering approach. Utility and even profit can be interpreted to include not only money gains but also other satisfactions: consumption, power, bequests or interesting challenges. Therefore, the criticism holds for 'information as oil' but it loses its force when the richer concepts of information as structured capital, as resource, as commodity, as perception of pattern and as a constitutive force in society are adopted. Finally, it should be added that economics does not speak with one voice: it is 'made up of a variety of subfield specialists, different generations with different kinds of training, persons of greatly varying ideological preferences, individuals with markedly different perceptions regarding appropriate methodological choices, and a lot of Indians and a lot of would-be chiefs … what interests one segment of the profession bores another' (Perlman, 1981: 4).

1 'The concept of a more or less freely functioning market system has been central to economic theory during the last three hundred years of its development' (Vickers, 1995: v). This defines and limits mainstream economics which appears as 'trust the market', 'small government' and economic rationalism. It emphasizes production rather than consumption, judges progress in terms of economic growth, and avoids matters of both institutions and internal organization. The counterview in terms of the tyranny of the market has come increasingly to base its critique on the mostly implicit assumptions about the role of information (Lamberton, 1996a; Middleton, 1998; North, 1990; Stiglitz, 1994; Thurow, 1983; Vickers, 1995; Vines and Stevenson, 1991).

2 An allocation of resources is (Pareto) efficient if no one can be made better off without someone else being made worse off. Major new works, for example Jones (2003) still endeavour to approach analysis of the knowledge economy from a neoclassical perspective.

3 Schement and Curtis advocate such an approach: 'bureaucracy … is itself an information technology' (1995: 230).

4 Grigorovici et al. (2004) acknowledge the significant paper by Michel Menou (1985). See also Menou (1993) with his call for research into the *use* of information rather than expenditure on ICT. For a new, disaggregated approach to the effects of liberalization on the composition of R&D activity, see Calderini and Garrone (2001).

5 A public good is characterized by non-rivalrous consumption (the marginal costs of providing it to an additional person are zero) and non-excludability (the costs of excluding an individual from consumption are prohibitively high).

6 Nightingale (2003) has posed important questions about reliance upon the tacit vs codified dichotomy.

7 For literature on these as economic phenomena see Bikchandani et al. (1998) and Anderson and Holt (1997).

REFERENCES

Adams, J.D. (2000) 'Endogenous R&D spillovers and industrial research productivity'. Working Paper 7484. New York: National Bureau of Economic Research.

Adler, R.P. (1995) 'Introduction', in Institute for Information Studies, *Crossroads on the Information Highway: Convergence and Diversity in Communications Technologies*. Queenstown, MD: Institute for Information Studies.

Anderson, L.R. and Holt, C.A. (1997) 'Information cascades in the laboratory', *American Economic Review*, 87 (2): 847–62.

Arnott, R., Greenwald, B., Kanbur, R. and Nalebuff, B. (eds), *Economics for an Imperfect World: Essays in Honor of Joseph E. Stiglitz*. Cambridge, MA: MIT Press.

Arrow, K.J. (1962) 'Economic welfare and the allocation of resources for invention', reprinted in D.M. Lamberton (ed.) (1996), *The Economics of Communication and Information*. Cheltenham: Elgar. pp. 227–43.

Arrow, K.J. (1974) *The Limits of Organization*. New York: Norton.

Arrow, K.J. (1984) *Collected Papers of Kenneth J. Arrow: The Economics of Information* Vol. 4. Oxford: Blackwell.

Arrow, K.J. (1996) 'Technical information and industrial structure', *Industrial and Corporate Change*, 5: 645–52.

Bikchandani, S., Hirshleifer, D. and Welch, I. (1998) 'Learning from behavior of others: conformity, fads, and informational cascades', *Journal of Economic Perspectives*, 12 (3): 151–70.

Boisot, M. and Canals, A. (2004) 'Data, information and knowledge: have we got it right?', *Journal of Evolutionary Economics*, 14: 43–67.

Boulding, K.E. (1963) 'The knowledge industry. Review of Fritz Machlup, *The Production and Distribution of Knowledge in the United States*', *Challenge*, 11 (8): 36–8.

Braman, S. (1989) 'Defining information: an approach for policymakers', reprinted in D.M. Lamberton (ed.) (1996), *The Economics of Communication and Information*. Cheltenham: Elgar. pp. 3–12.

Brousseau, E. (2000) 'What institutions to organize electronic commerce? Private institutions and the organization of markets', *Economics of Innovation and New Technology*, 9 (3): 245–73.

Calderini, M. and Garrone, P. (2001) 'Liberalisation, industry turmoil and the balance of R&D activities', *Information Economics and Policy*, 13 (2): 199–230.

Carter, A.P. (1996) 'Measuring the performance of a knowledge-based economy', in OECD Documents, *Employment and Growth in the Knowledged-based Economy*. Paris: OECD. pp. 61–8.

Ciborra, C.U. and associates (2000) *From Control to Drift: The Dynamics of Corporate Information Infrastructures*. Oxford: Oxford University Press.

Clark, N.G. (1991) 'Organisation and information in the evolution of information systems', in P.P. Saviotti and J.S. Metcalfe (eds), *Evolutionary Theories of Economic and Technological Change: Present States and Future Prospects*. Reading, MA: Harwood. pp. 88–107.

Crampton, J.W. (2003) *The Political Mapping of Cyberspace*. Edinburgh: Edinburgh University Press.

Das, P. and Srinivasan, S.J. (1999) 'Demand for telephone usage in India', *Information Economics and Policy*, 11 (2): 177–94.

Dow, S.C. and Earl, P.E. (eds) (1999) *Economic Organization and Economic Knowledge: Essays in Honour of Brian J. Loasby*. Cheltenham: Elgar.

Drahos, P. (ed.) (1998) 'Trade and intellectual property', *Prometheus*, 16 (3) (special issue).

Drahos, P. (ed.) (2000) *Intellectual Property*. Aldershot: Ashgate.

Droege, P. (ed.) (1997) *Intelligent Environments: Spatial Aspects of the Information Revolution*. Amsterdam: North-Holland.

Dudley, L. (1999) 'Communications and economic growth', *European Economic Review*, 43: 595–619.

Earl, P.E. (1998) 'Information, coordination and macroeconomics', *Information Economics and Policy*, 10 (3): 331–42.

Eliasson, G. (forthcoming) 'The nature of economic change and management in a new knowledge based economy', *Information Economics and Policy*.

Eliasson, G. and Taymaz, E. (2000) 'Institutions, entrepreneurship, economic flexibility and growth: experiments on an evolutionary micro-to-macro model', in U. Canter, H. Hanusch and S. Klepper (eds), *Economic Evolution, Learning, and Complexity*. Heidelberg: Physica. pp. 265–86.

Eliasson, G., Folster, S., Lindberg, T., Pousette, T. and Taymaz, E. (1990) *The Knowledge-based Economy*. Stockholm: Industrial Institute for Economic and Social Research.

Engelbrecht, H.-J. (1997) 'The international economy: knowledge flows and information activities', in D.M. Lamberton (ed.), *The New Research Frontiers of Communications Policy*. Amsterdam: North-Holland. pp. 19–42.

Engelbrecht, H.-J. (1999) 'International knowledge spillovers, absorptive capacity and productivity in OECD countries', in S. Macdonald and J. Nightingale (eds), *Information and Organization: A Tribute to the Work of Don Lamberton*. Amsterdam: North-Holland. pp. 46–85.

Gaspar, J. and Glaeser, E.L. (1998) 'Information technology and the future of cities', *Journal of Urban Economics*, 43: 136–56.

Geertz, C. (1995) *After the Fact: Two Countries, Four Decades, One Anthropologist*. Cambridge, MA: Harvard University Press.

Geroski, P.A. (2000) 'Models of technology diffusion', *Research Policy*, 29 (4–5): 603–25.

Goldberg, K. (ed.) (2000) *The Robot in the Garden: Telerobotics and Telepistemology in the Age of the Internet*. Cambridge, MA: MIT Press.

Gordon, R.J. (1999) 'US economic growth since 1870: one big wave?', *American Economic Review*, 89 (2): 123–8.

Greenstein, S.M. (1992) 'Invisible hands and visible advisors: an economic interpretation of standardization', *Journal of the American Society for Information Science*, 43 (8): 538–49.

Grigorovici, D.M., Schement, J.R. and Taylor, R.D. (2004) 'Weighing the intangible: towards a theory-based framework for information society indices', in E. Bohlin, S.L. Levin, N. Sung and C.-H. Yoon, *Global Economy and Digital Society*. Amsterdam: Elsevier, pp. 169–99.

Groenewegen, P.D. (1977) 'Adam Smith and the division of labour', *Australian Economic Papers*, 16: 161–74.

Haber, S., Razo, A. and Maurer, N. (2003) *The Politics of Property Rights*. Cambridge: Cambridge University Press.

Hawkins, R.W., Mansell, R.E. and Steinmueller, W.E. (1997) *Mapping and Measuring the Information Technology, Electronics and Communications Sector in the United Kingdom*. Brighton: SPRU, University of Sussex.

Helmstadter, E. (ed.) (2003) *The Economics of Information Sharing: A New Institutionalist Approach*. Cheltenham: Elgar.

Hodgson, G.M. (1993) *Economics and Evolution: Bringing Life Back into Economics*. Cambridge: Polity.

Hodgson, G.M. (1999) *Economics and Utopia: Why the Learning Economy Is Not the End of History*. London: Routledge.

Hofstadter, D.R. (1986) *Metemagical Themes: Questing for the Essence of Mind and Pattern*. New York: Bantam.

Jones, D.C. (ed.) (2003) *New Economy Handbook*. Amsterdam: Elsevier.

Jorgenson, D.W. and Stiroh, K.J. (1999) 'Information technology and growth', *American Economic Review*, 89 (2): 109–15.

Kalathil, S. and Boas, T.C. (2003) *Open Networks, Closed Regimes: The Impact of the Internet on Authoritarian Rule*. Washington, DC: Carnegie Endowment to International Peace.

Karikari, J.A. and Gyimah-Brempomg, K. (1999) 'Demand for international telephone services between US and Africa', *Information Economics and Policy*, 11 (4): 407–35.

Kirova, M. and Lipsey, R. (1998) 'Measuring real investment: trends in the United States and international comparisons'. Working Paper 6404, National Bureau of Economic Research, New York.

Lamberton, D.M. (1965) *The Theory of Profit*. Oxford: Blackwell.

Lamberton, D.M. (ed.) (1971) *The Economics of Information and Knowledge*. Harmondsworth: Penguin.

Lamberton, D.M. (1984) 'The economics of information and organization', in M.E. Williams (ed.), *Annual Review of Information Science and Technology (ARIST)*, vol. 19. Knowledge Industries Publicationsfor American Society for Information Science. pp. 3–30.

Lamberton, D.M. (1994) 'Intellectual property and innovation', in M. Dodgson and R. Rothwell (eds) *Handbook of Industrial Innovation*. Aldershot: Elgar. pp. 301–10.

Lamberton, D.M. (ed.) (1996a) *The Economics of Communication and Information*. Cheltenham: Elgar.

Lamberton, D.M. (1996b) 'A telecommunications infrastructure is not an information infrastructure', *Prometheus*, 14 (1): 31–8.

Lamberton, D.M. (ed.) (1997) *The New Research Frontiers of Communications Policy*. Amsterdam: North-Holland.

Lamberton, D.M. (1998) 'Language and critical mass'. Paper presented at the 12th Biennial International Telecommunications Society Conference, Stockholm.

Lamberton, D.M. (1999) 'Information: pieces, batches or flows?', in S.C. Dow and P.E. Earl (eds), *Economic Organization and Economic Knowledge: Essays in Humour of Brian J. Loasby*. Cheltenham: Elgar. pp. 209–24.

Lamberton, D.M. (ed.) (2002a) *Managing the Global: Globalization, Employment and Quality of Life*. London: I.B. Tauris and The Toda Institute for Global Peace and Policy Research.

Lamberton, D.M. (ed.) (2002b) *The Economics of Language*. Cheltenham: Elgar.

Lamberton, D.M. (forthcoming), 'Information sharing', in D. Rooney, G. Hearn and A. Ninan (eds), *Knowledge Economy Handbook*. Cheltenham: Elgar.

Lazaric, N. and Lorenz, E. (eds) (1998) *Trust and Economic Learning*. Cheltenham: Elgar.

Lee, C.-H., Sophie, Barua A. and Whinston, A.B. (2000) 'The complementarity of mass customization and electronic commerce', *Economics of Innovation and New Technology*, 9 (2): 81–109.

Lessig, L. (2001), *The Future of Ideas: The Fate of the Commons in a Connected World*. New York: Random House.

Loasby, B.J. (1998) 'The organization of capabilities', *Journal of Economic Behavior & Organization*, 35: 139–60.

Loomis, D.G. and Taylor, L.D. (eds) (1999) *The Future of the Telecommunications Industry: Forecasting and Demand Analysis*. Dordrecht: Kluwer.

Macdonald, S. (ed.) (1996) 'Informal information flow', *International Journal of Technology Management*, 11 (1–2) (special issue).

Macdonald, S. (1998) *Information for Innovation: Managing Change from an Information Perspective*. Oxford: Oxford University Press.

Macdonald, S. (2002) 'Managing with method: information in policy and strategy for innovation', in D.M. Lamberton (ed.) *Managing the Global: Globalization, Employment and Quality of Life*. London: I.B. Tauris and The Toda Institute for Global Peace and Policy Research. pp. 209–22.

Macdonald, S. and Nightingale, J. (eds) (1999) *Information and Organization: A Tribute to the Work of Don Lamberton*. Amsterdam: North-Holland.

Machlup, F. (1962) *The Production and Distribution of Knowledge in the United States*. Princeton, NJ: Princeton University Press.

Machlup, F. (1979) 'An economist's reflections on an Institute for the Advanced Study of Information Science', *Journal of the American Society for Information Science*, 30 (2): 111–13.

Machlup, F. (1982) 'Optimum utilization of knowledge', *Society, Knowledge, Information, and Decisions*, 20 (1): 8–10.

Machlup, F. and Mansfield, U. (eds) (1983) *The Study of Information: Interdisciplinary Messages*. New York: Wiley.

Madden, G. (1999) 'Asia–Pacific information flows and trade', in S. Macdonald and J. Nightingale (eds), *Information and Organization: A Tribute to the work of Don Lamberton*. Amsterdam: North-Holland. pp. 393–406.

Marschak, J. (1965), 'Economics of language', reprinted in D.M. Lamberton (ed.) (1971), *Economics of Information and Knowledge*. Harmondsworth: Penguin. pp. 37–58.

Mathias, P. (1983) 'The machine: icon of economic growth', in S. Macdonald, D.M. Lamberton and

T. Mandeville (eds), *The Trouble with Technology: Explorations in the Process of Technological Change*. London: Pinter.

McConnell, P. (ed.) (1995) *Making a Difference: Measuring the Impact of Information on Development*. Ottawa: International Development Research Centre.

Meier, R.L. (1960) 'Information, resource use and economic growth', in J.J. Spengler (ed.), *Natural Resources and Economic Growth*. Ann Arbor, MI: Resources for the Future, Inc. and Social Sciences Research Council.

Menou, M. (1985) 'An information system for decision support in national information policy-making and planning', *Information Processing & Management*, 21 (4): 321–61.

Menou, M. (ed.) (1993) *The Impact of Information on Development*. Ottawa: International Development Research Centre.

Middleton, R. (1998) *Charlatans or Saviours? Economists and the British Economy from Marshall to Meade*. Cheltenham: Elgar.

Miles, I. and associates (1990) *Mapping and Measuring the Information Economy*. London: British Library Board.

Mokyr, J. (2002) *The Gifts of Athena: Historical Origins of the Knowledge Economy*. Princeton, NJ: Princeton University Press.

Nelson, R.R. (1981) 'Assessing private enterprise: an exegesis of tangled doctrine', reprinted in D.M. Lamberton (ed.) (1996), *The Economics of Communication and Information*. Cheltenham: Elgar. pp. 59–77.

Neu, C.R., Anderson, R.H. and Bikson, T.K. (1999) *Sending Your Government a Message: E-mail Communication between Citizens and Government*. Santa Monica, CA: RAND Science and Technology.

Nightingale, P. (2003) 'If Nelson and Winter are only half right about tacit knowledge, which half? A Searlean critique of codification', *Industrial and Corporate Change*, 12 (2): 149–83.

Noam, E. and Singhal, A. (1996) 'Supra-national regulation for supra-national telecommunications carriers?' *Telecommunications Policy*, 20 (10): 769–87.

Nonaka, I., Ray, T. and Umemoto, K. (1998) 'Japanese organizational knowledge creation in Anglo-American environments', *Prometheus*, 16 (4): 421–39.

North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.

Oniki, H. (1999) 'On the informational structure and functioning of Japanese organisations: a comparison with Western organisations', in S. Macdonald and J. Nightingale (eds), *Information and Organization: A Tribute to the Work of Don Lamberton*. Amsterdam: North-Holland. pp. 197–214.

Pandit, N., Swann, G.M.P. and Watts, T. (1997) 'HTSF marketing and customer education: a role for a technology awareness programme?', *Prometheus*, 15 (3), 293–308.

Paquet, G. (1999) 'Lamberton's road to cognitive economics', in S. Macdonald and J. Nightingale (eds), *Information and Organization: A Tribute to the Work of Don Lamberton*. Amsterdam: North-Holland. pp. 63–79.

Pelikan, P. (1969) 'Language for a limiting factor for centralization', *American Economic Review*, 59 (4): 625–31.

Perlman, M. (1981) 'Editor's note', *Journal of Economic Literature*, 19 (1): 1–4.

Preissl, B. (1997) 'Information technology: a critical perspective on its economic effects', *Prometheus*, 15 (1): 5–25.

Ramiscal, N.G. (2000) 'The nature and functions of meta-tags: covert infringement of trademarks and other issues', *Prometheus*, 18 (1): 39–57.

Ricketson, S. (1992) 'New wine into old bottles: technological change and intellectual property rights', *Prometheus*, 10 (1): 53–82.

Romer, P.M. (1986) 'Increasing returns and long-run growth', *Journal of Political Economy*, 94 (5): 1002–37.

Ryan, J.P. (1993) 'Machine translation: matching reality to expectations', in S. Nirenburg (ed.), *Progress in Machine Translation*. Amsterdam: IOS.

Samuelson, P.A. (1967) 'The monopolistic competition revolution', in R.E. Kuenne (ed.), *Monopolistic Competition Theory: Essays in Honor of Edward H. Chamberlin*. New York: Wiley. pp. 105–38.

Schement, J.R. and Curtis, T. (1995) *Tendencies and Tensions in the Information Age: The Production and Distribution of Information in the United States*. New Brunswick, NJ: Transaction.

Shackle, G.L.S. (1968) 'Policy, poetry, and success', in G.L.S. Shackle (ed.), *On the Nature of Business Success*. Liverpool: Liverpool University Press. pp. 3–18.

Shackle, G.L.S. (1972) *Epistemics and Economics: A Critique of Economic Doctrines*. Cambridge: Cambridge University Press.

Shapiro, C. and Varian, H.R. (1999) *Information Rules: A Strategic Guide to the Network Economy*. Boston: Harvard Business School Press.

Shin, I. (2000) 'Use of informational network and organizational productivity: firm-level evidence in Korea', *Economics of Innovation and New Technology*, 9 (5): 447–63.

Shubik, M. (1971), 'Information, rationality, and free choice in a future democratic society', in D.M. Lamberton (ed.), *Economics of Information and Knowledge*. Harmondsworth: Penguin.

Simon, H.A. (1991) 'Organization and markets', *Journal of Economic Perspectives*, 5 (2): 25–44.

Snow, M.S. (1998) 'Economic, statistical, and linguistic factors affecting success on the test of English as a foreign language (TOEFL)', *Information Economics and Policy*, 10 (2): 159–72.

Soete, L. (1996) 'Globalisation, employment and the knowledge-based economy', in OECD Documents, *Employment and Growth in the Knowledge-based Economy*. Paris: OECD. pp. 383–7.

Stäglin, R. (1989) 'Towards an input–output subsystem for the information sector', reprinted in D.M. Lamberton (ed.) (1996), *The Economics of Communication and Information*. Cheltenham: Elgar. pp. 114–27.

Stigler, G.J. (1961) 'The economics of information', reprinted in D.M. Lamberton (ed.) (1971), *The Economics of Information and Knowledge*. Cheltenham: Elgar. pp. 61–82.

Stiglitz, J.E. (1985) 'Information and economic analysis: a perspective', *Economic Journal*, supplement, 95: 21–41.

Stiglitz, J.E. (1994) *Whither Socialism?* Cambridge, MA: MIT Press.

Stiglitz, J.E. (1999) 'Public policy for a knowledge economy' (speeches). Available online: www.worldbank.org

Sutton, J. (1998) *Technology and Market Structure: Theory and History*. Cambridge, MA: MIT Press.

Tattersall, I. and Matternes, J.H. (2000) 'Once we were not alone', *Scientific American*, 282 (1): 38–44.

Taylor, L.D. (ed.) (1989) 'Telecommunications demand modeling', *Information Economics and Policy*, 3 (4) (special issue).

Taylor, L.D. (1994) *Telecommunications Demand in Theory and Practice*. Dordrecht: Kluwer.

Temple, P. and Williams, G. (2002) 'Infra-technology and economic performance: evidence from the United Kingdom measurement infrastructure', *Information Economics and Policy*, 14 (4): 435–52.

The Economist (2000) 'A survey of the new economy', 23 September: 1–40.

Thurow, L.C. (1983) *Dangerous Current: The State of Economics*. New York: Oxford University Press.

Todd, J. (2004) *For Good Measure: The Making of Australia's Measurement System*. Drow's Nest: Allen & Unwin.

Towse, R. (2001) *Creativity, Incentive and Reward: An Economic Analysis of Copyright and Culture in the Information Age*. Cheltenham: Elgar.

Trimble, V. (1996) 'Productivity and impact of large optical telescopes', *Scientometrics*, 36 (2): 237–46.

Tyler, M. (1999) 'Review of Lamberton (ed.), *Communication and Trade*' *Telecommunications Policy*, 23: 717–18.

Vickers, D. (1995) *The Tyranny of the Market: A Critique of Theoretical Foundations*. Ann Arbor, MI: University of Michigan Press.

Vines, D. and Stevenson, A. (1991) *Information, Strategy and Public Policy*. Oxford: Blackwell.

Vulkan, N. (1999) 'Economic implications of agent technology and e-commerce', *Economic Journal*, 109: F67–90.

Webster, E. (1999) *The Economics of Intangible Investment*. Cheltenham: Elgar.

Wildman, S.S. (1998) 'Media and multimedia: the challenge for policy and economic analysis', *Information Economics and Policy*, 10 (1): 1–7.

Wilson, M.I. and Corey, E. (eds) (2000) *Information Tectonics: Space, Place and Technology in an Electronic Age*. New York: Wiley.

19

New Media and Trade Policy

ANDERS HENTEN AND KNUD ERIK SKOUBY

This chapter is concerned with trade and industry policy aspects of information society concepts and policies. Two sets of concepts are thus the focus of attention: 'information society' and 'trade and industry policy'. Whereas information society questions are widely discussed in this *Handbook* and will not be subject to any extensive deliberation here, it should be noted that the information society concepts are seldom defined or explicitly discussed, and that this applies not only to information society visions of governments, companies, etc., but also to more academic expositions.[1] Although this is regrettable, we will not here venture into a definition exercise regarding the information society concept but use the term in the same manner as it is mostly used, as a framework or template for discussions regarding the changes in society that are related to the increasing production and usage of information and communication technologies and services.

With respect to the other concept, 'trade and industry policy', the delimitation of the area corresponds to what, for instance, the Department of Trade and Industry in the UK and the Department of Commerce in the US deal with, namely the establishment and development of favourable framework conditions for business development in both the production and distribution fields. Trade does not necessarily denote international relations. However, in our exposé, we pay special attention to the international aspects of trade and industry policy developments as the internationalization (or globalization) of the economy increasingly is related to the opportunities offered by information and communication technologies.

Elsewhere in the *Handbook*, other aspects of information society developments are dealt with, including implications for the development of democratic procedures, access to information, etc. Some of these subjects are more or less related to the issue of trade and industry policy. They have a bearing on trade and industry developments, and trade and industry policy cannot be isolated from other policy areas. This is often reflected in information society visions of governments where trade and industry policy initiatives are seen as part of a more encompassing strategy comprising both 'harder' matters concerning economic development and 'softer' issues regarding democracy, education, universal access, etc. In this chapter, however, we seek to concentrate on matters that are at the core of trade and industry policy questions, and other matters will only be dealt with if closely related to this subject.

The chapter first discusses more thoroughly the subject matter of the trade and industry policy aspects of information society concepts and policies. After that, the academic origins of

the debates on information society developments are briefly traced. This is followed by a review of trends in economics and other social science research that have keenly affected information society discussions in the political establishment. We then concentrate on the information and communication equipment and service-producing sectors themselves, and deal with internationalization aspects. A presentation is given of the main trends in the information society visions and plans that have cropped up since the beginning of the 1990s, and is followed by the summary and conclusion.

