

Defining information

An approach for policymakers

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Single-definition and pluralistic approaches to defining 'information' are politically problematic. All decision-making concerns can be incorporated in, and the definitional dilemma resolved with, a hierarchy of four categories of definitions that increase in scope and complexity of the social structure to which they are applied as well as the amount of power granted information. These categories of information are as a resource, commodity, perception of pattern, and constitutive force in society. The first, deepest and standard-setting analysis of any issue must be made defining information as a constitutive force in society. Other definitions may be used at the second and subsequent stages of analysis as appropriate.

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¹Lewis Hyde, *The Gift: Imagination and the Erotic Life of Property*, Vintage, New York, 1983.

²Mustapha Masmoudi, 'A new world information order for better human understanding', paper presented at Annual Conference of the International Institute of Communication, Ottawa, Canada, 1980; Mustapha Masmoudi, 'The new world information order', in Jim Richstad and Michael H. Anderson, eds, *Crisis in International News: Policies and Prospects*, Columbia University Press, New York, 1981, pp 77-96.

³Geza Feketekuty, 'Trade in professional services: an overview', paper presented at the University of Chicago Legal Forum, *continued on p 234*

The abundance and diversity of definitions of information bewilder. Where some see the object and subject of religious acts¹ others see political force,² or a commodity on the order of boots and bullets.³ After identifying more than 40 academic fields that deal with information, Machlup and Mansfield voice a common frustration over this confusion: 'Evidently, there should be *something* that all the things called information have in common [but] it surely is not easy to find out whether it is much more than the name.'⁴ A recent survey reported that more than 100 definitions of the type of information processing called 'communications' alone are currently in use for international regulatory purposes.⁵

Theoretical pluralism⁶ seems an appropriate way to think about phenomena that occur and processes that unfold in different ways at different levels of a highly articulated social structure.⁷ Events throughout the social structure are, of course, interrelated; to Blau,⁸ successive and ever more encompassing levels of the social structure nest, while for Wallace⁹ the relationship among levels is one of expanding inclusiveness, with increasing complexities of pattern and rhythm. Descriptions of complex societies must thus account for each level and the interactions within and among them to be adequate.¹⁰

Because modes of information creation, processing, flows and use are shaped by socioeconomic and political class divisions and in turn reproduce them, policy-making, too, must take into account qualitative differences in phenomena at different levels of the social structure. A definitional hierarchy and sequencing in choice of definitions for use in particular situations are thus suggested here.

Technological determinism, too, may take more than one shape: sometimes society shapes technological development, and sometimes it is the reverse, depending on the particular historical conjuncture. Included among the factors that establish causal direction at any moment, however, is what might be called the social will – the will of a community, as expressed in its policy-making and policy implementation – to deliberately attempt to determine directions of change. Policy-making and analysis should be conducted *as if* social decisions can influence technological development in desired directions, even

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Chicago, IL, 1986; Geza Feketekuty and Jonathan David Aronson, 'Restrictions on trade in communication and information services', *The Information Society*, Vol 2, No 3-4, 1984, pp 217-48.

⁴Fritz Machlup and Ute Mansfield, eds, *The Study of Information: Interdisciplinary Messages*, Wiley, New York, 1983.

⁵Edward W. Ploman, *International Law Governing Communications and Information*, Greenwood, Westport, CT, 1982.

⁶See for example, Bruce Ackerman, *Reconstructing American Law*, Harvard University Press, Cambridge, 1984; Peter M. Blau, 'Introduction: diverse views of social structure and their common denominator', in Peter M. Blau and Robert K. Merton, eds, *Continuities in Structural Inquiry*, Sage, Beverly Hills, 1981, pp 1-23; Felix S. Cohen, 'Field theory and judicial logic', *Yale Law Journal*, Vol 59, 1950, pp 238-72; Chin Chuan Lee, 'Where are we in understanding international communication research? A methodological perspective', paper presented at International Communications Association, Honolulu, Hawaii, 1985; Robert K. Merton, 'Foreward: remarks on theoretical pluralism', in Peter M. Blau and Robert K. Merton, *op cit*, Ref 6, pp i-viii; Theda Skocpol, 'Bringing the state back in: strategies of analysis in current research', in Peter B. Evans, Dietrich Rueschmeyer, and Theda Skocpol, eds, *Bringing the State Back In*, Cambridge University Press, New York, 1985, pp 3-37.

⁷Charles K. Warriner, 'Levels in the study of social structure', in Peter M. Blau and Robert K. Merton, *op cit*, Ref 6, pp 179-90.