The idea and aim of the chapter are thus to review important academic trends and sources in the area of trade and industry policy aspects of information society discussions, and to relate these to the host of information society visions and policy declarations that have been issued by governments and other public authorities since the beginning of the 1990s.

A somewhat reassuring conclusion for the world of academia is that academic analyses seem to have had a visible impact on discussions among political decision-makers in this area. There is not a large gulf between academic analyses and the discussions taking place on the political scene. However, this may be an expression of a lack of sophistication on the part of the academic analyses of the societal changes related to the developments that have been dubbed 'information society', 'knowledge society' and 'network society'.

The main issue of the chapter is to examine the continued need for and existence of national trade and industry policies in the present information society settings characterized by fast technological developments in the information and communication technology fields, internationalization of the economy and a prominent position for liberal policies and ideology.

In trade and industry policies these developments have resulted in a turn away from direct forms of state interventionism towards more indirect forms of framework regulation. But they have not resulted in abolition of the need for or existence of national trade and industry policies as such. Where formerly trade and industry policies were concentrated on regulating more closed national markets and on supporting spearhead industries internationally, the policies of today focus more broadly on situating the national economies as advantageously as possible in the international economy.

This development is reflected in the great number of information society visions and plans that public authorities all over the world have been issuing during the past decade. Although it would seem to be a paradox that a liberalization of the national economies is followed by so much state planning, the reason is exactly the increasing internationalization of the economy that sets the need for new national trade and industry policies. However, these trade and industry policies are often not very specific but consist of broader vision statements, a fundamental belief that market forces will ultimately realize the visions, and an external framework regulation of the markets.

Trade and industry policies all over the world have much that is similar, but there are, of course, also many differences: policies in Europe, for instance, to a greater extent than US policies, are stretched between wealth and welfare policies. In spite of such differences, the chapter mainly deals with policy developments in Europe as these clearly illustrate the general trend from state interventionism to external regulation.

SUBJECT MATTER

In general terms, at present, the two most important areas of interest in the discussions of information societies are information and communication technologies and services, and internationalization/globalization – according not only to the information society visions and plans of public authorities but also to more theoretical analyses. ICTs and internationalization are the recurrent themes in most discussions of the matter.

Internationalization is the subject of a separate section in this chapter, where different approaches to the analysis of the internationalization of the economy are put forward, as well as different attitudes to the desirability of this development. There are, however, analysts who claim that the importance ascribed to

internationalization is exaggerated and not based on well-documented facts. This applies, for instance, to Paul Krugman (1997) who has argued sharply against tendencies to pay too much attention to the importance of internationalization for the US economy. It also applies, for example, to Paul Bairoch (1996) who has analysed indicators of the degree of internationalization over a long period stretching back to the late nineteenth century, and who shows that internationalization was as developed at the beginning of the twentieth century as it was at the beginning of the 1990s. It furthermore applies to Paul Hirst and Grahame Thompson in their book *Globalization in Question* (1996). But apart from such 'dissenting' views, there is an overwhelming focus on internationalization as an important trend in trade and industry developments today.

ICTs are, obviously, of central importance, and there are (at least) two sides to this importance. One side is related to the production of information and communication technologies and services. The other side has to do with the implications of the usage of these technologies and services in other societal connections – where the usage in other business areas is the other half of the issue in this chapter.

In a way, the focus of attention with respect to ICTs has changed, moving to and fro during the past 40 years or so. In the first period, in the 1960s and 1970s, there was a strong interest in the usage of information technologies for the purpose of automating industrial production. However, as we shall see in the following section on the origins of the discussions on information societies, there was, at the same time, an interest in information-processing occupations. In the following period, the focus of attention shifted more to the production of information and communication technologies and services. This was clearly the case in the European Community where big research programmes were launched, with first and foremost the Research in Advanced Communications in Europe (RACE) programme in the telecommunications field, demonstrating the interest in promoting the ICT sector in Europe by way of joint research initiatives.

Although this interest in promoting ICT production is still important, research interest gradually shifted back to the usage side during the 1990s. In the European Union, this shift is partly reflected in the changing focus of the telecommunications-oriented research programmes, from Advanced Communication Technologies and Services (ACTS) to Information Society Technologies (IST) today, where the title in itself illustrates both the central importance that the European Community attaches to information and communication technologies in the building of information societies, and the preferred framework and direction of information technology developments, namely their ability to support information society developments. But it is even more clearly reflected in the many information and network society vision statements by EU institutions or public authorities in individual member states.

However, lately one could claim that the centre of attention is returning to the production of information and communication products – however, this time with an emphasis on the production of services and content. There is a rising discussion concerning a new network economy, which encompasses 'old physical' production areas if they adopt the new ways of trading and interacting electronically, but mostly deals with the production of information or knowledge content and goods and services that are related to networked technologies and services.[2]

Of course, this kind of overall characterization of research and discussion themes risks suppressing other important development trends. All along there have been analyses and debates regarding both the development of information and communication technologies and services and their implications for other production fields. However, the shifts in focus between the production of ICTs and the usage of ICTs still illustrate important development trends in the discussions, especially with respect to the shift in emphasis from the production side in the 1980s towards the implication side since the 1990s. This is very clear, at present, as the implication side is very much where the discussion is today.

There are, however, two important themes to be added to the issues of internationalization and ICTs in the characterization of central

questions concerning trade and industry policy aspects of information society developments. The first one is services and their increasingly dominant position in the economy. Services constitute around 60–70 per cent of national GDP and occupations in developed economies. In developing countries, the picture is more mixed. However, services in developing countries also constitute the largest share of registered production.

It is, however, far from all services that are of interest in relation to the information society theme. Most services are 'old-fashioned' person-to-person services or services dealing with physical goods as, for instance, many repair services. However, information- and knowledge-intensive services constitute a growing share of services in total, and these services can, to different degrees, be entered on electronic media and transported on communication networks. There is, therefore, a special synergy between ICTs and information-intensive services, and services do play a special role in the development of information societies. This should be and often is reflected in trade and industry policy developments.

The second theme is liberalization. Since the beginning of the 1980s, a wave of liberalization has dominated politics and ideology, not only in the US, Europe and Japan but in almost every region of the world. It has strongly affected the communication areas as the societal organization of both telecommunications and broadcasting has been changed considerably. But it has also more generally affected the whole manner in which trade and industry policies are conducted. Liberalization and its many consequences with respect to new regulatory provisions are an important part of information society programmes. Liberalization of telecommunications and broadcasting are perhaps the most important results of the whole surge towards 'information societies'.

ORIGINS

Although debates on information, knowledge or network societies are most often seen as something new, they actually go back more than 40 years and even further if, for instance, some of the discussions on the importance of knowledge and the growth of services are included. We will, however, confine ourselves to the contributions that are directly linked to the present understanding of information society developments with a bearing on trade and industry policy.

The 'information society' concept itself can be traced back to the first half of the 1960s. A group of researchers from Napier University in Scotland have done a thorough investigation in this field, discussing the different possible origins of the concept and concluding that 'the lion's share of the credit for inventing the "information society"' must be assigned to the editorial staff of the Japanese journal *Haso Asahi* which ran a number of articles with titles including the words 'information society' from 1964 onwards (Duff et al., 1996: 119).

In the US, the term 'information society' was not used until 1970 where it first appeared in the discussions of the American Society for Information Science (1996: 118). However, the origins on the content side rather than the actual words are most often ascribed to the American economist Fritz Machlup, whose work *The Production and Distribution of Knowledge in the United States* was published in 1962. But as pointed out by Duff et al. (1996: 118), Machlup's book is concerned with the 'knowledge industry', not with the 'information society'.

Nevertheless, seen from our perspective in this chapter, Machlup's book constitutes an important starting point for the development of the conception and understanding of the trade and industry implications of the development of knowledge/information societies. He developed a foundation for analyses of the 'information economy' and documented the importance of knowledge production and distribution in a society that, at that time, was conceived as an industrial society.

Later, when this development had moved much further, Machlup's work was followed by a great many other 'measurements' of the information economy. The work led by Marc Uri Porat and resulting in the publication *The Information Economy: Definition and*

Measurement (1977) was the most prominent example. While Machlup operated with a definition of knowledge production that centred on sectors producing what he saw as knowledge products, the team led by Porat included two information sectors, the primary and the secondary, where the primary sector is comprised of companies that produce information goods and services and the secondary includes all information services for internal use in public institutions and private companies. On this basis, it was concluded that, in 1967, 53 per cent of all labour income in the US could be ascribed to information work of different kinds (1977, vol. I: 8).

Another often-cited originator of information society analyses is Daniel Bell, who published *The Coming of Post-industrial Society* in 1973. Although the term 'post-industrial society' cannot unequivocally be equated with the term 'information society', this book has since been seen as the foundation for subsequent theories concerning the information society concept – even though Bell was not too confident about the concept 'information society' himself (see, for instance, Duff, 1998). In his book, Bell analyses different aspects of what is now often summarized by the term 'information society': the composition of the workforce, the importance of information and knowledge in society, and the development of computer and communication technologies – all of which are issues that are still central to the discussions on information society developments.

The last origin to be dealt with here, even though many others might deserve mentioning, is the book by Peter Drucker, *The Age of Discontinuity* (1969/1994). Even in 1969 Drucker was writing about the new 'knowledge technologies'. He also analysed what he called the development 'from international to world economy' (77–168) – a theme that is today vital in many analyses of the changing world economic conditions under the headline of 'globalization'. Last but not least, he stated that the economy could best be described as a 'knowledge economy', thus preceding the many subsequent claims for a knowledge economy by a couple of decades.

THEORIES OF INDUSTRIAL CHANGE

This section reviews trends in the theories of industrial and economic change that clearly have affected thinking on trade and industry policy among political and administrative decision-makers. It is, of course, conceivable that more popular writings, as for instance the works of Alvin Toffler (1980), John Naisbitt (1982) or Nicholas Negroponte (1995), have had a greater and more direct impact on decision-makers. However, here we concentrate on the more academic contributions.

The theoretical contributions that we have chosen are the so-called regulation school, theories on flexible specialization, and theories on changes in the technoeconomic paradigms. There are many common threads in these theories. They all focus on industrial and economic change and they all have a kind of holistic approach[3] to change, integrating different aspects of the societal complex – not just the economic aspect. In the same vein, the writings of Manuel Castells should be mentioned. His monumental work on *The Rise of the Network Society* (1996) and the two works on *The Power of Identity (The Information Age)* (1997) and *End of Millenium* (1998) constitute a holistic analysis of global developments leading to the present network and information society developments.

It could be argued, and with good reason, that by far the most influential trend in trade and industrial policy in the past 20 years has been liberalism and, with respect to economic theory, a return to neoclassical economics. This trend has had a strong impact both on theoretical thinking and on practical policies. However, we have in this section chosen to look at theories that take alternative approaches although they do not exclude the trend of liberalism (discussed later). Liberal thoughts can be incorporated and are often part of the theoretical complexes.

The *regulation school* clearly has – in its intention at any rate – a focus on the totality of societal formation. It is interested in the relationship between production, consumption and political intervention and it also examines

the social struggles that lie behind the actual organization of the economy and the political sphere. The two most important concepts are 'accumulation regime' and 'mode of regulation' – where the first denotes conditions in the production sphere with an emphasis on the relations between capital and labour and capital growth, and the second deals with political organization and intervention. The interesting thing is to study how these two spheres relate to one another.

The regulation school is often called the French school of regulation, as some of the more prominent proponents are French: Michel Aglietta (1979), Alain Lipietz (1987) and Robert Boyer (1990). The regulation school clearly had its roots in a Marxist discourse on production relations, but has contributed to a much broader trend trying to explain the reasons for the economic (and political) crisis that began in the 1970s and the subsequent changes in the economic and political system. The emphasis has been on explaining how the accumulation regime and the mode of regulation were constructed in the post-World War II period, why and how this system has been breaking down, and in what direction the economic and political system is developing today.

The period from the end of World War II to the beginning of the 1970s is seen as a relatively stable period with steady economic growth. The period is called the Fordist period,[4] after Henry Ford as the paradigmatic representative of both mass production and relative welfare for workers. The Ford Corporation, when it really took off, paid higher wages to its employees than the average production site. This created a more stable labour force and also allowed for higher consumption by the employees. The paradigmatic system is thus based on a relationship and adaptation between mass production and mass consumption. The question is how such a system is created and what holds it together.

Part of the answer is that it is created in and by the social struggles between the classes and that it is held together, among other things, by the political governance of the state. There is a strong focus on the role of the state in the theories of the regulation school – which is obvious from its name. Markets are not seen as functioning independently of the political governance system. Markets are, to a large extent, politically constructed or, at least, held together by political regulation or intervention, and the founding economic theories of the Fordist period were much inspired by the writings of John Maynard Keynes who had, *inter alia*, emphasized the importance of stabilizing demand in order to avoid the worst fluctuations of the market.

However, this system gradually broke down during the 1970s and 1980s, triggered by the so-called oil crises of the 1970s. The period that followed was called the post-Fordist epoch by the regulation school, and the main questions being what caused this dissolution and what are the bases of a new period of economic growth.

The main reason for the dissolution of the Fordist period dealt with by the theories of post-Fordism is the increasing globalization of economic, political and ideological conditions. Another important reason is that there are limits to the positive relationship between production and consumption. Higher wages do facilitate more consumption and, therefore, increased production. But higher wages also cut down on the profits of investment, and consequently means were developed to undercut the strongholds of labour, comprising direct attacks on trade unions and changes in the organization of production.

Regarding globalization, the reason that these processes are so important to the regulation school is that production (and consumption) in the Fordist system, basically, is nationally oriented. With increasing globalization, national relations between production and consumption fall apart, there is increased international competition putting pressure on social contracts between capital and labour, and the role of the state is changed. This last point has, in the general debate, often been interpreted as a diminishing role for the state. However, proponents of the regulation school have been more inclined to see it as a new role for the nation-state. In the increasingly global marketplaces, nations tend to compete for production to be located in their country,

competing on establishing the most favourable conditions for investment. But this does not necessarily mean bad conditions for employees and people in general. A new role for the nation-state is to develop conditions with highly qualified labour power, efficient infrastructures, etc. This line of thought has, for instance, been taken by Robert Boyer and Daniel Drache (1996).

But what is the relevance of all this to trade and industry policy in an information society context? There is not much emphasis on the role of information or of information and communication technologies in the regulation school. However, the reason that it is interesting is the description of the post-Fordist epoch with its new, more flexible production structures, its more global production structures, and its emphasis on new roles for the nation-state: all of these issues are central in today's information society discussion.

The *flexible specialization* theory, which is the second theoretical trend to be presented here, can be interpreted as a variation of the theory of post-Fordism, which, as described, also underlines the importance of flexible work processes in the new era. However, the strength of the flexible specialization theoretical branch is that it sheds light and concentrates specifically on production structures, whereas the regulation school is more concerned with the relations between production and political regulation.

The primary proponents of the theory of flexible specialization are Michael Piore and Charles Sabel with their book *The Second Industrial Divide* (1984). But many others have followed, and there is a whole branch of analyses based on the concept of flexible specialization.

Piore and Sabel (1984) explicitly reject the explanation for the economic crises of the 1970s which proposes that state regulation limits the initiatives of entrepreneurs. They also reject the idea that the oil crises have any significant importance. None of these rejections, however, is directed against proponents of the school of regulation, as they do not see the oil crises as anything else than triggering events, and as they have focused not on the limitations that national states might have put on private initiative, but on the changing role that the national state has had to adopt in the face of globalization. However, these rejections show that Piore and Sabel's theory of flexible specialization is focused on the inner working of production and that the reasons for the breakdown of the former system must be found in the structures of production themselves.

Piore and Sabel point at cycles of production where new uses of labour and machines are followed by periods of expansion, but which culminate in crises signalling the limits of these arrangements (1984: 4). According to the authors, there are two kinds of crises: one where the existing match between production and consumption falls apart, and the other where the type of technology chosen and the production structures around it reach their limits of expansion (1984: 4–5).

This second kind of crisis is the one that interests Piore and Sabel the most. They describe situations in which different technology paths are possible as 'industrial divides'. The first great industrial divide took place at the beginning of the nineteenth century, when the dominant mode of production chosen was mass production instead of flexible craft production. Today, we face a second industrial divide, as the mass production system has entered crisis and it is once again possible to choose a new path where craft-based flexible production methods constitute a feasible possibility.

The words 'choose/chosen' are well considered by Piore and Sabel, as they believe that there is no one 'natural' path of production structures but that production structures are social constructs. The authors propose that a structure of flexible specialization is the best 'choice' in the present situation.

The relevance of this theory for our discussion of trade and industry policy with regard to information society developments is once again the emphasis on new production structures and the possibilities in these more flexible systems. One would think that ICTs would have a prominent place in such systems as they allow for a better coordination of, for instance, networks of companies. And computer technology is also dealt with in the book, representing new and more flexible work tools

instead of special-purpose machines used in the production of standardized mass production items. However, ICT is seen not as *the* vital technology in the development of flexible production structures, but as one important element among others (1984: 262).

The third and last of the theories that will be presented in this section is the so-called theory of *technoeconomic paradigms*. The most outstanding representatives of this theoretical trend are Christopher Freeman and Luc Soete (1982) and Giovanni Dosi (1984). Many of the thoughts in this theoretical trend are similar to those presented in the paragraphs on the regulation school and on flexible specialization. However, the theory of technoeconomic paradigms is characterized by a keener concentration on technology – especially technological innovation. It is, therefore, also often subsumed under the broader term 'innovation economics'.[5]

Technology has often not played any central role in economic theory, although there are some prominent exceptions: Adam Smith (partly), Karl Marx and Joseph Schumpeter. Mostly technology has been seen as an exogenous factor not to be dealt with more extensively. But in the theory of technoeconomic paradigms, technology is assigned a central role and is made the object of thorough analysis.

Four different kinds of innovation are depicted: (1) incremental innovations, which are the day-to-day improvements in existing production and marketing activities; (2) radical innovations, which are the results of more committed research and development activities which may result in wholly new products, but normally are confined to individual production sectors; (3) innovations of technological systems that are more fundamental innovations affecting a number of sectors; (4) changes in the technoeconomic paradigm, which affect the whole production system and constitute the basis for new production paradigms.

The understanding of the term 'paradigm' is borrowed from the philosopher Thomas Kuhn, whose book *The Structure of Scientific Revolutions* (1962) analysed the developments in science as structured by paradigmatic ideas changing over time. In the theory of technoeconomic paradigms this understanding is transferred to the field of production where succeeding technoeconomic paradigms are seen as based on different technologies and associated organizations of production.

The first paradigm or wave in the industrial era from 1780 to 1840 was the time of the industrial revolution. The key products were textiles and the energy systems were based on water power. A second paradigm revolved around iron and coal production and energy systems built on steam power, etc. Since the late twentieth century, a new technoeconomic paradigm has been under way, based on microelectronics and computer networks. ICTs are thus the central technologies in this new wave, illustrated by the fact that ICTs are used in practically all production areas. ICTs are the pervasive and generic technologies of our time.

Such thoughts are not entirely new as they are based on the works of Joseph Schumpeter, especially his book *Business Cycles* (1939), and before him Kondratieff (1925) and his theory of long waves in economic life. However, the proponents of the theory of technoeconomic paradigms have combined the thoughts of Schumpeter with Kuhn's theory of successive paradigms and have used these theoretical tools to examine the vital importance of ICTs today, and the many implications that these developments have on economic and social developments. There is no doubt that these thoughts have had a significant impact on the understanding of information society developments among political and administrative decision-makers.

THE ICT SECTOR

The sector comprised of information, communication and telecommunication activities, the ICT sector, has emerged as one of the most dynamic conglomerates of economic activities among industrialized countries and increasingly also among developing countries. The use of computing and communication technologies is transforming the way we produce, consume and accumulate wealth. It is generally acknowledged that a thorough restructuring is evolving and this has often been described

under the headings of convergence or, at a point of time, 'new economy', indicating that economics rooted in the ICT sector is based on new relations, rules and models of accumulation. However, it is not clear to what extent something is new from a theoretical point of view. This has partly to do with the fact that ICT is a troublesome area for the analyst. The activities of the sector unfold in three distinctly different areas or dimensions:

1 as a generic technology that is applied in most economic activities;
2 as an industry producing the equipment and software support for the generic technology;
3 as a broad and fast-growing service industry using the technology, equipment and software support mentioned earlier.

It is the combined effects of the three areas that give the ICT sector its vast potential. The background is that computing was 'just' part of the array of new technologies that resulted from the war effort and formed the material basis for the Fordist boom, first in the US and then gradually in the rest of the Western world. After four shifts of generation in computing, the fifth generation unexpectedly took the form of a rapid integration of computing and communications in the 1980s (Eliasson, 1998). This again was based on two developments. One is the introduction of personal computers. The other is the breakup of the Bell/AT&T system.

During the 1980s, personal computers were steadily adopted by businesses. By 1990, they began to enter the home and the microprocessor became embedded in tools, products for the home, cars, etc. By 2005, the power of computer chips is still being doubled roughly every 18 months (Moore's law), and increasingly pervasive computing is a reality as almost everything comes with a small, cheap chip. But it is in the combination with telecommunications, related to the Internet and mobile services, that the biggest potentials are emerging.

The trajectory of telecommunications parallels the computing development but is, to a large extent, rooted in organizational/institutional developments. The breakup of AT&T initiated in 1982 resulted immediately in heavy entrepreneurial activity in the US as companies like MCI and Sprint raced to build nationwide fibre-optic networks. But it also initiated a global liberalization drive propelled in Europe by the European Commission from 1987 onwards. The call for liberalization in Europe was really articulated by the issue of the Green Paper of 1987 that aimed to make the European telecommunication market become one market like its rivals in the US and Japan. Further, the ambition was to create a competitive market with its alleged virtues of lower prices and faster service and technology development. By 1 January 1998, telecommunication markets including infrastructure provision and telephony had opened up for competition in the majority of countries in the European Union and the European Economic Area. Telecommunication markets were liberalized, and this was further confirmed by a new 'regulatory package' (2002) aiming at harmonizing also the implementation of rules on the national markets.

Now, competition as an organizing principle may mean very different things. The most important dimension of the discussion concerns the differences between proponents of pure competition in the form of *laissez-faire*, where the market is just liberalized without any further regulation (advocated by incumbent operators), and types of regulated competition where an asymmetric regulation is established in order to open the market for new providers.

The pure competitive situation presupposes non-violation of the traditional full competition assumptions: no dominant supplier, no barriers to entry, transparent pricing, etc. None of these assumptions was initially or is today fulfilled on the telecommunication markets, with incumbent operators still having a dominant market share and controlling the delivery channels – the networks. These severe market failures call for regulation to ensure, for example, non-discriminatory access to networks, transparent pricing, etc. Hardly anyone disputes that this type of regulation is needed, and the liberalization that has been under development in the EU for the last 15 years has

been liberalization in the sense that regulations aim at advancing competition. Such a liberalization of markets does not, however, in itself lead to a situation where new competitors can obtain considerable market shares and compete with the incumbent operators on an equal footing. The former national monopolies have far too dominant positions in existing markets for this to develop.[6]

Even if it seems that the liberalization of telecommunication markets has not led to anything resembling a fully competitive market, and instead of legal monopolies we now have the old incumbents as quasi-monopolies with competition at the fringes, the liberalization of telecommunications has, nevertheless, played a dominating role in ICT developments. What began as fringes open for competition outside the focus of the traditional operators has developed into some of the most dynamic areas: the Internet, international communication, mobile and value added.

The symbiotic relationship that developed between the computer and telecommunication technology sectors led to major economic growth, first in the US from the beginning of the 1990s, and a few years later in Europe as well. Generally attributed to the explosive growth of the Internet, there was traditional economic growth effects as direct job creation, and traditional side-effects as exponential growth in hardware and infrastructure companies. Building the new information infrastructure emerged as one of the great global businesses with seemingly unlimited growth potentials. But in 2000, the bubble bursted, and activity, employment and share prices fell back. Five years later, the sector is reinstalled as a growth sector – on a lower and more realistic level but again with the most dynamic immediate economic impact is related to the third part of the converging ICT sector, the content-producing communication and mass communication industry. The ICT-related media industry is growing very fast to be ready to take advantage of the network's capabilities such as interactivity and individual customization (e.g. video on demand). The Internet has consolidated its status as the likely future medium, and the old television networks are engaged in a struggle with newcomers such as Disney and Microsoft for the dominance of digital TV. The empirical evidence of this is unfolding as mergers, fights for future markets, etc., but the field of convergence is still new as an academic discipline and the related social science research is still in its infancy. As a tendency, two points of view can be seen. One is the conventional view on convergence, in the sense that this is seen as an important driver for technological and economic development (Baldwin et al., 1996). Another point of view is more critical towards these possibilities in convergence owing to, for example, inherent differences among the traditional sectors involved with respect to technologies, organization and other structures (Garnham, 1996).

One effect of the emerging convergence, the liberalization and internationalization in the ICT areas, is that standards developments increasingly become an important issue. In a network, environment standards and interoperability are crucial. In the old regime with monopoly operators, standardization was dealt with in official or semi-official institutions such as the ITU with its subcommittees. In a market-driven environment this is no longer sufficient, and as a result standardization research is a fast-growing area that is acquiring great importance. Compatibility is a central theme and has been elaborated, for example, by Paul Allen (1995) and Stanley Besen (1995).

Statistically, the development of the ICT sector can be illustrated in different ways. As mentioned earlier, the sector is one of the most dynamic ones as the growth contribution of the sector is far greater than its share of GDP. Following the earlier discussion, the direct growth contribution from the US ICT sector during the 1990s has been estimated at about 15 per cent (OECD, 1999), whereas the total growth contribution of the sector has been estimated at 25–30 per cent (US Department of Commerce, 1999). This compares with a sector share of GDP of 8 per cent (US Department of Commerce, 1999). Furthermore, the development of the ICT sector in the emerging network economy has led to increasing productivity and competition and lower inflation. These effects are so far distinguishable especially in the US,[7]

but are increasingly felt in Europe and even in developing countries. In Europe, the contribution of ICT investments to GDP generally doubled when comparing 1990–1995 with 1995–2002 (OECD, 2004). One of the strongest indirect economic effects is seen in the service industries where ICTs create the possibilities for new divisions of labour and new tendencies in internationalization. Traditionally, most services have to be consumed where and when they are produced, as they cannot be transported. Once information-intensive services are detached from human beings and stored on electronic media, they can be transferred on telecommunication lines and traded across borders. Other services also experience an increased tradability when the acts of contacting and contracting become easier with new ICTs.

The emergence of ICTs as the pervasive and generic technologies in the global economy makes it difficult today to see these technologies just 'as one important element among others' (Piore and Sabel, 1984: 262). The convergence of computing, telecommunications and mass media as a phenomenon associated with the development of ICTs has introduced 'placelessness' in production, i.e. geographical localization is becoming less important. That placelessness is gaining importance especially in the production of services has been argued from a theoretical point of view (UN, 1994) and can be observed in, for example, the development of Bangalore, where a region in a developing country has emerged as a vital partner in the international production of software. First its role was as a supplier of cheap, basic coding jobs and then increasingly it has become an innovative environment for the development of sophisticated products. This is, however, no longer a unique example. Increasingly, there is evidence that ICTs enable the participation of developing countries in the international division of labour at an advanced level. During the last few years a small but growing indigenous software industry directed towards both the home market and the international market has emerged in West Africa and is increasingly seen as a possible avenue for participation in the global information society (Wayo Seini et al., 1998).

INTERNATIONALIZATION

Alongside the development of ICTs, internationalization is often depicted as the most important fundamental feature of information society developments. But why is this, and how does the importance of internationalization manifest itself? These questions are briefly dealt with at the beginning of this section, after which the discussion concentrates on developments in theories of internationalization with special interest for trade and industry policies.

The overall importance of internationalization is related to the implications that it has for the productive structures in different countries, based on competition from producers from other countries (import and settlement), and to the new possibilities for expansion (export and settlement) and political governance: compare the discussions of the abovementioned regulation school. This applies broadly to all industries (but not to the same extent), including the sectors that produce information and communication goods and services. On the other hand, ICTs have strong implications for the possibilities for trading and producing internationally because ICTs improve communications both between trading partners and inside transnational corporations. There is thus an affinity between questions of internationalization and questions of trade and industry policies in an information society context.

At the beginning of the chapter, the extent of the importance of internationalization was briefly discussed. Paul Krugman, Paul Bairoch, and Paul Hirst and Grahame Thompson were mentioned as examples of researchers who have advanced the view that too much emphasis can be attached to the phenomenon of internationalization. The reason for this view may be that in some expositions, if not all, far too many developments are attributed to internationalization.[8] After a good number of years spent attracting attention to the questions of internationalization,[9] it may seem to some economists that everything in public debates, apparently, can be explained by reference to the developments of internationalization and

that this requires some measure of correction. Examples of writings that either favour or condemn internationalization, i.e. see it as either a great advantage or a threat, are Martin Wolf's *Why Globalization Works* (2004), Jagdish Bhagwati's *In Defence of Globalization* (2004) (benefit), Noami Klein's *No Logo* (2000) and George Monbiot's *The Age of Consent* (2003) (threat). However, in spite of such differences in view, there is general agreement that internationalization is extremely important and has vast implications, not only for trade and industry development but also for society at large.

Theories of internationalization deal with many subjects, and it is impossible to do them justice in such a short space. However, the theme can be subdivided into two categories, namely trade and foreign establishment (settlement). Most often, these two subjects are treated separately, and in this section we concentrate on the discussions that take trade as their point of departure, not because foreign establishment is uninteresting – quite the contrary – but because trade discussions constitute the classical point of departure in theories of internationalization and because most of the themes that are interesting in an information society trade and policy discussion context can be approached via the trade debates.

Classical trade theory builds on David Ricardo's *The Principles of Political Economy and Taxation* (1817/1947) where the theory of comparative advantages was first expounded. In fact, Adam Smith in his book *The Wealth of Nations* (1776/1947) had already paved the way for a theory of absolute advantages. These two trends in the theoretical work regarding trade have continued to exist ever since. They do not necessarily exclude each other, but they emphasize different aspects of the determinants of trade. The theory of comparative advantages focuses on the determinants of international specialization, while the theory of absolute advantages focuses on economic power relations between countries. The theory of comparative advantages has had a dominant position ever since Ricardo, but there have also been other trends relating to different kinds of industrial policies, e.g. concerning the protection of infant industries and for the past 20–30 years concerning 'strategic trade policies', and even theories of absolute advantages. Also, innovation systems approaches constitute implicit criticisms of a pure comparative advantage approach.

The theory of comparative advantages clearly has some explanatory power in relation to trade between countries with different endowments. But the strongest reason for the persistence of the dominant position of this theory in international economic relations is probably that it supports the normative claim for the advantages of free trade. However, the assumptions on which the theory builds are not only very strict but in many ways highly unrealistic.[10]

In relation to our discussion, we will only mention three assumptions that are clearly unrealistic: that both product markets and factor markets are assumed to be perfectly competitive; that all factors of production are perfectly mobile within countries but immobile between countries; and that different countries enjoy equal access to the same body of technological knowledge. The first assumption applies generally in traditional neoclassical economics, but is no more realistic in international relations than in national circumstances. One of the implications is that there are production areas where economic rents (extra profit and/or extra high wages) are appropriated, and not only on a short-term basis. The second assumption regarding immobility of production factors is notoriously not true: international investment is gaining increasing importance. The third assumption concerning technical knowledge cannot be subscribed to either: this is one of the differences between countries that has a growing importance today.

The second assumption is the one that has attracted most attention in broader public discussions on international economic relations. Where internationalization formerly, to a larger extent, consisted of trade between countries, international investment and settlement in foreign countries is gaining increasing importance. The extent to which this is true can be discussed and is discussed, but international investments are important and have a growing importance. On a world political level, this is

reflected in the negotiations in the World Trade Organization (WTO) where not only traditional trade questions are raised, and in the attempt by the Organization for Economic Cooperation and Development (OECD) to establish a multilateral agreement on investment (MAI). It is also reflected in the increasing internationalization of services, where modes of internationalization other than traditional trade are of central importance.

Such developments and observations have led to a discussion of whether the term 'globalization' is more appropriate than the term 'internationalization', as the word 'internationalization' in itself denotes relations between (inter) nations while globalization, ostensibly, better expresses a situation where national borders are becoming less important in economic activities. We see the advantages of the term 'globalization' if internationalization is understood as describing merely traditional trade relations between countries. However, in both trade relations and international investment, there are still large national interests and one should not underestimate the importance of nation-state initiatives. As we shall see in the following, a continued role for the nation-state in international trade and industry policies can even be envisioned and defended.

The first and third assumptions regarding the theory of comparative advantages have been widely discussed in academic work. The question is whether, or to what extent, the theory of comparative advantages is the best way to analyse the positions of strengths and weaknesses of countries in different production areas and whether, or to what extent, the proposition of free trade advantages for all can be supported. The obvious fact is that different countries have different possibilities for access to technological knowledge and technologies. Furthermore, there are clearly production areas where rent is appropriated and where, for instance, higher wages cannot be explained by labour power with higher competencies.

These facts have been analysed and crystallized in theories regarding strategic trade policies (see e.g. Paul Krugman, 1986), competitive advantages (e.g. Michael Porter, 1990), absolute advantages (e.g. Giovanni Dosi et al., 1990) and national innovation systems (e.g. Lundvall (1992). The argument in 'strategic trade policies' is that, as some sectors produce higher rents and as technological innovations play an important role in the differences between companies and countries, one cannot rely on some automatic comparative advantage to create the best of all economic worlds. Strategic policy moves can be appropriate. The term 'competitive advantages' points in the same direction. Instead of more static comparative advantages, based on, for example, natural endowments, more dynamic competitive advantages are the foundations of the distribution of production. And, in the theory of absolute advantages, this argument is taken even further, claiming that some countries may have an overall advantage, covering almost all sectors, and that they will not move all their production into the sectors where their advantages are the best because this is not realistic, and because they are also highly competitive in the sectors where their advantages are the smallest. With ICTs, this situation is very feasible as ICTs are used in all sectors and, therefore, affect the competitiveness of all sectors in the countries that are advanced in the use of these technologies.

The conclusion of all this, in our case dealing with trade and industry policies, is that national and/or regional trade and industry policies are not becoming less relevant than they were in less internationalized phases. In a world where comparative advantages are the dominant mechanisms of distribution of production, there is not a great need for policy intervention, as wealth will automatically be optimized in all countries. However, if strategic moves are necessary and if competitive and even absolute advantages can be created, this calls for appropriate policies to be applied. However, as we shall see in the following section, it also calls for very much the same policies in all countries as they respond to similar mechanisms and priorities.

An open question in continuation of this is whether all countries really face similar situations. Do the poorer countries face issues similar to those faced by the richer countries? The degree of internationalization is, for instance,

much lower in poor countries compared with rich countries. By far the largest share of international trade and international investments take place between the US, Europe and the richer countries in Asia. The whole African continent seems practically exempt from international economic relations if one examines international trade and investment on an overall scale, for example, the percentage of international trade in which African countries are involved. However, seen from the perspective of these national economies, international economic relations play an important role and most of the policy discussions follow the same lines as in the richer countries. This partly reflects a policy import from richer countries but also reflects the fact that many of the questions that poorer countries face are not fundamentally different from those faced by richer countries.

POLICY VISIONS

Following the arguments in the sections above, there is general agreement that technological, economic and political developments together constitute the drivers in an increasing internationalization of the economic system. In this relation it is, however, also interesting to analyse to what extent it is possible to conduct national/regional policies. The question is multifaceted and was initially dealt with in research during the 1990s (e.g. Hirst and Zeitlin, 1992). As an immediate empirical observation, a surprising global coordination and timing of plans and visions for the information society can be seen. In 1993 the US government published *The National Information Infrastructure: Agenda Action*; the same year, the European Commission published its White Paper, *Growth, Competitiveness and Employment*; and in 1994 the Japanese government released *Reforms toward the Intellectual Creative Society of the 21st Century*. These were followed during 1994 and 1995 by plans and strategies issued by many countries in Europe. This applies, for example, to the UK and France and to the Netherlands, Sweden and Denmark. In other parts of the world, Singapore, South Korea, Canada and Australia published national plans during these years. And so did some developing countries in Asia, such as Malaysia, Thailand and the Philippines. Additionally, a G7 meeting in Brussels addressed the question in February 1995, and a Global Information Infrastructure Commission has been set up on the basis of a private initiative.

It is remarkable that so many countries and international institutions, at the same time, elaborate plans and programmes for the exploitation of the potentials of the emerging new information and communication technologies. Not since the construction of the railway system has a similar common international interest and enthusiasm for a technology and its possibilities been shown. Another analogy to this development comes easily to mind. As in the case of the railways, the electronic communication systems are only really useful when they are connected and developed more or less on the same level. It may be possible for a large country like the US to make some progress in ICTs alone. However, for smaller European countries, the advancement of one country very heavily depends on the advancement of other countries. The simultaneous drawing up of information society plans might be seen as an implicit understanding of this and, to a great extent, all of these strategy statements and plans build on the ideas and thoughts in the theoretical literature described earlier.

However, a closer analysis clearly reveals that these first-generation plans/visions hardly represent social planning in a strict sense, owing to two sets of assumptions. The basic problems in planning for a national information society are simply assumed away in the plans presented. The general assumptions are that the information society is emerging as a matter of fact, and attention can then be turned to the support of existing economic-political interests and problems. The second set of underlying assumptions is in reality that the market is taking care of the development of new services, technologies and structures. What seemed to be a global planning exercise was partly a demonstration of the general acceptance of the neoliberal policy vision.

Following the major reorganization of the telecommunication sector in most EU countries, the EU Commission and the member countries have, since the mid 1990s, been engaged in a second wave of information society plans. Where the first wave of plans emphasized liberalization of telecommunications and information technology development, the second wave has focused more on social aspects of information society developments.[11] This understanding is, to a large extent, well founded – especially if the first wave is seen as being represented by the Bangemann Report and the Action Plan of 1994 (European Commission, 1994). However, the shift has to be seen against a changed socioeconomic setting.

The first initiative of the European Commission in its information society planning of the 1990s was the White Paper *Growth, Competitiveness and Employment* of 1993. This was prepared by the Commission under the chairmanship of the former French Socialist Minister of Finance, Jacques Delors, and clearly bears the hallmark of a social democratic concern for job creation and equal opportunity combined with a focus on Europe's competitiveness in an increasingly internationalizing world economy. This broadly focused White Paper was followed by the Bangemann Report in 1994 on the basis of an initiative by the Council. Martin Bangemann is a former German FDP (liberal) minister, and the emphasis in the report, and the Action Plan that built on it, is much more on the issues of liberalization of telecommunications and the primacy of the private sector in the development of an information society.

In 1995, the European Commission initiated a high-level expert group (HLEG), and an Information Society Forum (ISF) was established to analyse 'the social aspects of the information society', as the HLEG (1997) puts it in its final policy report. As a justification for this focus, the HLEG wrote: 'Until that time, the debate on the emerging information society had been dominated by issues relating to the technological and infrastructure challenges and the regulatory economic environment' (1997: 14). There was, therefore, a perceived need for refocusing on the social dimensions of the 'European model' in line with the White Paper (HLEG, 1997: 17). This trend was further pursued in *eEurope – An Information Society for All* (Commission of the European Communities, 2002) – a plan adopted by the European Council in 2000 and updated in 2002.

The development in EU information society policy can thus be seen as having changed from a technology- and market-oriented focus to a broader social concern. One of the reasons for this priority is clearly that the development of the basic infrastructure through the liberalization of telecommunication has developed in a satisfactory way – seen from the point of view of the Commission. But even if other issues in other contexts may be given priority, the second-generation visions clearly cover a broader area than the first-generation visions. This has not, however, changed the clear neoliberal basis for the visions – a feature that is almost universal even in the present emerging plans/visions from former planned economies in developing countries, where Ghana's vision 'Ghana 2020' can be mentioned as a specific example.

SUMMARY AND CONCLUSION

The most conspicuous developments that have taken place through the last two to three decades with respect to trade and industry policy trends in an information society context can be summarized in the following way. On the technological side, information and communication technologies and services have developed and expanded vastly, and the processes of digitalization have allowed for new technological possibilities to be explored, among them a beginning convergence between formerly separate information and communication sectors. On the economic side, economies have internationalized to an increasing degree, and especially the growing internationalization of production processes (epitomized in the term 'globalization') and the beginning internationalization of services is seen as important. On the political (and ideological) side, liberalism has

changed the political climate considerably and has had a clear impact on the societal organization of, for example, electronic communication areas. And other important development trends and features could be mentioned, such as the ever increasing importance of services in the economies, the growth in information processing occupations, the role of information and knowledge in society, new and more flexible work processes and organizations, and changes in the role of national states.

These developments are reflected in economic and social science research and have greatly impacted on the trade and industrial policies implemented by public authorities. With respect to economic and social science theories with influence on information society visions of public authorities, at least four different trends (or areas of research) deserve mentioning here.

The first is concerned with the liberalization of the different communication sectors. Two of these sectors, telecommunications and broadcasting, were formerly in state monopoly or very strictly regulated. However, over the past 20 years this has changed, which clearly has been reflected in economic and social science research where a great deal of work has been done regarding the implications of liberalization.

The second research area is concerned with trends in the internationalization/globalization processes in the economic (and other) sphere(s). This area of research can hardly be drawn together in just one or a few trends. Many different processes are examined, though there is a dominant interest in international investment and the globalization of production structures.

The third deals with evolutionary (and revolutionary) developments in the economy and the importance of technological change. The theories examined in this chapter, to a large extent, are part of these areas of interest – although they also touch upon internationalization and state regulation. It is a broad category encompassing research interested in the technology side of production (innovation economics) and the evolutionary processes in the economy (evolutionary economics).

The fourth theoretical trend is interested in institutional aspects of the economy. This trend has not explicitly been dealt with in this chapter, but plays an important role in the discussions concerning flexible production and the importance and implications of electronic communications in production and distribution.

The influence of these theoretical trends on the discussions and decisions taken at a broader societal level, e.g. among decision-makers on the political scene, has been discussed in the course of this chapter and the evaluation expressed has been that there clearly is a connection between the academic world and the world of economic and political decisions in this area. However, a modification of this evaluation could be made. As much as it is a question of academic research influencing political discussions, one could claim that both 'worlds' have been under the influence of the significant changes that have taken place during the past two to three decades. Still, the overall evaluation is that discussions and concepts that have been crystallized in academic research have had a relatively strong influence on broader political debates and decisions in this area.

In a sense, it is strange that, since the beginning of the 1990s, there has been a surge of information and network society visions and plans issued by public authorities. Often, one of the common understandings is that with the many changes in the economic and political systems, state planning is *passé*. However, there has probably never been so much political planning as has been witnessed in relation to all the information society vision statements in the last decade.

But the content of these plans has changed considerably compared with former political interventions. This change has often been described as a turn away from direct state interventionism towards an emphasis on the creation of framework conditions for economic activity. This development can, for instance, be seen in telecommunications where direct control via ownership of operators is relinquished and indirect regulation is implemented.

The background for this development is multifaceted. However, the development towards framework regulation fits in well with the increasing internationalization where public

authorities aim at creating the best possible framework conditions for businesses in an international competitive environment; note, for example, the discussions of the regulation school on the changes in the role of the state.

Analyses show that the trade and industry policies relevant to the information society, implemented in the different countries, are to a large extent similar. The reason is partly that policy directions in one country inspire other countries – and for the poorer countries also there is external pressure from transnational corporations, richer countries and international organizations. However, it is also a result of the competition to become a prime site for production of different kinds in the international divisions of labour. Dynamic competitive advantages are increasingly important compared with more static comparative advantages. This has led to internationalization not only of production but also of trade and industry policies.

There are, nevertheless, differences in the policies. This applies, to some extent, to the priority given to the combination of 'harder' trade and industry policy measures and 'softer' areas like culture, education, etc., although most information/ network society visions today include such areas. But more fundamentally, it applies to the perspective in which trade and industry policies are seen. In Europe, there is a tendency to consider the creation of wealth and welfare as two aspects that should not be separated. In the US, there is a focus on wealth creation, and welfare is considered a byproduct. This is, of course, partly a reflection of the fact that social democratic governments dominate the European Union at present. But it is also a more basic difference, based on the differences in positions of strength of the social classes in the various areas.

NOTES

1 However, in this volume Frank Webster's contribution discusses the information society concepts, which are more comprehensively examined in Webster (1995).

2 Shapiro and Varian (1999) can be seen as an example of such an emphasis on information and knowledge content and networked communication goods and services.

3 This is the expression used by Webster (1995) when examining the regulation school.

4 With inspiration from the writings of Antonio Gramsci (1971).

5 Basic works in the tradition of innovation economics are Rosenberg (1982) and Nelson and Winter (1982).

6 A vast amount of research has been done in the field of telecommunication liberalization and regulation. For a comprehensive overview, see Melody (1997).

7 The US Department of Commerce (1999) has estimated a general lowering of the rate of inflation of 0.7 per cent in the 1990s.

8 This is the line of argumentation in, for example, Krugman (1997).

9 In the case of Krugman, see, for instance, Krugman (1986, 1990).

10 For a discussion of the assumptions underlying the theory of comparative advantages, see e.g. Grimwade (1989).

11 This is, for instance, the understanding of the Commission itself: see European Commission (1996), which is presented as 'an updated and revised Action Plan in order to launch a second phase of the EU information society strategy'.

REFERENCES

Aglietta, Michel (1979) A *Theory of Capitalist Regulation*. London: New Left Books.

Allen, Paul (1995) 'Standardization policies fornetwork technologies', in Richard Hawkins, Robin Mansek and Jim Skea (eds), *Standards, Innovation and Competitiveness*. Cheltenham: Elgar.

Bairoch, Paul (1996) 'Globalization myths and realities', in Robert Boyer and Daniel Drache (eds), *States against Markets*. London: Routledge. pp. 173–92.

Baldwin, Thomas, McVoy, Stevens and Steinfield, Charles (1996) *Convergence: Integrating Media, Information and Communication Systems*. London: Sage.

Beck, Ulrich (2000) *What is Globalization?* Oxford: Blackwell.

Bell, Daniel (1973) *The Coming of Post-industrial Society*. New York: Basic.

Besen, Stanley (1995) 'The standard processes in telecommunication and information technology', in Richard Hawkins et al. (eds), *Standards, Innovation and Competitiveness*. Cheltenham: Elgar.

Bhagwati, J. (2004) *In Defence of Globalization*. Oxford: Oxford University Press.

Boyer, Robert (1990) *The Regulation School: A Critical Introduction*. New York: Columbia University Press.

Boyer, Robert and Drache, Daniel (eds) (1996) *States against Markets*. London: Routledge.
Castells, Manuel (1996) *The Rise of the Network Society*. Oxford: Blackwell.
Castells, Manuel (1997) *The Power of Identity*. Malden, MA; Oxford: Blackwell.
Commission of the European Communities (2002) *eEurope 2005: An Information Society for All*, COM(2002) 263 final. Brussels: CEC.
Dosi, Giovanni (1984) *Technical Change and Industrial Transformation*. London: Macmillan.
Dosi, Giovanni, Pavitt, Keith and Soete, Luc (l990) *The Economics of Technical Change and International Trade*. Brighton: Harvester-Wheatsheaf.
Drucker, Peter (1969/1994) *The Age of Discontinuity*. New Brunswick, NJ: Transaction.
Duff, Alistair (1998) 'Daniel Bell's theory of the information society', *Journal of Information Science*, 24 (6): 373–93.
Duff, Alistair, Craig, David and McNeill, David (1996) 'A note on the origins of the "information society"', *Journal of Information Science*, 22 (2): 117–22.
Eliasson, G. (1998) *The Macroeconomic Effects of the Computer and Communications Technology*. Stockholm: KTH.
European Commission (1994) *Europe's Way to the Information Society: An Action Plan*. COM(94) 347. Brussels: EC.
European Commission (1996) *Europe at the Forefront of the Global Information Society: Rolling Action Plan*. COM(96)607. Brussels: EC.
Freeman, Christopher and Soete, Luc (1982) *The Economics of Industrial Innovation*. London: Pinter.
Garnham, Nicholas (1996) 'Constraints on multimedia convergence', in William Dutton (ed.), *Information and Communication Technologies: Visions and Realities*. Oxford: Oxford University Press. pp. 103–19.
Giddens, Anthony (1999) *How Globalization Is Reshaping Our Lives*. London: Profile Books.
Gramsci, Antonio (1971) 'Americanism and Fordism', in A. Gramsci, *Selections from the Prison Notebooks*. London: Lawrence & Wishart.
Grimwade, Nigel (1989) *International Trade: New Patterns of Trade*. London: Routledge.
Hardt, Michael and Negri, Antonio (2001) *Empire*. Cambridge, MA: Harvard University Press.
Hirst, Paul and Thompson, Grahame (1996) *Globalization in Question*. Cambridge: Polity.
Hirst, Paul and Zeitlin, Jonathan (1992) 'The problem of "globalisation"', *Economy and Society*, 21 (4): 357–96.
HLEG (1997) *Building the European Information Society for Us All*. DG V. Brussels: European Commission.
Klein, Noami (2000) *No Logo: No Space, No Choice, No Jobs*. London: Flamingo.
Kondratieff, N. (1925) 'The long wave in economic life', *Review of Economic Statistics*, 17: 105–15.
Krugman, Paul (ed.) (1986) *Strategic Trade Policy and the New Internnational Economics*. Cambridge, MA: MIT Press.
Krugman, Paul (1990) *Rethinking International Trade*. Cambridge, MA: MIT Press.
Krugman, Paul (1997) *Pop lnternationalism*. Cambridge, MA: MIT Press.
Kuhn, Thomas (1962) *The Structure of Scientific Revolutions*. Chicago: Chicago University Press.
Lipietz, Alain (1987) *Mirages and Miracles: The Crisis of Global Fordism*. London: Verso.
Lundvall, Bengt-Åke (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter.
Machlup, Fritz (1962) *The Production and Distribution of Knowledge in the United States*. Princeton, NJ: Princeton University Press.
Martin, H.-P. and Schumann, H. (1996) *Die Globaliserungsfalle: Der Angriff auf Demokratie und Wohlstand*. Reinbek: Rowohlt.
May, Christopher (2000) *The Information Society: A Sceptical View*. Cambridge: Polity Press.
Melody, William (1997) *Telecom Reform: Principles, Policies and Regulatory Practices*. Lyngby: Technical University of Denmark.
Monbiot, George (2003) *The Age of Consent: A Manifesto for a New World Order*. London: HarperCollins.
Naisbitt, John (1982) *Megatrends: Ten New Directions Transforming Our Lives*. New York: Warner.
Negroponte, Nicholas (1995) *Being Digital*. New York: Knopf.
Nelson, R.R. and Winter, S.G. (1982) *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
OECD (1999) *The Economic and Social Impact of Electronic Commerce*. Paris: OECD.
OECD (2004) *OECD ICT Key Indicators*. Paris: OECD.
Ohmae, K. (1990) *The Borderless World*. New York: Harper.
Piore, Michael and Sabel, Charles (1984) *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic.
Porat, Marc Uri (1977) *The Information Economy: Definition and Measurement*. Washington, DC: US Department of Commerce.
Porter, Michael (1990) *Competitive Advantages of Nations*. London: Macmillan.