⁸Peter M. Blau, *op cit*, Ref 6.

⁹Walter L. Wallace, 'Hierarchic structure in social phenomena', in Peter M. Blau and Robert K. Merton, *op cit*, Ref 6, pp 191-234.

¹⁰Immanuel Wallerstein provides a model of such a multilevel analysis in his historical work. His descriptions of medieval market transactions, for example, make clear the ways in which the same piece of information about the sale of a cow means radically different things to the peasant and to the global trader. Distinctions in socioeconomic class and political position enable each to understand, use – and receive the benefits of – information differently, with the advantage always accruing to those who take the longer and broader view. See Immanuel Wallerstein, *The Capitalist World-economy*, Cambridge University Press, New York, 1979; Immanuel Wallerstein, *The Politics of the World-economy: The States, the Movements, and the Civilizations*, Cambridge University Press, New York, 1984.

¹¹Richard Straus, ed, *Communications and International Trade: A Symposium*, International Institute of Communication, Washington, DC, 1982.

¹²Joan Edelman Spero, 'Information: the policy void', *Foreign Policy*, Vol 48, 1982,

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while the debate over the relationship between technology and society continues.

Because it is a commonplace that information policy is characterized by an extraordinary number of decision-making arenas and players, and becoming a commonplace that many of the same issues, from network design to data privacy, crop up across arenas from the international to the local, the term 'information policy' is used here in a very general sense.

As a last caveat, any typification is of course an over-simplification. Individual approaches to defining information will fit into categories to which they have been assigned to greater or lesser degrees. It is the framework itself that, it is hoped, will be of assistance to the working policymaker.

Approaches to the definitional dilemma

Disagreement over which definition of information should serve as the basis of negotiations lies at the heart of many of today's information policy debates. As Straus¹¹ notes, information policy issues seen in one country as cultural are understood in another as economic. US policymakers, both private sector¹² and public,¹³ argue in favour of using the trade perspective to discuss international information flow specifically because it provides a way of distinguishing social from economic issues, permitting policymakers to exclude social, political or cultural concerns when dealing with what they prefer to see as purely economic matters. Ambassador Diana Lady Dougan, head of the State Department's Bureau of International Communication and Information Policy, says directly:

We cannot accept such broad generalizations as the 'protection of cultural integrity' to be a sufficient justification for information control, particularly as these are too often only a guise for economic protectionism or censorship of the press.¹⁴

The argument over how to define information is critical because that definition is central to the just emerging information policy regime. A regime is a normative and regulatory international framework or 'meta-agreement'¹⁵ that is less rigid and formal than a legal system but nonetheless serves to bind all parties involved. In the words of an information policy analyst, a regime is 'an organizing device which focuses on converging expectations regarding principles, norms, rules and procedures in particular issue-areas'.¹⁶ Regimes vary in degree of formality, with the General Agreement on Tariffs and Trade (GATT) often cited as the classic model.¹⁷

The entire issue area¹⁸ of information is characterized by the recency of its emergence. Battles over the nature of the regime to dominate are still being fought, with the conflict over operational definitions a key battleground.

Thus what would seem the most logical, and in many respects the easiest, way out of this definitional dilemma – to choose one operational definition of information for use in all situations – is unfortunately to take a political stance that will at best polarize the policy discussion and at worst exclude certain discussants from participation. These political ramifications are both far-reaching and immediate.

Still, the pragmatic problem remains. A second approach starts from the position that information is multifaceted, so that multiple definitions

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pp 139–56.

¹³Kenneth Leeson in Straus, *op cit*, Ref 11, p 187.

¹⁴Diana Lady Dougan, *Promoting the Free Flow of Information*, Current Policy No 531, US Department of State, Washington, DC, 30 November 1983.

¹⁵Robert O. Keohane and Joseph Nye, *Power and Interdependence: World Politics in Transition*, Little and Brown, Boston, 1977.

¹⁶Stephen McDowell, *Building Consensus in the OECD: The Case of Transborder Data Flows*, presented to the Canadian Political Science Association, Hamilton, 1987.

¹⁷Karl J. Holsti, 'A new international politics? Diplomacy in complex interdependence', *International Organization*, Vol 32, No 2, 1978, pp 513–30; Charles W. Kegley, Jr, 'Decision regimes and foreign policy behavior', presented to the Conference on New Directions in the Comparative Study of Foreign Policy, Ohio State University, Columbus, Ohio, 1985; Robert O. Keohane, 'The theory of hegemonic stability and changes in international economic regimes, 1967–1977', in Ole Holsti, Randolph M. Siverson and Alexander L. George, eds, *Change in the International System*, Westview, Boulder, 1980, pp 131–62; Robert O. Keohane, 'The demand for international regimes', *International Organization*, Vol 36, No 2, 1982, pp 325–55; Stephen D. Krasner, 'Regimes and the limits of realism: regimes as autonomous variables', *International Organization*, Vol 36, No 2, 1982, pp 497–510; Stephen D. Krasner, 'Structural causes and regime consequences: regimes as intervening variables', *International Organization*, Vol 36, No 2, 1982, pp 185–205; Stephen D. Krasner, ed, *International Regimes*, Cornell University Press, Ithaca, 1983; James Rosenau, 'A pre-theory revisited: world politics in an era of cascading interdependence', *International Studies Quarterly*, Vol 28, No 3, 1984, pp 245–306.

¹⁸William C. Potter, 'Issue area and foreign policy analysis', *International Organization*, Vol 34, No 3, 1980, pp 405–27; Jerel Rosati, 'Developing a systematic decision making framework', *World Politics*, Vol 33, No 2, 1981, pp 234–52; Martin Sampson, *Issues in International Policy Coordination*, University of Denver Monograph Series, Denver, 1982; Avild Underdal, 'Issues determine politics determine policies', unpublished manuscript, 1981; William Zimmerman, 'Issue area and foreign policy-process: a research note in search of a general theory', *The American Political Science Review*, Vol 67, 1973, pp 1204–12.

¹⁹James W. Carey and Norman Sims, 'The telegraph and the news report', unpublished manuscript, 1976.

²⁰Herbert S. Dordick, Helen G. Bradley and Burt Nanus, *The New Network Marketplace*, Ablex, Norwood, NJ, 1981.

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apply concurrently. In the early 20th century formulation that influenced John Dewey and Robert Park, Franklin Ford argued that information appears differently when perceived by the individual, the class and the whole.¹⁹ Contemporary commentators Dordick, Bradley and Nanus²⁰ emphasize the heterogeneous nature of information, which varies according to infinitely variable conjunctions of supplier, processor, user and channel of communication. Economist Schmoranz²¹ identifies three distinct trade roles for information (as input and output of research and development, as transferable knowledge, and as a resource). To IBM, information operates simultaneously as an asset, a resource and a commodity.²² US policymakers²³ have similarly used pluralistic approaches to defining information.

This pluralistic approach is flexible and open to the entire range of values that informs policy-making in many decision-making cultures. It does not, however, offer any concrete guidance in choosing from the many a single operational definition for use in analysing specific fact situations or issues, each one arising within a particular decision-making arena characterized by its own constraints and motivations.

A third approach, therefore, is offered here. With the introduction of a hierarchy into the pluralism described above, a decision-making rule can be articulated. This hierarchy is based on differences in level of scope (how broad a range of social phenomena is incorporated into the concept) and complexity (how finely and variously articulated is the social organization that appears through the lens of a particular definition). They also differ in the amount of power granted to information and its creation, flows and use, from very little or none at all to a great deal. Distinguished along these dimensions, definitions of information in common use in the policy-making process fall into four broad groups: information as a resource, as a commodity, as perception of pattern, and as a constitutive force in society. The general characteristics, strengths and weaknesses of each of these types of definition are discussed below, concluding with an exploration of the implications of this definitional hierarchy for the working policymaker. (It was, of course, impossible to incorporate into this discussion every definition of information that has appeared. The selection discussed emphasizes those definitions that have emerged in policy discussions.)

Information as a resource

Definitions of information as a resource are popular, appearing in several bodies of literature. Economists such as Jonscher²⁴ and Madec²⁵ provide models for measuring information, its flows and its value that emulate those developed for physical resources. Much of mass communication theory, beginning with Lazarsfeld, Berelson and Gaudet's²⁶ work on the two-step flow and including the multitude of diffusion studies, treats information as a resource.²⁷ The New World Information Order debate is built upon²⁸ and rife with²⁹ discussions of the political impact of international flows of information as a resource.

It is characteristic of definitions of this kind to be general in nature. Machlup, for example, defines the basic informational unit as 'anything that is known by somebody',³⁰ for Oettinger, 'the generic concept of information resources encompasses any information content represented in any way, embodied in any format and handled by any physical processor.'³¹

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²¹I. Schmoranz, 'Macroeconomic sectors of the information economy', in Hans Peter Gassmann, ed, *Information, Computer and Communication Policies for the 80's*, OECD, Amsterdam, pp 75-82.