Ricardo, David (1817/1947) *The Principles of Political Economy and Taxation*. London: Dent.

Rosenberg, Nathan (1982) *Inside the Black Box: Technology and Economy*. Cambridge: Cambridge University Press.

Schumpeter, Joseph (1939) *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*. New York: McGraw-Hill.

Shapiro, Carl and Varian, Hal (1999) *Information Rules: A Strategic Guide to the Network Economy*. Cambridge, MA: Harvard Business School Press.

Smith, Adam (1776/1947) *The Wealth of Nations*. London: Dent.

Stiglitz, Joseph (2002) *Globalization and Its Discontents*. London: Penguin.

Toffler, Alvin (1980) *The Third Wave*. London: Collins.

UN (1994) *The Tradability of Banking Services*. ST/CTC/168. Geneva: United Nations.

US Department of Commerce (1999) *The Emerging Digital Economy*. Washington, DC: USDC.

Wayo Seini, A., Abdulai, M.-S. and Kwadwo Asenso-Okyere, W. (1998) *Telematics Usage for Ghana's Development*. A report prepared for the Ghana National Committee for Internet Connectivity (GNCIC). Available online: http:// www.bellanet.org/partners/aisi/nici/ghana/ghanaa

Webster, Frank (1995) *Theories of the Information Society*. London: Routledge.

Wolf, M. (2004) *Why Globalization Works*. New Haven: Yale University Press.

20

The Governance of Media Markets

BELLA MODY, HARRY M. TREBING
AND LAURA STEIN

In *Telecommunications Politics* (1995), Mody and collaborators wrote about the forces and factors that influenced the deregulation and privatization of telecommunication in developing countries, home to two-thirds of the world's population. We focused on the role of intergovernmental organizations like the World Bank, foreign capital, the nation-state and domestic capital. We traced the influences of these forces through national case studies. We warned that privatization alone would not achieve competition, and we urged that state–market relations be conceptualized as adaptive rather than opposed. The real question should be the nature of state intervention rather than how much.

Market-opening telecommunication deregulation has been championed on a global and national scale by growth-oriented industry and governments of the US, Japan and the UK since the 1980s. At the beginning of the twenty-first century, after two decades of promoting deregulation for competition, the tendency seems to be towards an industry characterized by tight oligopoly (defined as four leading firms together controlling 60–100 per cent of the market). The US formula for competition for global prosperity included three essential steps: (1) mandatory unbundling of local networks; (2) establishment of prices for network access and interconnection that do not inhibit competition; and (3) auctioning the frequency spectrum to promote wireless communication that can compete with wireline networks. Although there has been successful action in some of these areas in some nations, highly competitive networks have not emerged across the board, and industry concentration and/or tight oligopoly are becoming more and more evident on a national and global basis. Strictly economy-focused governance of liberalization that ignores social formations and political constituencies is rootless and insensitive to local conditions. We need a new architecture for the governance of new media markets that is based on consensus building, freely chosen international collaborations, and respect for the unique conditions in individual societies. In a world increasingly connected by the media, new and old, we cannot do media analysis that is single disciplinary, sectoral, technological or economic alone.

Five economic factors alone raise serious questions about the type of deregulated market structures that are evolving. First, there are substantial network economies inherent in the provision of telecommunications services. These lead to high concentration, which, in turn, creates a potential for exercising market and political power that can negate the effects of selective entry through open access. This is especially important when coupled with

vertical integration into downstream markets and common ownership of wireline and wireless plant.

Second, unbundling network components for new entrants will not overcome the obstacles confronting such entrants when dealing with an incumbent network providing widespread rebundled retail services. If the new entrant cannot match the wide range of offerings by the incumbent, then it will be confined to niche markets. Niche market rivalry is not a surrogate for workable competition, nor is niche market competition a sufficient constraint on the profits or pricing practices of the incumbent. Where the new entrant is large and has substantial market power, as in the case of new entry by the regional Bell holding companies into long-distance telecommunications markets, there will be a strong incentive for the inter-exchange carrier and the entrant to engage in bilateral oligopoly negotiations that will jeopardize neither the profits nor the discretionary behaviour of either player.

Third, the scope and capital intensity of comprehensive networks create a strong pressure to assure a stream of revenues sufficient to support a capital structure that is heavily weighted by debt capital. This financial burden creates incentives for market differentiation, price leadership and interdependent action. This serves as a further inducement for oligopoly behaviour.

Fourth, the prospects for developing generally accepted 'neutral' pricing guidelines for access appear to be remote. Incumbent telephone companies want high access charges covering profits forgone from not serving retail markets, a contribution to overhead costs, and the incremental cost of interconnection. Entrants want low access charges covering little more than bare-bones incremental costs. The outlook for a swift and straightforward reconciliation by national regulators is far from promising.

Fifth, successful rationing of the frequency spectrum to promote competition depends on the market structure in which auctioning takes place. In a tight oligopoly, the firm has an incentive to buy and withhold the spectrum in anticipation of high prices and profits at a later date, especially if this is necessary to secure a place in a market where future success is dependent on being a major full service provider capable of offering bundled wireline and wireless services. With few restrictions on licensees, oligopolists would be free to exploit such strategies to maximize advantage.

Why worry about oligopoly in telecommunication? Is it not superior to regulated private monopoly or to inefficient public monopolies? The rhetoric promoting market openings did not include the adverse consequences of tight oligopolies that are not amenable to light regulation through price caps, incentive allowances and open access. The first adverse consequence is the strong incentive for oligopolies to engage in an aggressive programme of mergers, acquisitions and various forms of collaborative behaviour such as alliances and joint ventures. Second, prices will no longer track costs. There will be strong incentives to engage in price discrimination and cross-subsidization between markets, to grant price concessions to large buyers, and to resort to patterns of price leadership to stabilize revenues wherever possible. Third, cost savings will not be distributed to final customer classes in a manner that is commensurate with their role in making such savings possible. Fourth, profit levels will be higher over time than those that would be expected to prevail under effective competition. This has been demonstrated in economies like New Zealand where privatization/deregulation programmes have been put in place. Fifth, network technology will be driven by the requirements of the largest users (multinational corporations) at the expense of a universal network designed to serve all classes. Sixth, network denigration and service deterioration are distinct possibilities under tight oligopoly and light regulation. The firm will have a strong incentive to redeploy assets based on profitability expectations. This can result in an incentive to underprovide quality service in many residual markets. Finally, tight oligopoly provides an excellent opportunity to promote new centres of economic and political power. Success in creating a centre of power in telecommunications will depend upon achieving three important goals; (1) the creation of an optimal mix of basic services and new growth-oriented services; (2) the capture of all

inherent network economies and technological advances involved in providing these services; and (3) an ability to fully exploit the demand and supply characteristics of differentiated markets in a fashion that will foreclose or circumscribe new entry while maintaining high levels of economic profits. Tight oligopolists will also have the advantage of possessing resources sufficient to shape public policies to achieve these goals.[1]

The rhetoric for competition has not resulted in competitive market structures, and advances in technology have not provided suitable solutions to these problems. Indeed, high levels of market concentration have persisted as the telecommunications industry has evolved from analogue to digital and then to Internet protocol technology. At the same time, regulatory attempts to address these problems through the promotion of competitive access have failed to create market structures that can be described as competitive (5–6 independent firms of equal size with no significant barriers to entry or exit).[2] A reform of the regulatory process is needed to deal with tight oligopoly through a system of monitoring corporate concentration, together with new innovative programmes that negate the adverse consequences of oligopoly in pricing, investment and marketing (Trebing, 2004). We should expect nothing less from regulatory agencies who are supposed to be custodians of the public interest.

Disappointment with the nation-state as the supposedly public interested service provider, and the availability of eager, willing and able foreign firms looking for new markets has led to intergovernmental agreements on equal treatment of all carriers and sources of capital. Service providers are protecting themselves from competition through mergers and alliances, layoffs (Yoo and Mody, 2000), the introduction of new technologies, and diversification into content provision. Firms are seeking to differentiate themselves on the features of their products and services rather than on price.

What is the status of telecommunication policy and regulation around the world? The lack of symmetry in regulation between content provision and carriage is being questioned as technological development blurs market boundaries. With broadband technology and increased use of data, mobile and leased lines over voice services, pricing regulation and rebalancing local and long-distance rates is now an issue. Some combinations of regulatory assurance of interconnectivity and determination of rates with industry-based access undertakings have emerged in many countries. Some nations have no explicit policies to promote innovation in the information and communication service industries while many others have used government procurement incentives, research and development programmes and taxation incentives. The Internet as innovation came from innovators free from network control; some worry that the AOL–Time-Warner merger will allow cable to control broadband access and compromise the promise of the Internet. National market stimulation policies have been limited to expanding the use of existing technologies through education and public access via telecentres, schools and libraries. Novel applications to meet unmet citizen needs are few and far between, e.g. graphic interfaces for illiterate users interested in information on employment opportunities for unskilled workers. National universal service policies have been premised on social equity more often than on human rights and economic development issues. New policy and regulatory approaches are needed to balance efficiency, distribution and fairness goals. National policy, regulatory measures and their impacts reflect the distinct social and economic conditions in which telecommunication infrastructure is embedded. These range from application of general competition, trade practices law and consumer protection across sectors, to the creation of an industry-specific regulator, to regulation separated from service provision, to maintenance of the traditional organization of service provision and regulation within the same government agency. Competition in the Danish telecommunication market has come further than competition in the EU countries in general partly because of sector-specific regulation. The Finnish conception of economic and electronic equity differs from that of the

US; thus Finland has the world's highest PC penetration and Internet usage rates. For 80 per cent of the world's population who live on 20 per cent of the world's income, (about 4.8 million people) arguably, e-equity should be at least as important as e-commerce.

REGULATION AND REGULABILITY OF NEW MEDIA

Whether government regulation of new media is desirable or possible is a point of contention in both popular and academic discourse.[3] Many view these media as natural agents of economic, cultural and political progress. This viewpoint, described variously as technological determinism, technological utopianism or technological optimism, holds that new technologies possess inherent characteristics that naturally tend toward beneficial outcomes. While some view these characteristics as so intractable as to override attempts at regulation altogether, others argue simply that new technologies should be allowed, whenever possible, to develop free from government or market regulation.[4] With regards to computer networks, examples of such thinking can be found in the works of Cate (1995) and Labunski (1997), who argue that the openness of computer networks, the presence of multiple Internet service providers (ISPs), and the capacity of these networks to carry large amounts of data, guarantee that individual rights are well protected in the absence of government regulation. Similarly, Johnson and Post (1997) hold that the ability of global communication systems to traverse national borders undermines the ability of nations to regulate them and negates the benefits of global commerce for those countries who attempt to do so. Others, such as Samorski et al. (1997: 155–6) and Froomkin (1997), hold that the decentralized nature of the Internet, the volume of data it carries, and the ability of users to communicate anonymously, render government regulation of the network too costly and inefficient. These scholars draw a causal connection between the apparent characteristics of new technologies and political, economic and social betterment.

Sceptics of network regulability also point out that government regulation can be circumvented in a number of ways. Users can configure their network connections to appear to reside somewhere else or make use of remailers which allow anonymous and untraceable communication (Johnson and Post, 1997: 9). In 1993, Canadian citizens used an anonymous remailer to establish a Usenet group that carried foreign news coverage of an ongoing high-profile criminal trial which under Canadian law could not be covered by the national press (Froomkin, 1997: 146–7). Government regulation can also be thwarted by the existence of countries, such as Anguilla, Bermuda and the aspiring 'Sealand', willing to act as data havens for the transmission and storage of communication that other countries designate as illegal (Garfinkel, 2000: 232; Gellman, 1997: 267; Mayer-Schönberger and Foster, 1997: 241). Finally, network users in regions that enforce significant content restrictions, such as China, the Middle East and North Africa, can access Internet service providers in foreign countries (Human Rights Watch, 1999: 27; Taubman, 1998: 266), or use proxy servers which act as gateways into otherwise censored websites (Human Rights Watch, 1999: 27).

Others reject the characterization of computer networks as inherently unregulable and uniformly beneficial. They argue for a more nuanced view of the relationship between technology and social outcomes, one which evaluates technology within the context of larger political, economic and social forces, and which acknowledges the malleability of allegedly innate characteristics. For example, scholars working in the tradition of critical political economy, such as Bettig (1997: 138), McChesney (1996: 99), Mosco (1989: 25) and Schiller (1999: 37), argue that computer networks are tools for the extension of a global market system which seeks to commodify and control information and its uses. From this perspective, new technologies are more likely to facilitate repressive political and economic relations than to transform them. In this view, the potential for computer networks to further

positive values, like political participation and equality, can only be achieved by protecting public principles and practices that are not served by the marketplace.

In addition, several historians and theorists of technology highlight the socially constructed nature of technology and its uses. These scholars argue that technology is not an independent artifact, with an inherent or instrumental logic, that inevitably will be developed and deployed in socially efficient and rational ways (Fischer, 1992: 12; Slack, 1984: 59). Rather, technology embodies and reflects the complex social systems within which it is produced and developed. Individual technologies may favour certain uses, but the uses to which technologies ultimately are put cannot be surmised solely by examining their characteristics. For example, Sassen (1998) maintains that the relationship between computer networks and global economic and social processes can be best observed by examining the concrete sites in which that relationship materializes. For Sassen, the information infrastructures implemented in global cities, such as New York, London, Tokyo, Paris, Frankfurt, Zurich, Amsterdam, Sydney, Hong Kong, Buenos Aires, Taipei, Bombay and Mexico City, among others, are useful sites for analyses.

Further, the presumption that communication technology alone can bring about political or social change is communicentric and technocentric (Slack, 1984: 144). The development and use of specific technologies are the result not of the artifact itself, but of social struggles and negotiations among numerous parties, including investors, competitors, customers and government agents (Castells, 1996: 5; Fischer, 1992: 18; McOmber, 1999). While it may be somewhat reductive, for the purpose of theoretical differentiation, we will call those who reject the position that technology has an inevitable trajectory apart from larger social forces 'technological constructivists'.

From a technological constructivist perspective, what appear to be the technological *characteristics* of a medium at any given moment are actually a subset of that medium's technological *capabilities*. Thus, within certain parameters, computer networks can be structured to serve different interests and values, to enable or disrupt various political, economic and cultural practices, and to permit different degrees of regulation. The particular set of capabilities that come to the fore in any given technology is an outcome of a complex interplay between a technology and the political, economic and social context in which its capabilities are embedded. This argument is well developed by Lessig (1999: 89), who points out that all computer code, or the human-made software and hardware that structure the environment of computer networks, necessarily constrains or enables different behaviours. Code formalizes such choices as whether data are collected, whether anonymity is possible, who is granted access, and what speech can be heard (1999: 217). Government intervention can shape code by mandating that certain choices be made in the deployment of computer networks. Code can also be shaped and conditioned by private commercial interests who seek to control and exploit information and communication.

Lessig attributes the current freedom of the Internet to its open and non-proprietary protocols that do not condition access on the personal identification of users. He notes, however, that closed, private networks can be layered on top of this otherwise open architecture. These private networks can control access by demanding that all users be authorized, by conditioning access to data on users' credentials, and by monitoring the nature of the data being transmitted. Numerous tools for verifying the identity of Internet users are already in use, including passwords, cookie files placed on users' hard disks by browsers, and digital signatures or certificates that authenticate information about users or their machines (1999: 34–5). Both government and commerce have strong incentives to design more control into the system, and the malleability of the technology makes it possible for them to do so.[5] Lessig (1999: 57, 2001) further notes that a second-generation Internet, with an architecture even more conducive to regulation, would allow governments and commerce effective control over users, even if some opportunities for regulatory circumvention prevent absolute control.

Technological constructivism suggests that technology and its uses are shaped by human agents. Since technology has no inevitable outcomes, citizens and their governments are not consigned to the role of passive observers of technological development. Moreover, while technological determinism rejects the notion that public policy might help determine the social uses of new technologies, technological constructivism posits an affirmative role for communication policies which are based on empirical investigations into the social contexts surrounding specific technologies (Carey, 1988; Fischer, 1992; Slack, 1984). From this perspective, public policy is a necessary and desirable response to the social choices that inevitably accompany the introduction of new technologies. Once we accept the notion that technology is inscribed with social choices and values, the question of whether technology can or will be regulated is rendered irrelevant. The real questions are, rather, which values and interests will technology be designed to serve, and whether those values will be defined publicly or privately, nationally or globally.

New global media are the impetus for a reconsideration of law and policy across many areas of information and communication practice. Nations around the world must decide how to respond to the social conflicts engendered by these media, whether that response is to let market forces resolve these issues or to reassert the role of government in defining and enforcing public service values. As Castells (1996: 7) points out, governments can either frustrate the development of technologies or accelerate their development and change the pace of national modernization and economic development. We are at a formative moment in the development of new global media. As many scholars note, policy decisions that are taken now can help shape the long-term infrastructures, institutions, goals, values and outcomes of global information and communication technologies (Carey, 1998: 34; Klopfenstein, 1998: 35; McChesney, 1996: 100; Melody, 1990: 31, 33; Neuman et al., 1993: 77–8).

While governments may have an important role to play in the development of national policies that determine the trajectory of the growth and development of ICT, there is considerable disagreement among scholars about what determines the ability of states to effectively formulate national policies. Typically, studies of national policy-making have been conducted at one of three major analytical levels: at the level of the international system, at the level of the state itself and at the level of civil society (Krasner, 1976; Singer, 1961; Waltz, 1979). These levels are differentiated in terms of the assumptions about the influence of factors operating at the domestic and/or international level on state behaviour (Cafruny, 1995).

For 'internationalist' approaches, the state is considered to act more or less independently of domestic social forces. The explanation is sought primarily at the international systemic level and in terms of the imperatives of a given configuration of the international system (Bousquet, 1980; Chase-Dunn, 1998; Frank, 1969; Gilpin, 1987; Krasner, 1991; Wallerstein, 1980). National communication policies are considered outcomes of, at one extreme, the 'globalization' of new media and interactive communication technologies and, on the other, the manifestations of new forms of cultural imperialism and economic domination by a handful of developed economies. For 'civil society' approaches the state is conceptualized as subordinate to the dominant economic forces in societies, and the struggle among competing economic forces and interest groups is the primary causal variable that explains state actions and behaviour (Jessop, 1989; Miliband, 1968; Poulantzas, 1969, 1973, 1976, 1978). Here national communication policies represent the interests of dominant economic formations, typically manifested in the growing concentration of media ownership and content in capitalist economies (Herman and Chomsky, 1988; Schiller, 1985). In contrast to the internationalist and civil society approaches, state-centred theorists argue that the state is a collection of institutions with a unique centrality in both national and international formations (Evans et al., 1985; Mann, 1983; Nordlinger, 1981; Skocpol, 1977). The state is a force in its own right and does not simply reflect the dynamics of either

civil society or the international system. National communication policies, from this perspective, are to be considered as exemplars of state action to promote and protect national goals and objectives (Hamelink, 1983; Katz, 1988; Noll, 1986; Petrazzini, 1993; Sinha, 1995; Tehranian et al., 1977).

A number of scholars have offered theoretical and empirical accounts of national policy-making that identify the continuities between social forces and the changing nature of the state and global relations. These scholars reject the assumption of the causal primacy of the international system and the corollary assumption of the analytical separation of state and society (Almond, 1988; Cafruny, 1995; Cox, 1986; Palan, 1992; Schmitter, 1985). From this perspective, national communication policies are the outcome of the complex interplay of forces operating within the international arena, the state and civil society (McAnany and Wilkinson, 1996; McDowell, 1994; Sinclair, 1996; Sinha, 1994, 1998). This type of analytical approach may be the most promising for examining issues relating to national policy-making in new media and interactive communication technologies.

We know a lot about *market* fundamentals. The International Labour Organization advocates also looking at the fundamentals in *people's lives*. Economic and social policies are not dichotomous. Telecommunication policies are made by men and women; they can be changed to go beyond the theoretical fundamentalism of foreign dictates and be integrated with a nation's need to eradicate poverty and social exclusion, and to create jobs. First and foremost, we must establish national and international principles to ensure that information and communication technologies are designed to serve collectively defined political, economic and social goals.

NOTES

1 In both the US and Canada, the large regional Bell holding companies (RBHCs) and the incumbent provincial telecommunications carriers (such as Bell Canada and Telus) not only have established themselves as tight oligopolies, but also appear to be emerging as new centres of power. The RBHCs have diversified into all phases of telecommunications, going beyond the provision of local wireline telephone service to include long-distance, wireless service, broadband service, voice over Internet protocol, high-speed data and video service (Trebing, 2004). They have also significantly constrained public-sector provision of telecommunications services by securing passage of laws in 11 states that specifically forbid municipal utilities from providing telecommunications services. Tight oligopoly also prevails in wireless markets at the national level, where three RBHCs, through their wireless affiliates, now serve almost 70 per cent of all US wireless customers. In Canada, the incumbent provincial carriers dominate the entire wireline market, large business long-distance service, wholesale long-distance data and private line service, and international service. Concurrently, the wireless (mobile) market remains a tight oligopoly, with Bell Canada, Telus and Rogers Wireless holding approximately equal shares of that market. In addition, Bell Canada (BCE Inc.) provides direct broadcast satellite service and commercial television, and has a major investment in the *Globe and Mail* newspaper (CRTC, 2004; Trebing, 2004).

2 The Telecommunications Act of 1996 was designed in part to introduce pervasive competition at the local exchange level in the US. This would be accomplished by compelling local exchange carriers, especially RBHCs, to lease or supply local hoops, switches and transport to competitive entrants to enable them to reach final customers. To accomplish this goal, the FCC introduced unbundled network elements incorporated into platforms designated as UNE-Ps which were to be sold at prices based on total element long run incremental cost. In March 2004, the US Court of appeals of the District of Columbia remanded the FCC's Triennial Review Order dealing with access issues for revision. In December 2004, the FCC drastically reduced its access requirements imposed on the RBHCs and other incumbent local exchange carriers. Switching would no longer be a UNE and access to high capacity fibre would be severely restricted or eliminated. Only local subloop copper would have to be leased but the new entrant would have difficulty getting access to this element. These revisions essentially left matters of access and access pricing to bilateral negotiations between a potential entrant and an incumbent carrier. Given the asymmetric distribution of power favoring the incumbent, the outcome of such a process is clear. Public policy makers would now appear to be placing primary reliance on new technology to constrain market dominance. Undoubtedly, the FCC's permissive merger policy is designed to facilitate new technologies which would presumably sweep away existing market power and promote innovation and change. This argument ignores the ability of centres of power to incorporate new technology within their ambit of control.

Mention should also be made of the efforts of AT&T to bypass the local exchange by employing a different technology. AT&T spent $100 billion to acquire cable properties to reach the final customer. But this effort failed and AT&T had to sell these properties to Comcast at a significant loss. Subsequently, AT&T has suffered 16 quarters of

declining revenues and its credit rating was reduced to junk status in 2004.

3 We use the term 'regulation' to refer generally to rules that govern, control or direct behaviour to desired ends. Agents of regulation may include governments, the marketplace, the self and others. The term 'government regulation' refers more specifically to government action designed in theory to control or direct behaviour in order to achieve goals deemed socially desirable (Rogerson and Thomas, 1998: 430). 'Regulability' refers to the capability of certain behaviours or practices to be regulated (Lessig, 1999: 14).

4 For the latter view, see Litan and Niskanen (1998). De Sola Pool (1983: 5) terms those who believe that government and other institutional forces can alter the otherwise benevolent course of technology 'soft technological determinists'.

5 Governments could use identification tools to verify attributes about computer users, such as age or place of residence, and determine whether their laws apply to that user. Different government jurisdictions would have an incentive to cooperate with one another to ensure that their laws are applied to their citizens when they engage in activities outside their jurisdiction (Lessig, 1999: 55–6). Commerce, for its part, favours user identification in order to engage in secure and safe transactions (1999: 39).

REFERENCES

Almond, G. (1988) 'The return to the state', *American Political Science Review*, 82 (3): 853–74.

Bettig, Ronald V. (1997) 'The enclosure of cyberspace', *Critical Studies in Mass Communication*, 14: 138–57.

Bousquet, N. (1980) 'From hegemony to competition: cycles of the core', in Terence Hopkins and Immanuel Wallerstein (eds), *Processes of the World System: Political Economy of the World System Annuals*. Beverly Hills: Sage. pp. 46–83.

Cafruny, A. (1995) 'Class, state, and world systems: the transformation of international maritime relations', *Review of International Political Economy*, 2 (2): 283–314.

Canadian Radio-television and Telecommunications Commission [CRTC] (2004) 'Report to the Governor in Council: status of competition in Canadian telecommunications markets', November.

Carey, James W. (1988) *Communication as Culture: Essays on Media and Society*. Boston: Unwin Hyman.

Carey, James W. (1998) 'The Internet and the end of the national communication system: uncertain predictions of an uncertain future', *Journalism and Mass Communication Quarterly*, 75 (1): 23–34.

Castells, Manuel (1996) *The Rise of the Network Society*. Malden, MA: Blackwell.

Cate, Fred H. (1995) 'The First Amendment and the national information infrastructure', *Wake Forest Law Review*, 30 (1): 1–50.

Chase-Dunn, Christopher (1998) *Global Formation: Structures of the World Economy*. Oxford: Blackwell.

Cox, R.W. (1986) 'Social forces, states and world orders: beyond international relations theory', in Robert Keohane (ed.), *Neorealism and Its Critics*. New York: Columbia University Press. pp. 204–54.

Evans, P., Rueschmayer, D. and Skocpol, T. (eds) (1985) *Bringing the State Back In*. Cambridge: Cambridge University Press.

Fischer, Claude S. (1992) *America Calling: A Social History of the Telephone to 1940*. Berkeley, CA: University of California Press.

Frank, André Gundar (1969) *The Development of Underdevelopment*. New York: Monthly Review Press.

Froomkin, A. Michael (1997) 'The Internet as a source of regulatory arbitrage', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 129–63.

Garfinkel, Simson (2000) 'Welcome to Sealand. Now bugger off', 8(7), July: *Wired*, 230–9.

Gellman, Robert (1997) 'Conflict and overlap in privacy regulation: national, international, and private', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 255–82.

Gilpin, R. (1987) *The Political Economy of International Relations*. Princeton, NJ: Princeton University Press.

Hamelink, Cees (1983) *Cultural Autonomy in Global Communications: Planning National Information Policy*. New York: Longman.

Herman, Edward S. and Chomsky, Noam (1988) *Manufacturing Consent*. New York: Pantheon.

Human Rights Watch (1999) *The Internet in the Mideast and North Africa: Free Expression and Censorship*. New York: Human Rights Watch.

Jessop, P. (1989) 'Capitalism, nation-states and surveillance', in David Held and John Thompson (eds), *Social Theory of Modern Societies: Anthony Giddens and his Critics*. Cambridge: Cambridge University Press. pp. 103–28.

Johnson, David R. and Post, David G. (1997) 'The rise of law on the global network', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information*

Infrastructure. Cambridge, MA: MIT Press. pp. 3–47.

Katz, R. (1988) *The Information Society: An International Perspective*. Cambridge, MA: Harvard University Press.

Klopfenstein, Bruce C. (1998) 'Internet economics: an annotated bibliography', *Journal of Media Economics*, 11 (1): 3–48.

Krasner, S. (1976) 'State power and the structure of international trade', *World Politics*, 28: 317–47.

Krasner, S. (1991) 'Global communications and national power: life on the Pareto frontier', *World Politics*, 47 (3), April: 336–66.

Labunski, Richard (1997) 'The First Amendment at the crossroads: free expression and new media technology', *Communication Law and Policy*, 2 (2): 165–212.

Lessig, Lawrence (1999) *Code and Other Laws of Cyberspace*. New York: Basic.

Lessig, Lawrence (2001) *The Future of Ideas: The Fate of the Commons in a Connected World*. New York: Random House.

Litan, Robert E. and Niskanen, William A. (1998) *Going Digital!* Washington, DC: Brookings Institution Press and Cato Institute.

Mann, M. (1983) 'The autonomous power of the state', *Archives européenes de sociologie*, 25 (2): 185–213.

Mayer-Schönberger, Viktor and Foster, Teree E. (1997) 'A regulatory web: free speech and the global information infrastructure', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 235–54.

McAnany, Emile and Wilkinson, Karin (eds) (1996) *Mass Media and Free Trade: NAFTA and the Cultural Industries*. Austin, TX: University of Texas Press.

McChesney, Robert W. (1996) 'The Internet and U.S. communication policy-making in historical and critical perspective', *Journal of Communication*, 46 (1): 98–124.

McDowell, S. (1994) 'India, the LDCs and GATT negotiations on trade and investment services', in R. Stubbs and G. Underhill (eds), *Political Economy and the Changing Global Order*. New York: St Martin's Press. pp. 497–510.

McOmber, James B. (1999) 'Technological autonomy and three definitions of technology', *Journal of Communication*, 49 (3): 137–53.

Melody, William H. (1990) 'Communication policy in the global information economy: whither the public interest?', in Marjorie Ferguson (ed.), *Public Communication: The New Imperatives*. Newbury Park, CA: Sage. pp. 16–39.

Miliband, R. (1968) *The State in Capitalist Society*. London: Weidenfeld & Nicolson.

Mody, Bella, Bauer, Johannes, M. and Straubhaar, Joseph D. (eds) (1995) *Telecommunications Politics: Ownership and Control of the Information Highway in Developing Countries*. Mahwah, NJ: Erlbaum.

Mosco, Vincent (1989) *The Pay-per Society: Computers and Communication in the Information Age*. Norwood, NJ: Ablex.

Neuman, W. Russell, McKnight, Lee and Solomon, Richard Jay (1993) 'The politics of a paradigm shift: telecommunications regulation and the communication revolution', *Political Communication*, 10 (1): 77–94.

Noll, R. (1986) 'The political and institutional context of communications policy', in M. Snow (ed.), *Market-place for Telecommunications*. New York: Longman. pp. 42–65.

Nordlinger, E. (1981) *On the Autonomy of the Democratic State*. New Haven, CT: Yale University Press.

Palan, R. (1992) 'The second structuralist theories of international relations: a research note', *International Studies Notes*, 17 (3): 32–56.

Petrazzini, B. (1993) 'The politics of telecommunications reform in developing countries', *Pacific Telecommunications Review*, March: 4–23.

Pool, Ithiel de Sola (1983) *Technologies of Freedom*. Cambridge, MA: Harvard University Press.

Poulantzas, N. (1969) 'The problem of the capitalist state', *New Left Review*, 58: 67–78.

Poulantzas, N. (1973) *Political Power and Social Classes*. London: New Left Books.

Poulantzas, N. (1976) *Crisis of the Dictatorships*. London: New Left Review.

Poulantzas, N. (1978) *State, Power, Socialism*. London: New Left Books.

Rogerson, Kenneth S. and Thomas, G. Dale (1998) 'Internet regulation process model: the effect of societies, communities, and governments', *Political Communication*, 15 (4): 427–44.

Samorski, Jan H., Huffman, John L. and Trauth, Denise M. (1997) 'The v-chip and cyber cops: technology vs. regulation', *Communication Law and Policy*, 2 (1): 143–64.

Sassen, Saskia (1998) *Globalization and Its Discontents*. New York: New Press.

Schiller, Dan (1999) *Digital Capitalism: Networking the Global Market System*. Cambridge, MA: MIT Press.

Schiller, Herbert, I. (1985) *Information and the Crisis Economy*. Norwood, NJ: Ablex.

Schmitter, P. (1985) 'Neocorporatism and the state', in Wyn Grant (ed.), *The Political Economy of Corporatism*. New York: St Martin's Press. pp. 32–62.

Sinclair, John (1996) 'Culture and trade: some theoretical and practical considerations', in Emile McAnany and Karin Wilkinson (eds), *Mass Media and Free Trade: NAFTA and the Cultural Industries*. Austin, TX: University of Texas Press. pp. 30–60.

Singer, J. (1961) 'The level of analysis problem in international relations', in K. Knorr and S. Verba (eds), *The International System: Theoretical Essays*. Princeton, NJ: Princeton University Press. pp. 77–92.

Sinha, Nikhil (1994) 'Information technology, economic development and technological unemployment in developing countries', *Revue Tiers Monde*, April–June: 411–24.

Sinha, Nikhil (1995) 'Telecommunications regulatory reform in the Third World: an institutional perspective', in Bella Mody, Joseph Straubhaar and Johannes Bauer (eds), *Telecommunications Politics: Ownership and Control of the Information Highway in Developing Countries*. New York: Erlbaum. pp. 297–308.

Sinha, Nikhil (1998) 'Telecommunications reforms and the changing role of the state in India'. Paper presented at the 48th Annual Conference of the International Communication Association, Jerusalem, 20–24 July.

Skocpol, T. (1977) 'Wallerstein's world capitalist system: a theoretical and historical critique', *American Journal of Sociology*, 82: 1075–89.

Slack, Jennifer D. (1984) *Communication Technologies and Society: Conceptions of Causality and the Politics of Technological Intervention*. Norwood, NJ: Ablex.

Taubman, Geoffrey (1998) 'A not-so World Wide Web: the Internet, China, and the challenges to nondemocratic rule', *Political Communication*, 15 (2): 255–72.

Tehranian, Majid, Hakimzadeh, Farhad and Vidale, Marcello (1977) *Communications Policy for National Development: A Comparative Perspective*. London: Routledge & Kegan Paul.

Trebing, Harry M. (2004) 'Assessing deregulation: the clash between promise and reality', *Journal of Economic Issues*, 38 (1), March: 1–27.

Wallerstein, Immanuel (1980) *The Modern World System*. New York: Academic.

Waltz, K. (1979) *Theory of International Politics*. Reading, MA: Addison-Wesley.

Yoo, H. and Mody, B. (2000) 'Predictors of downsizing in the US local telephone industry', *The Information Society*, 16 (1): 23–33.

21

New Global Media and the Role of the State

LAURA STEIN AND NIKHIL SINHA

Global information and communication technologies (ICTs) could precipitate extraordinary political, cultural and economic transformations over the twenty-first century. Carey (1998: 28) predicts that global communication systems such as the Internet will alter physical and symbolic environments worldwide just as the telegraph, telephones and railroads altered national and international landscapes throughout the nineteenth and early twentieth centuries. While most scholars agree that global media can facilitate change on a global scale, they differ sharply over the nature of these changes. Will these new media facilitate freedom of expression and access to knowledge and information, or will they deepen and intensify the control and commodification of information on a national and transnational scale? What values and principles will global communication systems serve and what role can or should national governments play in determining the structure and use of these media?

Indeed, regulation of information and communication systems is critical to nation-states for several reasons. First, communication systems are central to political processes. Democracies and non-democracies alike recognize the role of communication systems in conveying information to their citizens. Democracies depend on communication systems to generate the social knowledge necessary to collective decision-making processes (Barber, 1984: 197; Dewey, 1954: 155; Entman, 1989; Enzensberger, 1974; Rucinski, 1991) and to ensure citizens' communication rights (Melody, 1990: 19; Zhao, 2000: 43). At the same time, global media and interactions have worldwide effects that are in the interests of all nations to regulate. Yet, the mechanisms for representing, discussing, evaluating and collectively responding to these phenomena among affected populations are insufficient or lacking altogether. In this sense, global ICTs, as well as globalization generally, create a crisis of representation for political institutions and processes worldwide (Carey, 1998: 34). Second, ICTs are enmeshed in the social and cultural fabric of nations. Information and communication are part of the shared national symbolic environment, as well as the environment of other social or communal formations (Babe, 1995: 40). Consequently, many nations are concerned with how ICTs may impact their social and cultural life. For example, many nations fear that the availability of obscene, racist or blasphemous speech on the Internet will have a corrupting influence on their societies. A third and related reason why effective regulation of

global media has relevance to nation-states is the ultimate inseparability of real and virtual spaces. Although global ICTs host virtual transborder activities, virtual activities are experienced by real citizens rooted in real places. As such, nation-states have an interest in regulating these activities (Lessig, 1999: 190). Research which insists that virtual activities exist in 'cyberspace', rather than in real space, reifies network activity and prematurely dismisses the power and jurisdiction of nation-states to regulate it.[1]

This chapter addresses some of the challenges faced by nation-states in devising communication policies for the new global ICTs. Since a comprehensive discussion of global ICT policy would be too vast and unwieldy, we focus exclusively on computer networks, a prominent and growing sector of ICTs that have a potentially global reach. Computer networks are sets of computers that are linked at physical and logical levels (Schiller, 1999: xv). Computer networks, including the Internet, constitute new media in that they enable the convergence of formerly separate media forms onto a common delivery platform (Melody, 1990: 16; Schiller, 1999: 74). Drawing on aspects of other media, including print, audio, video and voice-based communications, computer networks allow for the creation of new media forms with new characteristics. These networks, along with the practices and policies that surround them, offer a vantage point from which to view the challenges new media pose to national regulators.

We begin by examining three key areas of legal and policy conflict over computer networks; namely, intellectual property, privacy and freedom of expression. Legal and regulatory trends and developments in these areas reveal how new technologies are destabilizing existing policy regimes and demanding a rethinking of communication policy on the part of national governments. The chapter concludes by examining some policy principles and new models of regulation proposed by scholars to adapt national governance mechanisms for the effective regulation of global media. The discussion recognizes that national policies are the outcome of a complex interplay of domestic and international forces. The nature and character of the state, the strengths of its institutional framework and its relationship to domestic and international forces will largely determine the form and content of such policies.

THREE AREAS OF POLICY DEVELOPMENT: INTELLECTUAL PROPERTY, PRIVACY AND FREEDOM OF EXPRESSION

Global computer networks raise challenging questions for law and policy on intellectual property, privacy and freedom of expression. A comprehensive analysis of these questions is beyond the scope of this chapter. Nevertheless, a broad sketch of central policy dilemmas in each of these areas, as well as the options open to national regulators, can situate otherwise abstract policy discussions in concrete social conflicts and choices facing many nations. Not only are many social conflicts around computer networks clustered around these key areas of policy development but, perhaps more importantly, law and policy in these areas shape the contours of the public use and exchange of information and communication. Though law and policy in each of these areas is in a state of flux worldwide, it is possible to discern patterns and trends that constitute the roots of policy dilemmas which are likely to play themselves out over the next couple of decades.

As they currently exist, computer networks possess a number of features that represent uncharted territory for governments wishing to implement and enforce policy and regulation. These features include the ability of computer networks to collect, store, process and retrieve vast quantities of information (Branscomb, 1994: 3; *The Economist*, 1999: 21; Johnson, 1994; OECD, 1997: 13; Peterson, 1995: 164); to copy information quickly and easily (Alleyne, 1995: 140; Halbert, 1999: 26); to allow direct and interactive communication between individuals and small groups (Morris and Ogan, 1996: 44); to bypass governmental and non-governmental media gatekeepers (Human

Rights Watch, 1999: 12; Taubman, 1998: 261); to send information along decentralized and unpredictable pathways (Froomkin, 1997: 131; Lessig, 1999: 166); to allow network users to communicate anonymously (Froomkin, 1997: 129; Lessig, 1999: 14); and to permit interactions between persons located in different legal and political jurisdictions (Kahin and Nesson, 1997: x; Lessig, 1999: 192; Reidenberg, 1997: 86; Robinson, 1989: 44). These features have considerable impact on the abilities of governments to regulate and enforce policies applying to computer networks.

Conflicts in the areas of intellectual property and privacy have arisen largely because of the increasing commodification of information. Information has become a valuable asset, and the ability of governments, organizations and individuals to monitor, control and trade information requires laws and policies that clearly delineate the property rights of all actors in the information exchange process. In the absence of comprehensive supranational property rights regimes, the role of defining property rights within networked environments necessarily falls upon national governments. In the case of freedom of expression, tensions have arisen because governments themselves have implemented laws or policies designed to protect national political and normative goals, often to the detriment of the speech rights of their own citizenry or in conflict with the speech rights regimes of other nations. The next three sections examine these conflicts, the ways governments are attempting to address them, and the options available for them to do so.

Intellectual Property

Computer networks intensify the conflict, ever-present in intellectual property law, between expression as a commodity and as a collective good. Intellectual property law grants copyright holders exclusive rights to control copying and other uses of creative works *for a limited period of time*. In this sense, intellectual property is not analogous to material property. Intellectual property law presumes that creativity is encouraged when copyright holders can benefit financially from their labour, but that the exclusive control of these works eventually becomes a detriment to society (Bettig, 1992: 149; Lessig, 2001). Ultimately, the collective good requires that information, knowledge and creative expression become freely and widely accessible to all. The collective good aspect of intellectual property is also captured in the notion of fair use. Fair use permits non-copyright holders to copy works for the purpose of comment, criticism and other activities which are understood to further the advancement of knowledge. By creating new opportunities both to control information and expression and to evade that control, computer networks invite challenges to both the copyright holder's right to control their work and the public's right to access this work.

Computer network technology can facilitate the extension of copyright controls or the free exchange of information and communication. Scholars are split on whether computer networks will underprotect or overprotect intellectual property. Many scholars note that computer networks enable non-copyright holders to engage in the widespread duplication and dissemination of copyrighted material. The ease with which computer networks permit such activities works to undermine copyright holders' control over intellectual property products (Thurow, 1997: 98–9). This underprotection of property rights results in a loss of domestic and international profits; a decline in the research, development and creation of new products; and a reluctance to engage in global trade among nations that export information-based products and services (Alleyne, 1995: 140; Jussawalla, 1992: 3, 43–4). Those who worry that new technology will underprotect copyrights focus on the need to develop law, policy and new technologies that promote the rights of intellectual property holders on computer networks (Thurow, 1997).

Others argue that computer technology may increase copyright holder control over intellectual property and override collective fair use principles for the sake of private profits (Halbert, 1999; Hunter and Herbeck, 1999; Lessig, 2001). Copyright holders can use software to track and control the uses of a creative

work, including how many times a work is viewed and how it can be altered or manipulated. Such software effectively allows copyright holders to disaggregate and charge for every aspect of information use (Halbert, 1999: 128; Lessig, 1999: 136). Copyright holders can also make access to creative works contingent upon private contracts, such as click-wrap or shrink-wrap agreements, which consumers tacitly accept when they view online information or open a software product package. These 'agreements' specify the terms and conditions of access and often demand that consumers relinquish their rights to fair use and collective good protections associated with intellectual property law (Feemster, 2000; Halbert, 1999: 62; Lessig, 1999: 135). In addition, copyright holders can limit the circulation of creative works online to trusted systems that agree to abide by their terms and conditions and that interact exclusively with other systems that agree to do so (Lessig, 1999: 129). Those who believe that computer technology will overprotect copyright argue that new developments in intellectual property law or practice must maintain the public's rights to access ideas.

Global computer networks, and the growing global trade in intellectual property goods, are also sites of tension between developed and developing countries. While there are no 'international copyrights' that enable individuals to protect work throughout the world, most countries are members of the Berne Union for the Protection of Literary and Artistic Property (Berne Convention) and the Universal Copyright Convention, which allow producers of intellectual property to protect their works in countries of which they are not a citizen or national.[2] Fearing information piracy on a global scale, developed nations argue that strong enforcement of intellectual property rights and internationally harmonized legal regimes are necessary to facilitate a global trade in information products (Burk, 1997: 221; Jussawalla, 1992: 4; OECD, 1997: 11–12; White House, 1997: 12). Nations with strong intellectual property regimes have exerted political and economic pressure, often in the form of international treaties and agreements, on countries that fail to enforce copyright (Alleyne, 1995: 34, 133; Bettig, 1997: 150; Boyle, 1997: 121–3; Burk, 1997: 221; Halbert, 1999: 77). For example, bilateral trade agreements have enabled the US to enact copyright laws in Singapore, Malaysia, Indonesia and South Korea (Jussawalla, 1992: 67). The World Intellectual Property Organization has strengthened the international intellectual property rights regime (May, 1998: 256), and the US succeeded in pushing through strong protections for intellectual property in the Trade Related Intellectual Property (TRIPS) agreement under the auspices of the World Trade Organization (Goldstein, 1994: 195; May, 1998: 256; Sell, 1995). The TRIPS agreement requires member states to comply with certain standards of protection for copyright, trademarks, industrial designs and patents. (Jackson, 1998: 473).

Yet many developing countries are reluctant to uphold intellectual property laws or agreements that make access to information more costly, impede technology transfer and increase the monopoly power of multinational corporations (Alleyne, 1995: 133; Jussawalla, 1992: 39–40, 58). Countries who view intellectual creativity as a collective rather than an individual creation, who themselves hold few copyrights, or who seek to further national and economic development through the cheap and widespread dissemination of intellectual products, see little reason to enforce restrictive copyright laws (Alleyne, 1995: 124; Burk, 1997: 213; Halbert, 1999: 78). However, many developing countries find themselves in a dilemma. While less stringent enforcement of international intellectual property regimes may provide developing countries with greater access to information resources from the more advanced industrial economies, the same rules may allow multinational corporations to extract and exploit economic and commercial information about national industrial and agricultural resources within developing counties. As Thurow (1997: 100, 103) notes, rather than conform to the intellectual property regimes of developed countries, developing countries should ensure that any copyright regime they adopt addresses their particular needs.

As we have earlier stated, computer networks can be used to alter the balance that

different countries have achieved between information as a commodity and as a social good. Tensions over intellectual property law both within and between countries revolve largely around where to draw the line between information control and the free flow of information. As trade in online information, products and services grows, copyright holders seek out ways to charge for every use of information, to prevent unauthorized uses, and to assert and extend their ownership over information, ideas and artifacts (Bettig, 1997: 140, 147; Halbert, 1999: 49; Mosco, 1989). Such behaviour is in keeping with the logic of the marketplace and constitutes a modern enclosure movement (similar to that of the enclosure of public lands in England during the first half of the nineteenth century) in which ideas and information are being converted from common goods into private property (Bettig, 1997: 138; Lessig, 2001; Thurow, 1997: 101). The more cultural artifacts and assets are privately controlled and monopolized, the fewer opportunities the public has to participate in the iterative creation and re-creation of social and cultural life (Bettig, 1992: 152; Halbert, 1999: 147). While the commercialization of computer networks and information may be inevitable, as Abrahamson (1998: 14) argues, many fear that unchecked commercialization and commodification will impede information's widespread distribution and the social benefits that come from sharing information (Besser, 1999; Halbert, 1999; Thurow, 1997: 101). From this perspective, too much control over information discourages creativity, commentary and criticism. On an international level, excessive control over intellectual property inhibits the free flow of information between developed and developing countries and leads to a loss in social and economic welfare (Jussawalla, 1992: 86, 110–11). As private parties reach to extend copyright protections locally and globally, societies must ask themselves at what point information control and ownership exceed adequate incentives and rewards for the creation and trade of intellectual artifacts and begin to harm the collective good.

Precisely where to strike this balance is a matter of both law and policy. Governments must decide the extent to which copyright will be protected on computer networks and which rights will be upheld against the technology's ability to negate them. Many nations have been quick to devise laws and legislation that bolster intellectual property protections for copyright holders and strengthen the global trade in information (Bettig, 1997: 150; Halbert, 1999: 37, 43–4). Law and policy will also decide the extent to which the collective good aspects of copyright and the copy duties of copyright holders will be reconfigured by private computer code, business practices and contract law. Governments must also consider whether, and under what conditions, information and knowledge should be publicly available and accessible (Branscomb, 1994: 3; Demac, 1994: 63; Lessig, 1999; Thurow, 1997: 103) and to what extent they will adhere to international agreements, like the TRIPS, in their struggle to access and disseminate global information while protecting potentially valuable local intellectual and information resources. The ability of governments to effectively address these issues varies widely and, as we shall discuss later, is dependent on a variety of international and domestic factors not all of which are subject to governmental control.

Privacy

The ability of computers to collect, search and exchange data feeds a growing market for personal information and harbours the potential to erode personal privacy. Personal information can be collected any time someone writes a cheque, uses a credit or debit card, engages in a financial transaction, views World Wide Web pages, or does anything else that generates a data trail (*The Economist*, 1999; Peterson, 1995: 167), and it includes names, telephone numbers, marital status, education level, job history, credit history, medical records, and any other information that can be linked to specific persons or data subjects (Branscomb, 1994: 4). Often, individuals have little choice but to reveal this information, which is collected without their consent or knowledge, or is a byproduct of a sale or service transaction

(1994: 4; Gandy, 1993: 78, 82; Peterson, 1995: 164). Furthermore, personal information can become the basis for decisions made about an individual by others, such as whether someone is offered a job, targeted for government surveillance or eligible for medical insurance (Branscomb, 1994: 4). As Gandy (1993: 83–4) notes, personal information derives its market value from the signals it gives organizations about the desirability of forming relationships with individuals as consumers, employees or political agents.