²²Harry De Maio in Straus, *op cit*, Ref 11.

²³Arthur A. Bushkin and Jane H. Yurow, *The Foundations of United States Information Policy*, OECD, Paris, 1980; Kenneth W. Leeson, *International Communications: Blueprint for Policy*, North-Holland, Amsterdam, 1984.

²⁴Charles Jonscher, 'The economic causes of information growth', *InterMedia*, Vol 10, No 6, 1982, pp 34-7.

²⁵Alain Madec, 'The political economy of information flows', *InterMedia*, Vol 9, No 2, pp 29-32.

²⁶Paul F. Lazarsfeld, Bernard Berelson and Helen Gaudet, *The People's Choice: How the Voter Makes Up His Mind in a Presidential Campaign*, Columbia University Press, New York, 1984.

²⁷For example, J. Oliver Boyd-Barrett, 'Cultural dependency and the mass media', in Michael Gurevitch, Tony Bennett, James Curran and Janet Woollacott, eds, *Culture, Society and the Media*, Methuen, New York, 1982, pp 174-95; Peter Golding, 'Media role in national development: critique of a theoretical orthodoxy', *Journal of Communication*, Vol 24, No 3, 1974, pp 39-53; Lucian W. Pye, 'Communication operation in non-Western societies', *Public Opinion Quarterly*, Vol 20, 1956, pp 249-57; Lucian W. Pye, 'Communication, institution building and the reach of authority', in Daniel Lerner and Wilbur Schramm, eds, *Communication and Change in the Developing Countries*, East-West Center, Honolulu, 1967, pp 35-55; Everett M. Rogers, *Modernization among Peasants: The Impact of Communication*, Holt, Rinehart and Winston, New York, 1969; Everett M. Rogers, 'Communication and development: the passing of the dominant paradigm', *Communication Research*, Vol 3, 1976, pp 213-40.

²⁸Al Hester, 'The news from Latin America via a world news agency', *Gazette*, Vol 20, 1974, pp 82-98; Harold A. Innis, *The Bias of Communication*, The University of Toronto Press, Toronto, 1951; James W. Markham, 'Foreign news in the U.S. and South American press', *Public Opinion Quarterly*, Vol 25, 1961, pp 249-62; Fernando Reyes Matta, 'The Latin American concept of news', *Journal of Communication*, Vol 29, No 2, 1979, pp 164-71; Richard O'Mara, 'Latin America: the hole in the news', *Nation*, Vol 221, No 1, 1975, pp 16-18; Herbert I. Schiller, *Mass Communications and the American Empire*, Augustus M. Kelley, New York, 1969.

²⁹Mustapha Masmoudi, 1980, *op cit*, Ref 2; Richstad and Anderson, *op cit*, Ref 2.

³⁰Fritz Machlup, *Knowledge and Knowledge Production*, Princeton University Press, Princeton, 1980, p 7.

³¹Anthony G. Oettinger, 'Information re-

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It is among the strengths of definitions of information as a resource that they are relatively easy to comprehend. As a concept, the notion is easily grasped, widely applicable and open to extended applications in a number of different settings. As a metaphor, the definition of information as a resource has great power.

For Ravault,³² it is an advantage of this type of definition that it emphasizes the uses people make of information rather than its effects upon people and society. This type of definition also has utility in the articulation of specific laws and regulations, finding its way variously into legal systems. In the USA, such a definition is implicit in the concept of the marketplace of ideas, a notion that is explicitly used to justify many information policy decisions.³³ In specific areas of the law, such as international trade,³⁴ information is directly treated as a resource. In another area, the federal government is increasingly choosing to treat its own informational resources, such as computerized census data and reports from federally funded research, as resources for selling.³⁵

Problems are also encountered when defining information as a resource. As a result of their generality, discussions of information as a resource tend towards grand historical statements. A number of difficulties stem from the basic fact that, unlike physical matter, information is not composed of mass and energy and thus is not subject to physical laws, leading Braunstein³⁶ and others to argue that the combined effect of these characteristics is to make it impossible to adequately treat information like physical resources in economic terms.

From the perspective of information as a resource, information and its creators, processors and users are viewed as discrete and isolated entities. Information comes in pieces unrelated to bodies of knowledge or information flows into which it may be organized. The social structure as viewed this way is simple (there are two classes - haves and have-nots), and the scope of the phenomena covered is limited. Information is not seen to have any power in and of itself, though its role in sustenance of specific entities is acknowledged.

Definitions that treat information as a resource have implicit within them the notion that, also like physical resources, information can be processed. Those definitions that explicitly develop this aspect are sufficiently different qualitatively that they form their own group, definitions that treat information as a commodity.

Information as a commodity

One obvious characteristic of this category of definition is the profusion of terminology in use. 'Services', a term which itself has no consensual definition, is one example. Attempts to define services include *The Economist's* 'Things which can be bought and sold but which you cannot drop on your foot',³⁷ Feketekuty's 'any exchanged product of economic activity that is not a good',³⁸ Cleevly and Cawdell's³⁹ taxonomy of applications, or, most often, simple listings of things to be included in this category.⁴⁰

Another term often applied to information and its flows when treating them as commodities is transborder data flow (TDF). Though this label originally applied only to international information flows of computerized information, its use has come to include information of all types and to penetrate discussions in the domestic arena. As cases arise under

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sources: knowledge and power in the 21st century', *Science*, Vol 209, 1980, p 194.

³²Rene J. Ravault, 'Information flow: which way is the wrong way?' *Journal of Communication*, Vol 31, No 4, 1981, pp 129–34.

³³Edwin Diamond, Norman Sandler and Milton Mueller, *Telecommunications in Crisis: The First Amendment, Technology, and Deregulation*, Cato Institute, Washington, DC, 1983; Harvey J. Levin, 'Foreign and domestic US policies: Spectrum reservations and media balance', *Telecommunications Policy*, Vol 6, No 2, June 1982, pp 123–35; Barbara Sweeney, 'The marketplace of ideas: an economic analogy for freedom of speech', paper presented to the Association for Education in Journalism and Mass Communication, Gainesville, FL, 1984.

³⁴Sandra Braman, 'The GATT and services: shaping an information policy regime', paper presented to International Communications Association, Montreal, 1987.

³⁵Mary M. Cheh, 'Government control of private ideas: striking a balance between scientific freedom and national security', *Jurimetrics Journal*, Vol 23, No 1, 1982, pp 1–32; Ruth L. Greenstein, 'Federal contractors and grantees: what are your First Amendment rights?', *Jurimetrics Journal*, Vol 24, No 3, 1984, pp 197–209.

³⁶Yale M. Braunstein, 'The potential for increased competition in television broadcasting: can the market work?' in Timothy R. Haight, ed, *Telecommunications Policy and the Citizen*, Praeger, New York, 1979, pp 55–64.

³⁷A GATT for services, *The Economist*, 12 October 1985, p 20.

³⁸Feketekuty, *op cit*, Ref 3, p 3.

³⁹David Cleevely and Richard Cawdell, 'A telecommunications taxonomy', *Telecommunications Policy*, Vol 10, No 2, June 1986, pp 107–19.

⁴⁰See for example, *Exchange of information pursuant to the ministerial decision on services: Communication from the EEC to GATT*, Office of the US Trade Representative, Washington, DC, 1984; *Exchange of information pursuant to the ministerial decision on services: Communication from Japan to GATT*, Office of the US Trade Representative, Washington, DC, 1984.

⁴¹The US Supreme Court provides a venue for resolution of disputes involving information as it flows across state and municipal borders. Cases dealing with interstate issues during the 1980s include: *Edgar v Mite Corp.*, 457 US 624 (1981); *Keeton v Hustler Magazine*, 456 US 770 (1981); *Calder v Jones*, 465 US 783 (1983); *Capital Cities Cable v Crisp*, 467 US 691 (1983); *Dowling v US*, 473 US 207 (1984); *Louisiana Public Service Commission v FCC*, 476 US 355 (1986); *Posadas de Puerto Rico Associates v Tourism Company of Puerto Rico*, 478 US 328 (1986).

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interstate commerce in the USA, for example, TDF issues emerge when information encounters state,⁴¹ and even municipal,⁴² borders. McDowell⁴³ attributes this creeping presence to the fact that TDF actually refers not to a specific object or phenomenon, but to a perspective through which information policy matters can be viewed. Definitions of TDF include 'a point-to-point exchange of proprietary information based on contractual relationships',⁴⁴ 'international data transmissions over computer-communication systems',⁴⁵ and lists of items including broadcast programmes, remote satellite sensing, and computer data flow.⁴⁶ Branscomb⁴⁷ was able to identify seven variations on the theme.