The growing trade in personal information has many nations concerned about the privacy rights of their citizens. Though conceptions of privacy vary from country to country, privacy is frequently linked to the rights of individuals to enjoy autonomy, to be left alone, and to determine whether and how information about one's self is revealed to others (Branscomb, 1994: 28; Johnson, 1994: 225; Peterson, 1995: 171; Westin, 1967: 7). A useful definition of privacy is provided by Westin: 'privacy is the claim of individuals, groups and institutions to determine for themselves, when, how and to what extent information about them is communicated to others' (1967: 158). A central privacy concern of many nations, and one which we will focus on here, involves the ability of individuals to access and control how their personal information is used by others (Gellman, 1997: 278; Global Internet Liberty Campaign, 1998: 1; Peterson, 1995: 164). As computer networks provoke more and more privacy conflicts between information subjects and information users, the question of who controls personal information takes on increasing importance. Surveillance of individuals by businesses and governments, the dissemination of personal data across national borders, and the use of information for purposes other than that for which it was originally collected, as well as other uses and abuses of personal information, are prodding many governments to rethink their privacy policies. Governments must determine whether privacy policies are necessary to limit the collection and use of personal information by both governmental and private parties, and, if such policies are necessary, how best to formulate them.

Opponents of government regulation of privacy argue that privacy rights are bad for commerce, technologically unenforceable, and antithetical to free speech. This view, typified by an issue of *The Economist* (1999) focusing on privacy, holds that privacy rights impede the free flow of information by putting constraints on the trafficking of personal information and that the inability to control technology makes the decline of privacy as a value inevitable. The ability of privacy rights to inhibit unfettered trade in personal information is also seen as interfering with free speech, though Peterson (1995: 173) points out that the equation of free trade with free speech comes primarily from businesses who sell personal information and marketing firms who use it to sell products. For many opponents of government privacy regulations, voluntary self-regulation on the part of industries and organizations who control personal information is the best means of addressing privacy concerns. From this perspective, personal information belongs to those who collect it (Branscomb, 1994: 13), and ownership confers the right to determine how it is used. On this view, the only way for governments to balance privacy concerns against free speech and the free flow of information is to allow private companies to self-regulate (Cochran, 1996).

Proponents of stronger privacy regulation argue that privacy is a social value that governments must affirmatively protect. In their view, personal information is a type of asset or property that is rightly controlled by the person who generates it, rather than those who collect it (Branscomb, 1994; Gandy, 1993; Lessig, 1999: 156; Westin, 1967). Indeed, those who collect this information surreptitiously or without fair compensation can be seen as engaging in a type of theft (Gandy, 1993: 82). According to Peterson (1995: 186) and Branscomb (1994: 30), the taking of this asset warrants some form of compensation. However, while Branscomb (1994: 28) believes that responsible companies could offer consumers sufficient incentives to release their personal information, Gandy (1993: 91) maintains that fair or equitable compensation is impossible because individuals have no way of estimating the true value of

their information. From this perspective, industry self-regulation is an inadequate means of protecting privacy rights. Self-regulation generates conflicting and complex rules among different industries and sectors that increase the costs of business compliance and that undermine consumer confidence (Green et al., 2000). Public service-oriented government regulation, on the other hand, allows for consistent privacy policies that facilitate the flow of legitimately traded information, bolster electronic commerce and protect human rights (Araki, 1989: 193; Global Internet Liberty Campaign, 1998; Green et al., 2000; OECD, 1997: 15, 18).

The privacy policies of the United States and the European Union (EU) draw on the two approaches to privacy rights outlined above and illustrate two contrasting ways in which governments can respond to privacy concerns. In its 1995 Data Protection Directive, the EU explicitly affirms the right to privacy of EU citizens, and defines a comprehensive set of principles and provisions that adhere to that right. The Directive accords specific rights and responsibilities to data subjects and data processors, protects data subjects' rights to control the collection and use of personal information by both governments and private companies, and harmonizes data protection rules among member countries. Among its many provisions, the Directive requires that companies or agencies wanting to process personal information first gain the unambiguous consent of the data subject.[3] Since data subjects must 'opt into' personal data transactions by granting their free and informed consent, the burden of initiating this process falls on the would-be information processor, and non-consenting data subjects are spared the task of tracking and halting objectionable uses of their information (Peterson, 1995: 180). Another provision, perhaps the most controversial in the Directive, prevents personal data from being exported to countries that do not provide comparable levels of protection. Some view this rule as an impediment to the development of electronic commerce in EU countries and to trade with outside countries, such as the United States, which lack significant privacy protections (Mitchener, 2000: 32; *The Economist*, 1999: 23). At the very least, the Directive creates pressure on countries who want to trade with European Union members to develop comparable data protection rules (Global Internet Liberty Campaign, 1998).

Unlike the European Union's comprehensive approach to data protection, the United States' approach is characterized by fragmentation. No comprehensive federal privacy policy exists. Instead, the US employs a mixture of narrowly targeted federal legislation, state law and industry self-regulation to address privacy concerns. Federal legislation has focused on specific problems related to particular industries, technologies or types of data. Furthermore, while federal legislation places restraints on how the government can use or process information, these rules do not apply to private organizations who collect information (Branscomb, 1994: 17).[4] Several state constitutions protect information privacy, but these provisions apply only to the public sector (Peterson, 1995: 165). For the most part, the US administration advocates private sector self-regulation and marketplace solutions as the best means to address concerns over personal information (White House, 1997: 19). Among US businesses, the preferred method of privacy protection is to permit consumers to exercise an 'opt-out option', under which personal information may be collected and processed unless consumers request otherwise. Under the US position, the burden of protecting privacy and personal information falls upon the individual, and the corporations and organizations collecting the information have wide latitude in the use and dissemination of information.[5] Tensions between the conflicting privacy approaches of the US and the European Union have resulted in a Safe Harbor agreement, finalized in the spring of 2000, which allows US-based companies to choose between formal oversight by EU regulators or qualifying self-regulatory regimes enforced by the US Federal Trade Commission.[6]

Governments around the world have started to tackle the difficult issue of devising laws and policies to protect the data privacy of their citizens. These positions range from the strong protections offered by the EU to the self-regulation

model adopted by the US. However, this remains a constantly shifting legal and policy terrain, and most national positions are still in a state of flux. Instead of describing the state of national policies as they relate to specific countries, we offer a broad schema that allows for the assessment and analysis of national policies and, consequently, the condition of privacy protections offered by national policies. Broadly, governmental attempts to regulate data privacy can be assessed according to the degree of protection offered to citizens in four general categories: consent, disclosure, security and accuracy, and enforcement. *Consent* deals with the right of individuals to decide when, how and what kinds of information others collect about them over a computer network. It also includes the activities for which that information is collected and the clarity with which an individual is made aware that consent is required and being asked for. *Disclosure* deals with the terms, conditions and circumstances under which an agency can collect information and disclose it to others, including the kinds of organizations and activities for which disclosure may be permissible. *Security* and *accuracy* involve the obligation of information-collecting agencies to ensure that the collected information is securely stored and accurately maintained. The obligation to maintain accurate information contains the implicit right of individuals to have access to the information about themselves to ensure its accuracy and demand correction in case of errors. Finally, the effectiveness of privacy and data protection laws depends on their mechanisms for *enforcement*.

Persistent questions about who should control personal information suggest that governments will eventually have to clarify ownership rights and responsibilities. Information has become a major asset and commodity, necessitating the protection and definition of ownership rights (Branscomb, 1994: 1). Law and legislation must ultimately define property rights in information, like property rights in traditional and tangible property (Mensch, 1990: 13, 23; Michelman, 1987: 1319, 1335–6; Streeter, 1996: 207). Streeter (1996: 207) and Boyle (1997: 27) point out that all property rights and entitlements are socially constructed artifacts of governments who must allocate specific legal powers to some and withhold them from others. In the case of information assets, this allocation of rights is by no means straightforward. As Gandy (1993: 75) argues, personal information is created when someone observes the behaviour of another, and property rights in that information are highly debatable. Whether personal information belongs to those who generate it or those who collect it, and whether anyone has the right to traffic in this information, are political questions that must be determined through the development and application of legislative, policy and regulatory mechanisms.

Freedom of Expression

Freedom of expression is a value that numerous nations endorse as a political or social right. While countries, such as India, the US, Canada and others, protect speech rights in their national constitutions, many others acknowledge this right in international human rights agreements. For instance, both the International Covenant on Civil and Political Rights (1966) and the Universal Declaration of Human Rights (1948) guarantee people 'freedom to seek, receive and impart information and ideas' in all media regardless of geographical frontiers. While it may be true that many nations support freedom of expression in theory rather than practice (Human Rights Watch, 1999: 3), speech rights nevertheless remain an expressed value and goal of many nations.

Computer networks open up new and significant opportunities to engage in expression. Computer networks allow groups within civil society to forge direct connections with one another through electronic mail, web pages, file transfers, real-time messaging, and online newsletters and discussion groups. In this sense, computer networks fill a communicative gap between interpersonal media, like telephones, and mass media, like television (Human Rights Watch, 1999: 14; Kavanaugh, 1998). These networks also enable communication that bypasses media gatekeepers and resists government controls on speech. People

around the world can utilize these networks to circulate political and cultural content that is censored or suppressed offline, such as sexually explicit works, politically dissident information and ideologies, hate speech, banned texts, and other materials deemed subversive. Computer networks make it possible, as Taubman (1998: 261) argues, to establish social networks outside official government channels. One reason they can do so is that current computer network technology makes government control of speech in this medium a complex proposition (Froomkin, 1997: 129; Lessig, 1999: 166). The ability to communicate anonymously, to encrypt messages so that only specified senders and receivers can read them, and to distribute data over decentralized routes all make computer network communication difficult to monitor or block. For those with access to them, these networks enable a range of practices conducive to freedom of expression.[7]

The ability to circulate what some governments deem objectionable content has provoked social conflict, and in some cases swift policy responses, in numerous countries. Both the United States and Australia have made bids, successfully in the case of the latter and unsuccessfully in that of the former, to criminalize the distribution of sexually explicit material on the Internet on the grounds that it could be available to children (Murphy, 1999).[8] In China, the government requires Internet service providers (ISPs) to block objectionable pornographic or political sites. Included among these sites are those carrying American news media, news and commentary from Taiwan, appeals to free Tibet, and other content which threatens to disrupt 'public order' (Froomkin, 1997: 145; McCarthy, 2000: 22; Rosenthal, 2000: A1; Smith, 2000: C2; Taubman, 1998: 264–5). In Kuwait, Israel and Saudi Arabia, the Internet has been perceived as a threat to local religious and moral sensibilities (Human Rights Watch, 1999: 21, 24; Wheeler, 1998: 362, 365). Scholars have suggested that government regulation of content may occur for political and ideological reasons or as a response to societal pressures to repress 'immoral' or 'unethical' communication (Rogerson and Thomas, 1998; Taubman, 1998). Although each country has a different definition of what constitutes objectionable content, these definitions are grounded in the cultural values, political beliefs and historical circumstances of each.

Government attempts to control political and cultural content on computer networks raise questions of how speech rights will be configured in these forums and what content government can legitimately regulate. While some scholars would prefer that computer networks be free from any government regulation that affects content (Cate, 1995: 1; Labunski, 1997: 191–2), others find it unrealistic to expect governments to refrain from content regulation (Mayer-Schönberger and Foster, 1997). For many countries, content regulation is an extension of social and cultural norms and standards. Many countries consider rules that apply offline, such as restricting access to pornography or discouraging speech that insults or degrades racial, ethnic or other social groups, to be equally desirable online. As Wheeler (1998) argues, the cultural values and frameworks of a nation will affect the practices and policies surrounding computer networks.

Scholarship on speech rights and computer networks focuses on three primary concerns that relate to the conditions prohibiting or promoting freedom of expression. First, analysts identify potential methods of government control of information. Although scholars unanimously acknowledge that total control is difficult to achieve, they nevertheless catalogue numerous methods whereby governments can effectively (if not completely) control speech. Second, scholars examine the efforts of authoritarian or non-democratic governments to control political speech. This research scrutinizes the popular assumption that computer networks are inherently democratic and able to deflect government control. Third, scholars examine the jurisdictional questions raised when the social and cultural restrictions on speech in one country clash with those of another. The ability of citizens to access materials that are banned or restricted in their own countries raises the question of whether international cooperation and agreement will be necessary to enforce content regulations or whether such regulations will become increasingly untenable.

The openness of computer network architecture has not prevented governments from pursuing numerous strategies to control or contain access to objectionable content within their borders. As Mayer-Schönberger and Foster (1997: 235) note, national restrictions on freedom of expression are common around the world. In the US, Benkler (2000) found that laws aiming to control information flows were a major category of Internet legislation in the 1990s. Although specific content regulations may change from year to year, most regulations exhibit commonalities that are likely to persist over time. Regulatory restrictions and content containment strategies can be divided into those that attempt to control gateways to content and those that attempt to control the users themselves. Governments have multiple means of controlling or creating content gateways. Many governments require ISPs to filter or block objectionable content on their systems. By limiting the number of ISPs available, licensing them, or managing them outright, governments can keep a close watch on ISP activities. Governments can also establish proxy servers that act as gateways through which users must pass to gain access to global networks. Both ISPs and proxy servers can utilize software that filters content based on criteria such as the e-mail addresses of senders and recipients, Internet protocol addresses which identify message origins or destinations, or characters that appear in the body of a message (Human Rights Watch, 1999: 36; Kavanaugh, 1998: 37). Kuwait, Saudi Arabia, Yemen, the United Arab Emirates, Tunisia, Algeria, the US and China are among the countries who have used these methods to constrain access (Human Rights Watch, 1999: 24; Kavanaugh, 1998: 82, 84; McCarthy, 2000: 21–2; Taubman, 1998: 265; United States v. American Library Association, 2003; Wheeler, 1998: 362–3). In China, Singapore and the United Arab Emirates, governments also mandate the blocking of some of the more well-known anonymous remailer sites which could help citizens circumvent content regulation (Human Rights Watch, 1999: 39). Measures like these counteract the decentralized architecture of computer networks by utilizing or creating centralized access points that are amenable to control. Governments may also monitor or restrict user access to the network. For example, in Jordan the government restricts user access by keeping the price of Internet service artificially high (Human Rights Watch, 1999), while in Myanmar only those who are close to the ruling party are authorized to use e-mail (Barron, 2000). Other nations, such as Iraq, Libya, Syria and Saudi Arabia, have chosen to deny their citizens access altogether (Human Rights Watch, 1999: 27; Schneider, 2000: A1). Finally, Chinese Internet users and publishers risk criminal penalties if they fail to register with the government (Taubman, 1998: 264).

Several studies, including Human Rights Watch's (1999) study on the Middle East and North Africa, Kavanaugh's (1998) study on North Africa, and Taubman's (1998) study on China, suggest that non-democratic governments can project their political and cultural will onto computer networks. These studies collectively argue that non-democratic governments are able to increase access to the medium while simultaneously militating against the potential unintended effects of exposing citizens to what Taubman (1998: 257–8) terms 'ideational pluralism'. Ideational pluralism, or multiple sources of ideas and information, threatens the ability of non-democratic governments to maintain hegemony over information and ideology within their borders. It also offers politically discontent groups access to viewpoints and perspectives that could help foment opposition movements. Cognizant of the threats to centralized power posed by computer networks, many non-democratic governments attempt to strike a balance between the control of information and the diffusion of technology seen as promoting economic and social advancement. While these strategies help to maintain the primacy of state-controlled information in the short term, whether they will be able to successfully control content in the long run remains to be seen. Nevertheless, all of these studies presume that network technology will be the Trojan horse that foils government control of content. There is already some evidence of the successful use of the Internet to 'subvert' the political control governments have sought

to exercise over dissenting movements. During the Tiananmen Square uprising in 1989 and the attempted coup in the Soviet Union in 1990, phone, fax and computer networks provided alternative sources of information to the outside world (Fredrick, 1993, 293; Quarterman, 1990: xxiii–xxiv). In Mexico, a representative for the Zapatista movement, Subcommandante Marcos, was able to use the Internet to communicate with his supporters and the rest of the world (Ford and Gil, 2001). Similarly, during the Kosovo war, the dissident radio station B92 was able to continue broadcasting by using the Internet even after the station was closed down by Serbian police (Hibbert, 1999: 401).

Diverse and contradictory content regulations also raise questions about whether a nation's rules have jurisdiction over content that originates elsewhere. Examples of jurisdictional conflict over content include a 1995 attempt by the German government to force the global access provider CompuServe to block German users' access to 200 sexually explicit computer discussion groups and a subsequent effort on the part of the French government to pressure the search engine Yahoo! into preventing French citizens from viewing Nazi memorabilia on its English-language auction sites (Associated Press, 2000; Delaney, 2000: B10; Rogerson and Thomas, 1998: 247: *Yahoo! Inc. v. Le Ligue Contre le Racisme*, 2001). Both cases raised, but have yet to answer, the question of exactly whose laws should apply to communication that regularly crosses national borders. At present, contradictory national laws govern global computer networks (Mayer-Schönberger and Foster, 1997). Such laws are a concern of companies who worry about their liability for data that regularly travel through multiple countries with diverse policies (White House, 1997). Contradictory laws and unclear jurisdictions are also a concern of countries who seek to protect national norms and values.

Unlike the dilemmas new technologies have precipitated in intellectual property and privacy policies, tensions over political and cultural content are the result not of conflicts over information ownership but over the social, cultural and political environment of different countries. Ultimately, these conflicts beg the question of whether governments can or should regulate content over computer networks in order to protect national values, given the political and cultural diversity both among and within nations. For many countries, the ability of citizens to communicate over computer networks destabilizes existing balances between the free flow of information and information control. While some analysts argue that computer networks are ultimately incompatible with government controls and authoritarian rule (Froomkin, 1997: 141; Wriston, 1994), others are less certain that governments will fail to assert control over these networks (Goldsmith, 1998: 1200; Kavanaugh, 1998: xiii). Research in this area must continue to ask whether and under what conditions regulations affecting freedom of expression are appropriate and sustainable, and whether the current openness of computer networks engenders freedom of expression, or whether social and cultural practices and values will instead reshape the architecture of computer networks.

POLICY PRINCIPLES AND MODELS OF GLOBAL MEDIA REGULATION

Computer networks have already precipitated serious social conflicts in the areas of intellectual property, privacy and speech rights. Although computer technology and services are constantly evolving, many of the conflicts they engender will persist through successive incarnations of the technology. For this reason, governments must define the purposes, principles and values that should animate their communication systems. Making these social choices now will allow these decisions to be incorporated into technology and industry as they develop, rather than forcing costly and inefficient changes later. Thoughtful policy choices should also ensure that valued rights are respected and protected throughout this period of technological innovation and change brought on by global computer networks. This section explores models

of regulation and policy principles that can be applied to computer networks. Several policy models exist for managing and resolving conflicts over computer networks, including marketplace and private sector regulation, national public service or interest regulation, and international or multinational regulatory regimes. None of these options are mutually exclusive; they can be used in combination to supplement and counterbalance each other's protections. Moreover, none of these models circumvent the need for government regulation, since even the marketplace requires governments to structure and enforce its terms and conditions, while international regimes require the support of participating nations. Nevertheless, we will discuss these models separately in order to highlight the distinctions between them and to examine their respective advantages and disadvantages. After reviewing these models, we go on to consider the principles and guidelines that might successfully steer future developments in intellectual property, privacy, and speech rights law and policy.

Given that computer networks can and will be regulated, nation-states must determine what methods of regulation to employ, whether these are public service or market-oriented, based on national laws and normative systems, or subject to international agreements and covenants. To be effective, regulations must be enforceable and achieve collectively desired outcomes. Yet, global communication systems challenge the ability of nation-states to regulate effectively and to exercise their sovereignty. Sovereignty refers to a ruling body's power to make and enforce policies that affect people or territories within its jurisdiction. One challenge comes from market participants that increasingly assert their claim to privately regulate transactions over these networks. Another comes from the ability of communication and information to regularly cross national borders, thereby calling the jurisdictional limits of nation-states into question. Furthermore, the increasing ability of individuals and organizations to communicate globally begs the question of whether international instruments would be more effective agents of regulation than nation-states: and, if so, how these instruments would incorporate participation, attain legitimacy, and provide accountability for those affected by their actions. These factors put pressure on nation-states to redefine their role in formulating and enforcing communication policy.

Whether future communication policies are market or public interest driven, or the product of national or international regulatory regimes, scholarship suggests that these policies require a socially agreed set of principles at their core. Principles are general rules or propositions on which subsequent actions can be based. In addition, they are a jargon-free way of expressing policy goals (Proceedings of the Annenberg Washington Program Panel Two, 1995: 84–5). Defining the core principles of national and international communication policy has several advantages. First, principles can underscore the values that nations wish to privilege with regards to privacy, intellectual property, speech rights and other policy areas. Principles can help nations protect access to communication systems and content, set minimum standards of conduct among data processors and collectors, and delineate spheres of public knowledge and information. Defining principles at the outset of technological development allows governments to shape communication systems before special interests become entrenched and change becomes more difficult (Kirby, 1983: 13). Principles also provide a firm foundation on which to build coordinated and comprehensive legislation. For Branscomb (1994: 84), principles are a superior basis for legislation to their alternative – narrowly conceived laws formulated in response to narrowly framed problems. Principles can also foster the linkages necessary to coordinate between national and international policy, law and technological development. Socially sanctioned principles can facilitate the harmonization of domestic laws among nations (OECD, 1997: 11), treaty negotiations among countries (Kirby, 1983: 14), and the overall development of global communication systems (OECD, 1997: 4). Finally, nations that have an express commitment to communication policy principles possess clearer benchmarks for assessing whether specific regulations achieve their

desired goals.[9] Without larger principles or goals in mind, any policy can become an end in itself.

Identifying principles is a critical step towards setting national and international policy goals. Yet, it is only the first step. Once principles are determined, nations must decide how to apply them. Principles must be incorporated into national and international law and legislation if they are to have any force or effect. Meshing international and other guidelines, which do not have the force of law, with legal traditions and practices in individual countries will be challenging (Kirby, 1983: 17–18). Nations will also have to decide the domains in which to apply these principles. For example, while EU privacy principles apply across all information processing, marketplace policies focus on specific industries, technologies and other sectoral divisions. In the area of speech rights, scholars disagree over whether access principles should be applied according to the specific technology involved (Cate, 1995; Labunski, 1997), the functions of the medium (Melody, 1990; Plotkin, 1996: 238), or the classification of an entity as a content provider or transmission facility (OECD, 1997: 4). Despite these difficulties, the process of harmonizing and coordinating national and international policy cannot succeed without attention to the fundamental principles that will guide these policies and shape global communication systems.

Market-based Regulation

Marketplace regulation of computer networks, through code and contracts, limits the sovereign powers of nations by reducing their role to enforcing market structures. The use of competitive markets to allocate communication resources is favoured by many scholars and policy-makers. According to supporters of marketplace regulation, markets are responsive to fluctuating demands for products and services, can measure the value individuals assign to various communication services, and 'depoliticize' decision-making by allowing private actors within the marketplace to determine resource allocation (de Sola Pool, 1983; Kahn, 1988: Preface). The primary goal of market systems is economic efficiency, and the ability of economic efficiency to maximize the wealth of nations is equated with the overall public interest and beneficial social outcomes (Office of Technology Assessment, 1990: 21–2). From this perspective, marketplace regulation is preferred to socially determined, public interest regulation which is seen as hindering the efficient allocation of resources, as well as improvements in products and services (Hilton, 1972; Kahn, 1988; MacAvoy, 1979).

Market regulation, also referred to as private sector or self-regulation, allows private actors operating within competitive markets to settle social conflicts over communication (Mosco, 1988). Under a market model, businesses can develop their own rules, standards and practices (Glickman and Carney, 2000: 196), and consumers are free to patronize those businesses whose rules and practices they favour. The legitimacy of this model rests on the assumption that consumers can choose at any time to 'exit' a relationship that involves one set of rules in order to form a new relationship under another rule set (Johnson and Post, 1997: 32). In this model, the role of government is limited to establishing a legal framework that facilitates commerce, providing industries with incentives to regulate themselves, and maintaining marketplace competition and consumer choice. Extending the argument to the international arena, market theorists maintain that an international market economy, institutionalized in international economic regimes characterized by self-regulating norms and rules, would constitute a public good for all participating nations because it would ensure the greatest economic benefit for the greatest number (Gilpin, 1987; Kindleberger, 1978; Krasner, 1991; Waltz 1979). This is the preferred model of the US, which would like the private sector to build and control computer networks (Bettig, 1997: 146; White House, 1997: 18–19).

Johnson and Post (1997), Reidenberg (1997: 100) and others argue that computer networks are good candidates for private sector self-regulation. In their view, computer networks constitute distinct spaces, clearly demarcated

from the real world, with their own unique problems. They argue that computer network providers and infrastructure organizations can take on their own sovereign powers by creating their own borders and rules of order. Network users and system operators could devise their own rules for controlling behaviour in these spaces, and system operators could ban users who didn't follow their rules. Banned or discontented users would be able to establish new relationships with other system operators, presumably under better conditions and terms of service. Johnson and Post suggest that, excepting cases where network activities affect the vital interests of nation-states, national governments could defer their authority over behaviour in these spaces to network self-regulation. While Reidenberg (1997: 96) believes that governments must continue to protect the public interest over computer networks, he also suggests that they reallocate some of their authority to the virtual world. On a similar note, Louveaux et al. (1999) suggest that 'cyber-tribunals' or 'virtual magistrates' be set up online to provide non-judicial dispute resolution for conflicts that occur over computer networks.

Private sector regulations may be implemented through voluntary standards and codes, contracts between service or access providers and consumers, and the conscious design of network architecture. While private sector regulations allow businesses to determine the methods and values behind network regulation, they risk short-changing the public good aspects of communication law and policy. Voluntary standards and codes allow businesses maximum flexibility in regulating their own behaviour over computer networks. However, voluntary rules can easily result in overlapping and conflicting guidelines, especially since these rules can apply variously to individual companies, industry sectors, particular corporate functions, professional associations or the technology itself (Gellman, 1997: 256, 260). Poorly structured private sector regulations can also leave significant gaps in the areas and practices they cover. Furthermore, since there are no penalties for failing to enforce voluntary rules, incentives to adhere to them are weak.

Regulation of behaviour over computer networks can also be achieved through the use of private contracts. Access or service providers can subject network users to contractual arrangements as part of their terms of service (Bing et al., 1983: 114; Proceedings of the Annenberg Washington Program Panel One, 1995: 26). These contracts effectively establish private law and policy on computer networks. For example, copyright holders increasingly employ contracts to lay out conditions and terms of service. These contracts may specify acceptable uses of their products and require consumers to waive their rights under intellectual property law, such as the right of fair use or first sale (Lessig, 1999: 135). Thus, while contracts can be used to resolve conflicts surrounding information flows over computer networks, they can also be used to displace or circumvent rights established under public law.

Finally, the private sector can use technology to solve problems associated with intellectual property, privacy and freedom of expression. Lessig (1999: 7) argues that, without government intervention, code, or the software and hardware that make up these systems, will regulate computer networks. There are many examples of regulation through network technology. Technological means, such as filtering or age verification systems, can be used to control access to objectionable expression over computer networks (1999: 175–6; White House, 1997: 25). Software programs can be used to protect privacy by determining a user's privacy preferences and alerting the user when computer sites don't meet their standards (Global Internet Liberty Campaign, 1998; Green et al., 2000: 94; Lessig, 1999: 160). Technology can also be used to extend the control of copyright holders over intellectual property by tracking and controlling copies of materials or by designing technology in a way that limits its potential uses. For example, digital audiotape (DAT) is designed to degrade in quality with successive copies, even though DAT is technically capable of producing an infinite number of perfect copies (Lessig, 1999: 128). While technology can solve problems brought on by computer networks, it will solve these problems according to who has power in the

marketplace and who controls or owns the technology (Lessig, 1999: 7). In some cases, consumers may be able to use technology to protect their rights and preferences, as with privacy software or filtering programs implemented by the end user. Conversely, technology may be used to strip consumers and citizens of rights they hold under public law, as in the case of some intellectual property technologies or content filters imposed by companies, service providers or governments rather than freely chosen by end users. In the case of content filters, end users may be unaware that regulations are being applied and, therefore, be incapable of challenging them. Given the potential of technology to override public values, many analysts believe that governments must have a role in monitoring and penalizing network practices which fail to conform to accepted rights and standards (Global Internet Liberty Campaign, 1998; Green et al., 2000: 94; Lessig, 1999: 160).

Critics of marketplace regulation argue that allowing businesses to determine the social purposes of computer networks results in the erosion of public service values traditionally maintained by governments (Lessig, 1999: 59; Schiller, 1999: 59, 87). By defining economic efficiency as the end goal of communication systems, market regimes reduce information and communication to mere commodities, and fail to recognize the other roles they play in social, cultural and political life (Babe, 1995: 18). Regulating behaviour on computer networks through contract and code takes areas of regulation, including privacy, intellectual property and speech rights, out of the domain of public political processes and into that of private decision-making. Rights that exist in the public realm of government will not necessarily find protection in the private realm of commerce. Governments' role in regulating media is dramatically transformed. Whereas a public service model of government regulation expects governments to ensure access to and availability of services and technology, affordable prices for essential services, and the rights of media owners and users (Office of Technology Assessment, 1990: 23), the market model views governments as enforcers of market rules and requirements, such as property rights, contracts and information flows. Citizens who are dissatisfied with the terms of service can seek out another service provider, but they do not have the opportunity to change those terms by having a 'voice' in those systems (Hirschman, 1986: 77: Lessig, 1999: 201). Lessig (1999: 199) argues that governments which allow market regulation to control the architecture of the Internet will undoubtedly experience a loss of sovereignty.

Private sector regulation of computer networks is problematic in a number of other regards. As articulated by Johnson and Post (1997), network self-regulation presumes that online behaviour takes place in a unique space that is detached from the real world. This line of reasoning reifies computer networks and the activities that take place over them. In fact, as scholars such as Lessig (1999: 190) and Mayer-Schönberger and Foster (1997: 238) point out, these networks are not extraterritorial. Behaviour that takes place in online space simultaneously occurs in real geographic space. Consequently, both spaces have a degree of control over network actors. The marketplace model also characterizes network actors as consumers who are free to change rule sets whenever they become dissatisfied with conditions under a particular network service or access or content provider. Yet, for many network users, the label of consumer falls short of accurately characterizing their relationship to online spaces. As Lessig (1999: 201–3) points out, people become members of online communities; they spend time there, build relationships and establish social capital. Given these circumstances, moving to another rule set can constitute a significant burden, and human dignity may demand that people have some opportunity to shape these spaces (1999: 217). Finally, private sector regulation has additional disadvantages. Unlike socially determined government regulations that are transparent in the sense that they are publicly discussed and scrutinized, private sector regulations are often non-transparent. Private regulators can be less forthcoming and less accountable than their public counterparts (1999: 178–1). Private sector regulations are

also less likely to achieve the kind of coordinated and predictable network environment many business users seek. While these regulations may resolve some conflicts over information and communication, they may also work to achieve private goals, like the extension of control over information, that disregard public values. Even with private sector regulations in play, citizens must call on governments to resolve disputes that arise and to ensure the preservation of public values associated with law on intellectual property, privacy and speech rights, as well as other areas of social life.

National Public Service Regulation

National politically determined, public service regulation of communication policy can be set through national laws, legislation and rule-making bodies. Policy may be written into government constitutions, as is the case with speech rights protections in many countries. Newer constitutions may even include rights associated with data protection, such as the right to access and control personal information found in the constitutions of Hungary and South Africa. National legislation allows countries to systematically consider different policy options and to collectively choose the values animating their communication systems. National judiciaries can adjudicate conflicts that arise according to the legal traditions and customs of a given country.

National public service regulation allows for political choices to be made on a scale commensurate with citizen participation and with government accountability. National governments possess the tools to devise and enact policies that protect public values and interests (Reidenberg, 1997: 96). For example, as research on data protection shows, comprehensive national regulation is key to controlling abuses of information privacy (Lessig, 1999: 163; Peterson, 1995: 164; Reidenberg, 1997: 95). Governments also define the rules that govern communication markets and act as a line of defence against private actors who use contracts, technology or other methods to erode public rights in favour of private interests. Hence, Lessig (1999: 197–9) argues that governments must ultimately decide the degree of protection to give to values that are called into question by new technologies, as well as the appropriate balance between the rights and responsibilities of network users and network owners.

Notwithstanding the importance of the role governments can and in many cases should play in the governance of new communication technologies, of significant concern is their very ability to devise and enforce effective regulations. The main dilemma being faced by governments is how to respond to the growing technological and economic pressures brought about by global computer networks, while safeguarding important social and political goals and objectives. While there is no correct blueprint for what makes government oversight successful, there are certain themes and characteristics that will determine the effectiveness and credibility of national regulation. First, the development of national policies toward communication technologies is a political process, and the nature of the political system and the dominant political ideology will be key factors in determining the nature and substance of the policy process. Second, the strength of the legal system, including the nature of contractual laws and the property rights regime within a country, will be critical for providing stability and enforceability of national policies. Finally, the nature and effectiveness of safeguarding institutions like the judiciary and the regulatory agencies and instruments developed to oversee computer networks will be crucial to determining the effectiveness of the management of these new technologies. Many countries lack the institutional framework required to effectively develop and implement national policies and regulations.

Another challenge to national sovereignty stems from the ability of computer networks to facilitate interactions between people and organizations residing in different legal jurisdictions. Legal differences between jurisdictions cut across multiple areas of law, including privacy, freedom of expression and intellectual property, and are often related to the different culture, history and attitudes of specific countries

(Kirby, 1983: 11–12). When communication crosses many jurisdictions and has effects in many places, including outside its country of origin, the authority of any one territorial sovereign to apply laws becomes questionable. The ability of computer network communication to regularly cross national borders makes it difficult for governments to determine whether an activity or actor falls within their jurisdiction (Rogerson and Thomas, 1998: 430). In addition, the architecture of global computer networks, with its possibilities of anonymity and decentralized communication, can frustrate governments' attempts to identify and locate people engaged in illegal behaviour (Lessig, 1999: 19). In effect, these features of global communication systems weaken the relationship between sovereignty and geographical territory (Gellman, 1997: 271; Kirby, 1983: 12; Reidenberg, 1977: 85). Sovereign power has traditionally depended on the ability to regulate behaviour within a particular geographic territory and on the implicit or explicit consent of those governed (Johnson and Post, 1997: 5–6; Perritt, 1997). These aspects of sovereignty do not readily translate into a context in which behaviour involves multiple jurisdictions.

Such international interactions and transactions are increasingly being seen as part of the emergence of a global or transnational civil society (Braman and Sreberny-Mohammadi, 1996; Calabrese, 1999; Frederick, 1993; Hamelink, 1991). Defining civil society as that part of collective social life that is free from both the power of the state and the market, these scholars document the impact of computer networks on growing trans-border cooperation between various types of citizens groups especially in the areas of human rights, consumer protection, peace, gender equality, racial justice, environmental activism, consumer protection and workers' rights (Frederick, 1993: 285). These new social movements, non-governmental organizations (NGOs) and citizen advocacy groups have taken advantage of networks such as the Association for Progressive Communications (a network connecting dozens of smaller networks such as Econet, PeaceNet, ConflictNet, and WorkNet) to provide alternative mechanisms for citizens to support and participate in a variety of global activities. A number of scholars have documented the use of communication technologies in general and computer networks in particular to foster transnational progressive, alternative and radical social movements (Bennett, 2003; Calabrese, 1999; Downing, 2001; Ford and Gil, 2001; Waterman, 1998). Though there is no doubt that computer networks have increased the scope for global civic engagement by citizens often in opposition to the positions taken by their own national governments, the long-term impact of both new technologies and new social movements on the overwhelming power of states and markets is as yet undetermined. Although legal and jurisdictional conflicts may weaken the ability of nations to regulate, they do not render national regulation altogether ineffective. Nations can still assert control over network users, operators and infrastructures within their jurisdictions (Reidenberg, 1997: 99). For example, data havens, or countries which apply few or no rules to computer network communication, may not be able to shield computer network communication from the jurisdictional claims of other countries. Other nations may succeed in claiming jurisdiction over the network equipment and facilities which allow data havens to achieve connectivity outside their territory, or over the network users and operators who maintain citizenship outside the data haven (Garfinkel, 2000: 238–9).

While national government regulation is both unavoidable and, in many cases, desirable, it also has significant weak points. If not kept in check by a strong conception of public rights, governments may go beyond maintaining the structures that protect rights and instead become a prime violator of these rights. As we have noted, authoritarian regimes continue to limit the range of information and ideas that they want circulating within their civil societies and view computer networks as real threats to their ability to control the nature and flow of information within their societies. Further, for governments who fail to set national policy in a comprehensive or coordinated way, conflicting rules can hinder electronic commerce and create uncertainty for network users (Gellman, 1997: 256–7). Finally,

national regulation alone cannot solve problems that arise when communication crosses numerous jurisdictions with conflicting policies. Such cases call for international and multilateral policy responses. Nevertheless, the authority of nations to regulate across jurisdictions remains precarious, and national rules will be harder to assert over global computer networks absent an amenable network architecture and international cooperation.

International and Multinational Regimes

Effective regulation of global computer networks may require the development or refinement of international instruments and institutions for communication policy-making. Many scholars point out the growing links between national and international policy. Domestic policies in one country can easily have effects on other countries (Michalski, 1989: 15; OECD, 1995: 4). Transnational laws, such as the European Union Privacy Directive, have ramifications for countries both inside and outside their jurisdiction (Kirby, 1983: 52; OECD, 1995: 5). And global transactions raise transnational problems whose solutions require international cooperation and coordination (Kirby, 1989: 167; Lessig, 1999: 205–6; Mayer-Schönberger and Foster, 1997: 243; OECD, 1997: 5). Proponents of the global marketplace argue that international organizations should be used to harmonize conflicting commercial regulations and to set the rules of the global market game (Bitterman, 1989: 308; Cate, 1994; Glickman and Carney, 2000). From this perspective, international ICT policy is necessary to rationalize and refine global competition. From another angle, Lessig (1999: 205) argues that global ICTs open up new communicative spaces in which citizens from around the world can participate. As activity in such spaces increases, more questions are raised about our legal status there (1999: 226). For Lessig, clarification of the rights and responsibilities that adhere to international spaces and international life is essential for the fair and humane treatment of all network users and participants.

Conflicting legal rules have created pressures to harmonize regulation across countries or to find some method of coordinating or cooperating among multiple jurisdictions (Glickman and Carney, 2000: 195; Hudson, 1994: 141; Lessig, 1999: 192). In other words, nations must accept laws that apply across multiple jurisdictions or agree on a way to determine, in case of conflict, whose laws apply. International cooperation could come in many forms. Countries could mandate the regulability of network architecture, and mutually agree to enforce one another's laws by instituting mandatory electronic identification and zoning (Lessig, 1999: 207). Nations could cede some of their sovereign powers to third parties, such as international regulatory agencies, arbitrators or courts (Johnson and Post, 1997) – though, in this case, national legal systems would be necessary to implement, enforce or interpret third-party decisions (Perritt, 1997). Whichever mechanisms or methods are chosen, cooperation and coordination will require the establishment of international policy principles that serve as a common denominator between countries and/or that indicate the circumstances in which sovereignty should be deferred. Establishing these principles requires that nations come to some agreement on the political and economic goals of international society and international life (Alleyne, 1995: 17).

Global information flows, along with the jurisdictional limitations of nation-states, necessitate the development of transnational regimes for communication law and policy. The majority of communication and legal scholars support the idea that the protection of legitimate rights and interests on global communication systems requires international cooperation (Bitterman, 1989: 308; Blumenthal, 1999: 550; Cate, 1994; Glickman and Carney, 2000; Kirby, 1989: 167; Lessig, 1999: 205–6; Mayer-Schönberger and Foster, 1997: 243; OECD, 1997: 14; Thurow, 1997: 100). What these scholars disagree on, as our earlier discussions on speech rights, intellectual property and privacy suggest, are the normative goals of international cooperation and how these goals are best achieved. Since these perspectives have

already been covered at length in earlier sections, our purpose here will be to briefly survey the current landscape of transnational treaties, agreements and organizations, along with the promises and pitfalls they hold for global media regulation.

Transnational communication regimes are nearly as old as the earliest global media, the mail and the telegraph. To date, international rule makings and organizations have centred largely on the areas of telecommunications, the mail and intellectual property (Alleyne, 1995: 21). In 1849, multinational agreements were forged to rationalize the transnational use of the telegraph, and in 1865, 20 countries signed a multilateral treaty that created the International Telegraph Union (ITU), an organization designed to set the rules for international telegraphy. Later renamed the International Telecommunication Union and incorporated into the United Nations, the ITU makes binding decisions regarding the technical regulation of telecommunications, including the protocols used for modems. In the case of the mail, the formation of an organization in 1874 that would eventually become the Universal Postal Union (UPU) heralded the beginning of a multinational postal regime. The UPU today encourages worldwide international cooperation and standardization of postal services (Bing et al., 1983: 133). Intellectual property law has been subject to multilateral copyright agreements since 1886 when several countries, including Japan, Germany, France and the United Kingdom, adopted the Berne Convention for the Protection of Literary and Artistic Works. The Berne Convention sought to establish international norms for intellectual property protection by requiring member states to accord the same intellectual property protections to nationals from other member states as exist for their own citizens, a concept known as the national treatment standard (Berne Convention, 1886; Braunstein, 1989; Goldstein, 1994: 183–4).

The preponderance of international intellectual property agreements and organizations is due largely to the desire of copyright-holding countries to protect their intellectual goods against piracy and fraud. International agreements generally aim to establish and harmonize international intellectual property principles and laws (Bing et al., 1983: 134; Jussawalla, 1992: 4). In addition to the Berne Convention, intellectual property protections have been part of numerous bilateral and multilateral agreements, including the Universal Copyright Convention (UCC), the World Trade Organization (WTO), the North American Free Trade Agreement (NAFTA), the US–Canada Free Trade Agreement, and many others. Since 1967, the Berne Convention has been administered by the World Intellectual Property Organization (WIPO).[10] Another prominent international intellectual property agreement, the Universal Copyright Convention (UCC), was created in 1952 to impose minimum intellectual property requirements on the US, Latin America, Europe, Asia and Africa. Administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the UCC acts as the smallest common denominator for intellectual property law at the international level (Bing et al., 1983: 79). In 1996, the Berne Convention was updated to include the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty. These two treaties sought to strengthen intellectual property rules in relation to digital communication and to encourage online commerce (White House, 1997: 13). Another international intellectual property organization, the Internet Corporation for Assigned Names and Numbers (ICANN), was established in the late 1990s in order to administer Internet domain names and intellectual property addresses. Unlike all of the aforementioned organizations which are publicly funded and maintained, ICANN is a private, non-profit group.

Countries have been slower to forge transnational agreements on privacy issues and speech rights. Two transnational organizations, the Organization for Economic Cooperation and Development (OECD) and the Council of Europe, have devised privacy guidelines for transnational information flows based on fair information practices (Gellman, 1997: 265). OECD and Council of Europe guidelines have become the foundation for numerous countries' privacy policies. In addition, the European Union leads the world in promoting international cooperation and harmonization of privacy

policies. The EU Privacy Directive, like other EU Directives, formulates centralized policy objectives and standards at the European level and asks EU member states to implement these in their respective nations. Although Directives do not create transnational rights that citizens can draw on directly, they do allow member countries to implement uniform rules in such areas as data protection and intellectual property (Reidenberg, 1997: 94–5). In the case of the Privacy Directive, the EU has been able to coordinate information policy among its member nations and to pressure many nations outside the EU to conform to higher privacy standards. Finally, several international rights covenants exist which include speech rights clauses, such as the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, and the (European) Convention for the Protection of Human Rights (Cate, 1994: 470). These agreements declare the intentions of their signatories to uphold the values of freedom of expression and information.

International and multinational agreements and organizations exist in various states of development in countries across the world, with intellectual property rights regimes tending to be more developed, speech rights less so, and privacy rights somewhere in between. While these efforts represent necessary first steps in ensuring global communication rights regimes that can keep pace with global communication processes, they also highlight several issues that need to be addressed if nations are to pursue more equitable international policies. These issues include how such regimes will affect included and excluded countries, how representative they are of the world's citizens and countries, and how their rules will be coordinated, monitored and enforced. First, multinational regimes are prone to inclusion and exclusion problems. As we saw with the EU data protection rules and some intellectual property rules, excluded countries that did not ascribe to an agreement's norms and standards felt pressured to conform nevertheless. This issue is particularly pronounced for developing countries who are pressured to adhere to restrictive intellectual property rights that do little to promote the growth of knowledge and information in their home countries. Conversely, countries that are party to these agreements have difficulty protecting their rights in outside territories. Protecting rights globally may require some uniform standards that all countries can agree to, but which leave room for flexibility and experimentation. As Burk (1997: 226, 231) suggests, international agreements should create minimum standards of protection which at the same time permit innovation and variation. One example of such flexibility is the inclusion of a global 'fair use' clause in the Berne Convention and UCC. Supported by African, Asian and Latin American countries, this clause allows for the circulation of copyrighted works for the purposes of teaching, scholarship or research if member countries obtain licences and provide reasonable remuneration (Goldstein, 1994: 187–9).

A second issue, and one to which less attention has been paid, concerns the representative aspects of international regimes. Ideally, international regimes should allow participating countries to coordinate law and policy so as to further the common good for all involved and should be representative of, and accountable to, those who fall under their regulations. In practice, these regimes may be unduly affected by differentials in political and economic power so that the stronger powers dominate the rule-making and policy processes (Alleyne, 1995: 152). Representation may also turn out to be a problematic aspect of private, non-profit regulatory bodies, such as ICANN. ICANN is responsible for assigning name and address spaces on the Internet, essentially delegating property rights to specific individuals. While Glickman and Carney (2000: 196) laud ICANN as a new model of international regulation, Mueller (1999: 517, 519) argues that ICANN's private status allowed it to avoid public input and scrutiny during its formation and ultimately led to public demands for procedural safeguards like those applying to government organizations. For Mueller (1999), the rhetoric of private regulation simply masks a policy process in which valuable rights and assets are allocated without adequate public representation

and accountability. Lastly, international regimes may need to be consolidated, clarified or made more effective. At present, there are numerous organizations, treaties and agreements regulating various aspects of intellectual property, privacy and speech rights law. For example, in the area of intellectual property, Kirby (1983: 49) notes that there are a number of pre-existing organizations capable of dealing with intellectual property issues, and Jussawalla (1992: 56) sees a need to specify relations between TRIPS, WIPO and the UCC. In addition, regimes can only be effective to the extent that they monitor and enforce the principles and rules they set forth. Yet, the link between some regimes and mechanisms for monitoring or enforcing policy is weak. For example, while many international rights covenants protect speech rights, none sponsors organizations that monitor speech rights violations or enforce speech rights protections.

International Policy Principles

Arriving at internationally accepted principles will be a formidable task. One method might be for nations to examine the principles contained in existing policy agreements. Yet, while Bing et al. (1983: 81) review contemporary policy instruments for indications of global communications principles, they also suggest that relying on established principles is insufficient. Global communication systems raise new and unanswered questions. In some cases decision-makers may be able to apply old principles in a new context, but in others new principles will have to be developed in accord with social, cultural and political values. In this section, we briefly lay out some suggested policy principles for intellectual property, privacy and speech rights.

In the area of intellectual property, nations must determine what principles will define the public use and availability of information and knowledge. Will fair use and first-sale principles be extended into global communication systems, or will these principles be swept away by technological design, legal means or industry practices? What length of time should copyright holders enjoy monopoly rights over intellectual goods, and at what point does this monopoly become a detriment to society? Scholars suggest that principles must protect the fundamental philosophical aim of copyright law, the promotion and dissemination of knowledge and creativity throughout society (Halbert, 1999; Lessig, 1999; Thurow, 1997). Halbert (1999: 158) argues that copyright rules should strike a balance between the public good and private gain; copyright holders should be able to profit from their work, but not at the expense of the greater common good. Lessig (1999: 141; 2001) and Thurow (1997: 102) maintain that copyright principles should effectively demarcate public from private knowledge and establish a public domain or intellectual commons in which knowledge and information are broadly accessible. This public domain might include basic scientific knowledge (Thurow, 1997: 102), computer software code that enacts basic functions or processes (Jussawalla, 1992: 112), and cultural symbols that have already duly profited their copyright holders (Halbert, 1999).

Numerous countries have already developed privacy principles, defining the values associated with the collection and use of personal information. Many of these countries have data protection or information privacy laws which are based on guidelines set forth by the OECD and the Council of Europe and on general principles of fair information practices (Council of Europe, 1981; Gandy, 1993: 7; Gellman, 1997: 265; Global Internet Liberty Campaign, 1998; OECD, 1981). These principles generally favour the values of openness and transparency in information collection and processing. Among the principles set forth on privacy are that individuals should have the right to control their own data, to have data about them collected fairly and lawfully, to opt into (rather than out of) data processing and sharing, to access and correct inaccurate data about themselves, and to limit secondary uses of personal data (Branscomb, 1994: 24; Global Internet Liberty Campaign, 1998; Hausman, 1994: 138; Lessig, 1999: 156; Maxeiner, 1995: 99; OECD, 1997: 14; Peterson, 1995: 184). In addition, countries should require data collectors to

disclose their information and privacy practices, impose penalties on those who fail to comply with privacy rules, and assign a government agency the task of monitoring and enforcing privacy policy (EU Data Protection Directive, 1995; Green et al., 2000: 84; OECD, 1981).

Speech rights principles cover access to communication systems, resources and content. Some scholars, such as Hudson (1994: 137) and Melody (1990: 30), argue that universal access must be a core principle of communication policy. Melody (1990) favours the application of universal service principles to all communication systems that constitute essential facilities. The concept of universal service mandates non-discriminatory access to, and pricing of, communication systems and services. Others favour this concept as a means of preventing system gatekeepers and owners from charging monopoly prices for their services, giving special treatment to favoured content and service providers, or discriminating among those who wish to interconnect with their systems (Human Rights Watch, 1999: 5, 7). Analysts also suggest that governments should eschew centralized content censorship. For speech rights absolutists, there is no justification for government regulation of speech. For others, such as the OECD (1997: 15), governments must promote the free flow of information in a way that respects both speech and privacy rights. One principle which seeks to contain unwelcome government content censorship, put forth by Samorski et al. (1997: 163) and Human Rights Watch (1999: 4), holds that control over content should, whenever possible, be delegated to end users. Receiver-based software allows individual users to set their own parameters for filtering unwanted content and could reduce pressures on service providers to act as content gatekeepers. Human Rights Watch (1999: 6) further suggests that government surveillance be subject to due process and judicial supervision so that it doesn't unduly infringe on individuals' privacy or civil rights. Additional speech rights principles have been set out in UNESCO's new world information and communication order (NWICO) initiative of the 1970s, which advocates a plurality of information sources, freedom and responsibility of communication workers, and the rights of all citizens to participate in international information exchanges and communication processes (Alleyne, 1995: 123). More recently, the United Nation's World Summit on the Information Society (WSIS) reaffirmed international principles related to free speech, including media independence, pluralism and diversity; freedom to receive and impart information; media responsibility; diversity of media ownership; and the closing of the gap in communication skills and resources between nations (United Nations, 2003: article 53).

CONCLUSION

New media, and the practices and institutions surrounding them, pose significant challenges to regulatory regimes around the world. National control over communication systems is complicated by technologies whose reach and effects extend beyond the jurisdictional boundaries of nation-states. Many governments fear the loss of political and economic sovereignty, others the loss of cultural identity. New media highlight a gap that now exists between life and governance; people can interact in supranational or global arenas that as of yet have no definitive mode of governance. Global networks offer a vast array of options to people, corporations and organizations for the pursuit of political, economic and cultural activities. Nations who wish to determine the goals and values that animate global media systems must pursue effective legal and legislative frameworks both nationally and internationally. In addition to transgressing jurisdictional boundaries, new media also test the conceptual and definitional boundaries of policy regimes affecting intellectual property, privacy and speech rights. Social conflicts in each of these areas demand policy responses that demarcate public rights, set behavioural standards and curtail abusive practices. New global media raise fundamental questions and concerns about who will control communication systems and the terms and conditions of access to

them. These concerns cannot be addressed simply by turning to legal precedent or technological solutions. Rather, nations must declare the principles that will define or redefine the social values and purposes of media systems in today's world.

Communication and legal scholars have been charting and surveying shifts in the regulatory landscape, assessing these shifts in normative terms, and seeking workable models of global media regulation. This scholarship tracks the tremors that occur as technologies, processes of commodification or private sector regulation collide with national norms, values and practices. Communication scholars identify the characteristics and practices accompanying new technologies, examine their social and political effects, and look for indications of whether these technologies will aid or abate social control. Legal scholars observe the conflicts new technologies are already creating in national and international life and explore various tools and mechanisms that might reconcile national policy goals with jurisdictional concerns.

Monitoring and assessing the changing landscape of communication systems is a critical task in this era of rapid technological and industrial change. Only by doing so can we determine how these systems interact with global political economic processes, how human agents are configuring and developing their structures, and how national and international policy-makers can act to protect socially determined goals. Global media systems like the Internet raise a classic problem of political organization. As the effects and consequences of global technology extend beyond the mechanisms for governing them, we must investigate the terms under which national and international governance mechanisms can claim to legitimately represent the world's nations and citizenry. Scholars of political communication and the philosophy of communication should investigate the institutional and communicative resources and requirements necessary for global governance. Scholars must also examine the real practices and effects of existing national and international policy instruments and institutions. Closer study of these areas will fill the gaps that currently exist in our knowledge of how new media are affecting the regulatory landscape and help point the way towards sensible, humane and representative global communications policy.

NOTES

1 An example of such research can be found in Johnson and Post (1997), who argue that global networks constitute their own spaces with their own sovereignty. These authors underplay the fact that those who communicate over ICTs are already subject to real-world sovereigns who have an obligation to protect their citizens.

2 Under these treaties, the following works may be protected: (1) both unpublished and published works of an author who is a national or resident of a country that is a member of these treaties; or (2) published works, with permission, of an author who is not a national or resident of a country that is a member of these treaties.

3 For more details on the Directive, see the Directive on the Protection of Individuals with Regard to the Processing of Personal Data and on the Free Movement of Such Data. For a concise summary of the Directive's provisions, see Rosenoer (1997: 156– 60).

4 For example, the Privacy Act of 1974 (5 U.S.C. § 552a) mandates limited privacy protections for government-maintained databases, including the right of individuals to review and correct personal information stored in government records. The rules do not apply to privately held databases.

5 Although the US continues to advocate self-regulation and narrow sectoral rules, numerous analysts have deemed the US approach a failure (Branscomb, 1994; Gellman, 1997; Global Internet Liberty Campaign, 1998; Green et al., 2000; *The Economist*, 1999). US privacy protections are a patchwork of inconsistent, weak and inadequately enforced rules which leave US citizens with no substantive protections for personal information. No federal agency oversees or enforces data protection in the US, and support for such rules among the business community is weak (Gellman, 1997: 267, 274; Mitchener, 2000).

6 Under the agreement, any organization must offer individuals the opportunity to choose (opt out) whether and how personal information they provide is used or disclosed to third parties. For sensitive information (i.e. personal information about medical or health conditions, racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership or information specifying the sex life of the individual) they must be given affirmative or explicit (opt in) choice if the information is to be used for a purpose other than those for which it was originally collected. Organizations are required to take reasonable precautions to protect information from loss, misuse and unauthorized access, disclosure, alteration and destruction and to take reasonable steps to ensure individuals have access to personal information about them and are able to correct, amend or delete that information where it is inaccurate.

7 This section focuses on speech rights restrictions posed by national governments. Freedom of expression and access to communication resources can also be restricted by non-governmental actors, such as system operators or network infrastructure owners (Office of Technology Assessment, 1990: 169). While this type of censorship is rare and ineffective at present owing to the competitive market for network access and services and the current open network architecture, it may figure more prominently in the future (Cooper, 2000; Lessig, 1999: 167). Although not our focus here, we believe that any private sector developments that threaten freedom of expression should be closely examined by policy-makers and corrected when necessary.

8 Although the US rules were struck down in the resulting Supreme Court case of *Reno v. ACLU* (1997), the US Congress has continued to pursue legislation that aims to restrict the availability of pornography on the Internet. Congress has mandated that public schools and libraries who accept designated government technology subsidies use filtering software to censor indecent content when providing Internet access to students and library patrons (*United States v. American Library Association*, 2003).

9 For example, while markets systems have as their primary goal the efficient allocation of resources, efficiency is only one value among many that most countries would apply to communication systems. Markets and other models of regulation must be evaluated against the range of goals which countries aim to achieve, including those related to privacy, access and speech rights.

10 WIPO also helps countries create and reform intellectual property rules, comply with international intellectual property treaties, and encourage more specialists to enter the intellectual property field (Alleyne, 1995: 30). In the 1990s, WIPO took on the additional role of investigating Internet domain name trademark conflicts, making recommendations on how to resolve top-level domain disputes, and otherwise managing the international domain name trademark regime (Mueller, 1999: 505–6).

REFERENCES

Abrahamson, David (1998) 'The visible hand: money, markets, and media evolution', *Journalism and Mass Communication Quarterly*, 75 (1): 14–18.

Alleyne, Mark D. (1995) *International Power and International Communication*. New York: St Martin's Press.

Araki, Toshihiro (1989) 'Information technology and legal issues', in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology and Global Interdependence*. New York: Greenwood. pp. 193–6.

Associated Press (2000) 'French court says Yahoo! broke racial law', *New York Times*, 23 May (online).

Babe, Robert E. (1995) *Communication and the Transformation of Economics: Essays in Information, Public Policy, and Political Economy*. Boulder, CO: Westview.

Barber, Benjamin R. (1984) *Strong Democracy: Participatory Politics for a New Age*. Berkeley, CA: University of California Press.

Barron, Sandy (2000) 'Myanmar works hard to keep the Internet out', *New York Times*, 14 July (online).

Benkler, Yochai (2000) 'Net regulation: taking stock and looking forward', *University of Colorado Law Review*, 71: 1203–61.

Bennett, W. Lance (2003) 'Communicating global activism: strengths and vulnerabilities of networked politics', *Information, Communication & Society*, 6 (2): 143–68.

Berne Convention (1886) Berne Convention for the Protection of Literary and Artistic Works, 9 September 1886, 828 U.N.T.S. 221 (1972).

Besser, Howard (1999) 'Will copyright protect the public interest?', *Peace Review*, 11 (1): 25–31.

Bettig, Ronald V. (1992) 'Critical perspectives on the history and philosophy of copyright', *Critical Studies in Mass Communication*, 9 (2): 131–55.

Bettig, Ronald V. (1997) 'The enclosure of cyberspace', *Critical Studies in Mass Communication*, 14 (2): 138–57.

Bing, J., Forsberg, P. and Nygaard, E. (1983) 'Legal problems related to transborder data flows', in Organization for Economic Cooperation and Development (ed.), *An Exploration of Legal Issues in Information and Communication Technologies*, 8. Paris: OECD. pp. 59–135.

Bitterman, Mary G.F. (1989) 'Conclusions from TIDE II', in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology and Global Interdependence*. New York: Greenwood. pp. 307–8.

Blumenthal, Marjory S. (1999) 'The politics and policies of enhancing trustworthiness for information systems', *Communication Law and Policy*, 4 (4): 513–55.

Boyle, James (1997) *Shamans, Software, and Spleens: Law and the Construction of the Information Society*. Cambridge, MA: Harvard University Press.

Braman, Sandra and Sreberny-Mohammadi, Annebelle (1996) *Communication and Transnational Civil Society*. Creskill, NJ: Hampton.

Branscomb, Anne Wells (1994) *Who Owns Information? From Privacy to Public Access*. New York: Basic.

Braunstein, Yale M. (1989) 'Economics on intellectual property rights in the international arena',

in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology and Global Interdependence*. New York: Greenwood. pp. 183–92.

Burk, Dan L. (1997) 'The market for digital piracy', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 205–34.

Calabrese, Andrew (1999) 'Communication and the end of sovereignty', *Info*, 1 (4): 313–26.

Carey, James W. (1998) 'The Internet and the end of the national communication system: uncertain predictions of an uncertain future', *Journalism and Mass Communication Quarterly*, 75 (1): 23–34.

Cate, Fred H. (1994) 'Global information policy-making and domestic law', *Indiana Journal of Global Legal Studies*, 1 (2): 467–87.

Cate, Fred H. (1995) 'The First Amendment and the national information infrastructure', *Wake Forest Law Review*, 30 (1): 1–50.

Cochran, Wendell (1996) 'Computers, privacy, and journalists: a suggested code of information practices', *Journal of Mass Media Ethics*, 11 (4): 210–22.

Cooper, Mark (2000) 'Open access to the broadband Internet: technical and economic discrimination in closed proprietary networks', *University of Colorado Law Review*, 71: 1011–69.

Council of Europe (1981) Convention for the Protection of Individuals with Regard to the Automatic Processing of Personal Data, ETS No. 108, Strasburg.

Delaney, Kevin J. (2000) 'Yahoo! returns to French court to address Nazi paraphernalia', *Wall Street Journal*, 11 August: B10.

Demac, Donna A. (1994) 'Multimedia and intellectual property rights', *Media Studies Journal*, 8 (1): 59– 63.

Dewey, John (1954) *The Public and Its Problems* (1927). Athens, OH: Ohio University Press.

Downing, John D.H. (2001) *Radical Media: Rebellious Communication and Social Movements*. Thousand Oaks, CA: Sage.

Entman, Robert (1989) *Democracy without Citizens*. New York: Oxford University Press.

Enzensberger, Hans Magnus (1974) *The Consciousness Industry*. New York: Seabury.

EU Data Protection Directive (1995) Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the Protection of Individuals with Regard to the Processing of Personal Data and the Free Movement of Such Data. Available online: http://www.privacy.org/pi/intl_orgs/ec/final_EU_Data_Protection.html

Feemster, Ron (2000) 'When libraries faced the future', *University Business*, February. Available online: http://www.universitybusiness.com/0002/library.html

Ford, Tamara V. and Gil, Genève (2001) 'Radical Internet use', in John D.H. Downing (ed.), *Radical Media: Rebellious Communication and Social Movements*. Thousand Oaks, CA: Sage. pp. 201–34.

Frederick, Howard (1993) 'Networks and emergence of global civil society', in Linda M. Harasim (ed.), *Global Networks: Computers and International Communication*. Cambridge, MA: MIT Press. pp. 283–95.

Froomkin, A. Michael (1997) 'The Internet as a source of regulatory arbitrage', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 129–63.

Gandy, Oscar H. (1993) 'Toward a political economy of personal information', *Critical Studies in Mass Communication*, 10: 70–97.

Garfinkel, Simson (2000) 'Welcome to Sealand. Now bugger off', *Wired*, July: 230–9.

Gellman, Robert (1997) 'Conflict and overlap inprivacy regulation: national, international, and private', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 255–82.

Gilpin, Robert (1987) *The Political Economy of International Relations*. Princeton, NJ: Princeton University Press.

Glickman, Howard and Carney, Dan (2000) 'Watching over the World Wide Web', *Business Week*, 28 August: 195–6.

Global Internet Liberty Campaign (1998) 'Privacy and Human Rights: An International Survey of Privacy Laws and Practice'. Available online: http://www.gilc.org/privacy/survey/intro.html

Goldsmith, Jack L. (1998) 'Against cyberanarchy', *The University of Chicago Law Review*, 65 (4): 1199–250.

Goldstein, Paul (1994) *Copyright's Highway: The Law and Lore of Copyright from Gutenberg to the Celestial Jukebox*. New York: Hill & Wang.

Green, H., France, M., Stepanek, M. and Borrus, A. (2000) 'Online privacy: it's time for rules in Wonderland', *Business Week*, 20 March: 83–8, 92.

Halbert, Debora J. (1999) *Intellectual Property in the Information Age*. Westport, CT: Quorum.

Hamelink, Cees (1991) *Communication: The Most Violated Human Right*. Stockholm: Inter Press Service Dispatch.

Hausman, Carl (1994) 'Information age ethics: privacy ground rules for navigating in cyberspace', *Journal of Mass Media Ethics*, 9 (3): 135–44.

Hibbert, Bill (1999) 'Regulation of electronic publishing and commerce', *Info*, 1 (5): 393–404.

Hilton, George W. (1972) 'The basic behavior of regulatory commissions', *American Economic Review*, 62 (2): 47–54.

Hirschman, Albert O. (1986) *Rival Views of Market Society and Other Recent Essays*. New York: Viking.

Hudson, Heather (1994) 'Toward universal access to information', *Media Studies Journal*, 8 (1): 137–42.

Human Rights Watch (1999) *The Internet in the Mideast and North Africa: Free Expression and Censorship*. New York: Human Rights Watch.

Hunter, Christopher D. and Herbeck, Dale (1999) 'From LaMacchia to the No Electronic Theft Act: criminal copyright infringement and the freedom of expression'. Paper presented at the Annual Meeting of the International Communication Association, San Francisco, CA.

International Covenant on Civil and Political Rights (1966), G.A. Res. 2200, U.N. GAOR, 21st Sess., Supp. No. 16, at 52, U.N. Doc. A/6316, art. 19.

Jackson, Margaret (1998) 'Keeping secrets: international developments to protect undisclosed business information and trade secrets', *Information, Communication & Society*, 1 (4): 467–87.

Johnson, David R. and Post, David G. (1997) 'The rise of law on the global network', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 3–47.

Johnson, J.T. (1994) 'The private I, you, they', *Journal of Mass Media Ethics*, 9 (4): 223–8.

Jussawalla, Meheroo (1992) *The Economics of Intellectual Property in a World without Frontiers*. New York: Greenwood.

Kahin, Brian and Nesson, Charles (1997) 'Preface', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. vii–xi.

Kahn, Alfred E. (1988) *The Economics of Regulation: Principles and Institutions*. Cambridge, MA: MIT Press.

Kavanaugh, Andrea L. (1998) *The Social Control of Technology in North Africa*. Westport, CT: Praeger.

Kindleberger, Charles P. (1978) *International Economics*, 6th edn (1st edn 1958). Homewood, IL: Irwin.

Kirby, Michael D. (1983) 'Legal aspects of information technology', in Organization for Economic Cooperation and Development (ed.), *An Exploration of Legal Issues in Information and Communication Technologies*, 8. Paris: OECD. pp. 9–57.

Kirby, Michael D. (1989) 'Informatics and democratic society: beyond the Tokyo Summit', in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology and Global Interdependence*. New York: Greenwood. pp. 157–71.

Krasner, Stephen D. (1991) 'Global communications and national power: life on the Pareto optimal curve', *World Politics*, 43 (3): 336–66.

Labunski, Richard (1997) 'The First Amendment at the crossroads: free expression and new media technology', *Communication Law and Policy*, 2 (2): 165–212.

Lessig, Lawrence (1999) *Code and Other Laws of Cyberspace*. New York: Basic.

Lessig, Lawrence (2001) *The Future of Ideas: The Fate of the Commons in a Connected World*. New York: Random House.

Louveaux, S., Salaün, A. and Poullet, Y. (1999) 'User protection in cyberspace', *Info*, 1 (6): 521–37.

MacAvoy, Paul W. (1979) *The Regulated Industries and the Economy*. New York: Norton.

Maxeiner, James R. (1995) 'Freedom of information and the EU Data Protection Directive', *Federal Communications Law Journal*, 48 (1): 93–104.

May, Christopher (1998) 'Capital, knowledge and ownership', *Information, Communication & Society*, 1 (3): 246–69.

Mayer-Schönberger, Viktor and Foster, Teree E. (1997) 'A regulatory web: free speech and the global information infrastructure', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 235–54.

McCarthy, Terry (2000) 'China dot now', *Time*, 28 February: 16–23.

Melody, William H. (1990) 'Communication policy in the global information economy: whither the public interest?', in Marjorie Ferguson (ed.), *Public Communication: The New Imperatives*. Newbury Park, CA: Sage. pp. 16–39.

Mensch, Elizabeth (1990) 'The history of mainstream legal thought', in David Kairys (ed.), *The Politics of Law: A Progressive Critique*. New York: Pantheon. pp. 13–37.

Michalski, Wolfgang (1989) 'Advanced information technologies: challenges and opportunities', in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology*

and Global Interdependence. New York: Greenwood. pp. 9–18.

Michelman, Frank I. (1987) 'Possession vs. distribution in the constitutional idea of property', *Iowa Law Review*, 72: 1319–50.

Mitchener, Brandon (2000) 'EU privacy rules carry a cost', *Wall Street Journal*, 14–15 April: 29, 32.

Morris, Merrill and Ogan, Christine (1996) 'The Internet as mass medium', *Journal of Communication*, 46 (1): 39–50.

Mosco, Vincent (1988) 'Toward a theory of the state and telecommunications policy', *Journal of Communication*, 38: 107–25.

Mosco, Vincent (1989) *The Pay-per Society: Computers and Communication in the Information Age*. Norwood, NJ: Ablex.

Mueller, Milton (1999) 'ICANN and Internet governance: sorting through the debris of "self-regulation" ', *Info*, 1 (6): 497–520.

Murphy, Jamie (1999) 'Australia passes law on limiting the Internet', *New York Times*, 1 July (online).

Office of Technology Assessment (1990) *Critical Connections: Communications for the Future*. Washington, DC: US Government Printing Office.

OECD (1981) *Guidelines Governing the Protection of Privacy and Transborder Data Flows of Personal Data*. Paris: OECD.

OECD (1995) *Information Technology Policies: Organizational Structure in Member Countries*, 3 (43). Paris: OECD.

OECD (1997) *Global Information Infrastructure – Global Information Society (GII–GIS): Policy Recommendations for Action*, 81 (5). Paris: OECD.

Perritt, Henry H., Jr (1997) 'Jurisdiction in cyberspace: the role of intermediaries', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 164–202.

Peterson, Sandra Byrd (1995) 'Your life as an open book: has technology rendered personal privacy virtually obsolete?', *Federal Communications Law Journal*, 48 (1): 163–86.

Plotkin, Adam S. (1996) 'The First Amendment and democracy: the challenge of new technology', *Journal of Mass Media Ethics*, 11 (4): 236–45.

Pool, Ithiel de Sola (1983) *Technologies of Freedom*. Cambridge, MA: Harvard University Press.

Privacy Act (1974) 5 U.S.C. § 552a.

Proceedings of the Annenberg Washington Program Panel One (1995) 'Information issues: intellectual property, privacy, integrity, interoperability, and the economics of information', *Federal Communications Law Journal*, 48 (1): 5–55.

Proceedings of the Annenberg Washington Program Panel Two (1995) 'Information policy making', *Federal Communications Law Journal*, 48 (1): 57–91.

Quaterman, John S. (1990) *The Matrix: Computer Networks and Conferencing Systems Worldwide*. Bedford, MA: Digital.

Reidenberg, Joel R. (1997) 'Governing networks and rule-making in cyberspace', in Brian Kahin and Charles Nesson (eds), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*. Cambridge, MA: MIT Press. pp. 84–105.

Reno (1997) *Reno, Attorney General of the United States, et al. v. American Civil Liberties Union et al.*, 521U.S. 844.

Robinson, Peter (1989) 'Information technology and the relationship among OECD countries', in Meheroo Jussawalla, Tadayuki Okuma and Toshihiro Araki (eds), *Information Technology and Global Interdependence*. New York: Greenwood. pp. 40–6.

Rogerson, Kenneth S. and Thomas, G. Dale (1998) 'Internet regulation process model: the effect of societies, communities, and governments', *Political Communication*, 15 (4): 427–44.

Rosenoer, Jonathan (1997) *CyberLaw: The Law of the Internet*. New York: Springer.

Rosenthal, Elizabeth (2000) 'China issues rules to limit e-mail and web content', *New York Times*, 27 January: A1.

Rucinski, Dianne (1991) 'The centrality of reciprocity to communication and democracy', *Critical Studies in Mass Communication*, 9 (2): 184–94.

Samorski, Jan H., Huffman, John L. and Trauth, Denise M. (1997) 'The V-chip and cyber cops: technology vs. regulation', *Communication Law and Policy*, 2 (1): 143–64.

Schiller, Dan (1999) *Digital Capitalism: Networking the Global Market System*. Cambridge, MA: MIT Press.

Schneider, Howard (2000) 'Syria advances cautiously into the online age', *Washington Post*, 27 April: A1.

Sell, Susan K. (1995) 'The origins of a trade-based approach to intellectual protection: the role of industry organizations', *Science Communication*, 17 (2): 163–85.

Smith, Craig (2000) 'Tough new rules don't faze Chinese Internet start-ups', *New York Times*, 4 October: C2.

Streeter, Thomas (1996) *Selling the Air: A Critique of the Policy of Commercial Broadcasting in the United States*. Chicago: University of Chicago Press.

Taubman, Geoffrey (1998) 'A not-so World Wide Web: the Internet, China, and the challenges to nondemocratic rule', *Political Communication*, 15 (2): 255–72.

The Economist (1999) 'The end of privacy', 1 May: 15, 21–3.

Thurow, Lester C. (1997) 'Needed: a new system of intellectual property rights', *Harvard Business Review*, September–October: 95–103.

United Nations (2003) International Telecommunications Union: Declaration of Principles: Building the Information Society: A Global Challenge in the New Millenium. 12 December 2003, 12 January 2005. Available online: http:www.itu.int/wsis/docs/geneva/official/dop.html

United States v. American Library Association (2003) 156 Supreme Court Reports, Lawyers' Edition 2d. 221.

Universal Declaration of Human Rights (1948) G.A. Res. 217 (III), U.N. Doc. A/810, art. 19.

Waltz, K. (1979) *Theory of International Politics*. Reading, MA: Addison-Wesley.

Waterman, Peter (1998) *Globalization, Social Movements and the New Internationalism*. London: Mansell.

Westin, Alan F. (1967) *Privacy and Freedom*. New York: Atheneum.

Wheeler, Deborah L. (1998) 'Global culture or culture clash: new information technologies in the Islamic world – a view from Kuwait', *Communication Research*, 25 (4): 359–76.

White House (1997) 'A framework for global electronic commerce'. 1 July.

Wriston, Walter B. (1994) 'The inevitable global conversation', *Media Studies Journal*, 8 (1): 17–25.

Yahoo! Inc. v. Le Ligue Contre le Racisme (2001) 169 F.Supp. 2d. 1181 (N.D. Cal. 2001).

Zhao, Yuezhi (2000) 'Caught in the web: the public interest and the battle for control of China's information superhighway', *Info*, 2 (1): 41–66.