The proliferation of terms referring to information as a commodity is but one indication of a second, and more important, characteristic of this type of definition – its increasing scope, penetration and domination. While information about supplies and prices has been considered a commodity for hundreds of years, it is only in the past few decades that both personal information and information about the public affairs of a community have come to be treated as commodities, a trend that has received philosophical treatment by Ellul,⁴⁸ Ong⁴⁹ and others.

The notion of information as a commodity requires as a complement a concept of an information production chain. The steps of such a chain, adapted from models suggested by Machlup⁵⁰ and Boulding⁵¹, include information creation (creation, generation and collection), processing (cognitive and algorithmic), storage, transportation, distribution, destruction and seeking. Commoditized information gains in economic value as it passes through each stage of the chain.

Definitions of information that treat it as a commodity have heuristic and organizational value. A recent study of Supreme Court cases in the 1980s that dealt with information policy (operationally defined as those cases dealing with any stage of the information production chain) showed a Court that is extremely sensitive to distinctions among and relationships between stages of the chain.⁵² Policymakers in other arenas, such as the international GATT or the US FCC, similarly reflect awareness – usually unconscious – of the notion of an information production chain in their thinking.

This type of definition also provides flexibility in response to the problem outlined by Hyde:

Gifts are a class of property whose value lies only in their use and which literally cease to exist as gifts if they are not constantly consumed. When gifts are sold, they change their nature as much as water changes when it freezes, and no rationalistic telling of the constant elemental structure can replace the feeling that is lost.⁵³

Under a regime in which only one type of definition of information is permitted, economic value may well destroy other types of value inherent in social, cultural, religious and aesthetic information. The notion of an information production chain permits policymakers to *exclude* specific types of information, actors and actions at individual or several stages of the chain. It could be decided, for example, that religious information should never be treated as a commodity, even though other types of information are. Similarly, valuation of artistic information may operate under different rules from those that govern the economic treatment of, say, patents. Rather than commoditizing all information, the use of this type of definition of information as a commodity processed through an information production chain both

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⁴²US Supreme Court cases dealing with disputes over information as it crossed municipal borders during the 1980s include: *Metromedia v City of San Diego*, 453 US 490 (1980); *Community Communications Co. v Boulder*, 455 US 40 (1981); *Los Angeles v Taxpayers for Vincent*, 466 US 789 (1983); *Los Angeles v Preferred Communications*, 476 US 488 (1986).

⁴³McDowell, *op cit*, Ref 16.

⁴⁴Meheroo Jussawalla and Chee-Wah Cheah, 'Emerging economic constraints on transborder data flows', *Telecommunications Policy*, Vol 7, No 4, December 1983, pp 185-96.

⁴⁵United Nations Centre on Transnational Corporations, *On the Effects of the Operations and Practices of Transnational Corporations*, New York, 1981, p 1.

⁴⁶Allan Gottlieb, Charles Dalfen and Kenneth Katz, 'The transborder transfer of information by communications and computer systems: issues and approaches to guiding principles', *American Journal of International Law*, Vol 68, 1974, pp 227-57.

⁴⁷Anne W. Branscomb, 'Global governance of global networks: a survey of transborder data flow in transition', *Vanderbilt Law Review*, Vol 36, 1983, pp 985-1043.

⁴⁸Jacques Ellul, *The Technological Society* (J. Wilkinson, trans), Vintage, New York, 1964.

⁴⁹Walter J. Ong, *Orality and Literacy: The Technologizing of the Word*, Methuen, New York, 1982.

⁵⁰*Op cit*, Ref 30.

⁵¹Kenneth Boulding, 'The economics of knowledge and the knowledge of economics', *American Economic Review*, Vol 56, No 2, 1966, pp 1-13.

⁵²Sandra Braman, *Information Policy and the United States Supreme Court*, unpublished doctoral dissertation, University of Minnesota, Minneapolis, 1988.

⁵³*Op cit*, Ref 1, p 21.

⁵⁴Fritz Machlup, 'The economics of information: a new classification', *InterMedia*, Vol 11, No 2, 1983, pp 28-37.

⁵⁵F.A. Hayek, 'The use of knowledge in society', *American Economic Review*, Vol 35, 1945, pp 519-30.

⁵⁶Marc U. Porat, *The Information Economy*, doctoral dissertation, Stanford University, 1976.

⁵⁷George Stigler, 'The economics of information', *Journal of Political Economy*, Vol 69, No 3, 1961, pp 213-25.

⁵⁸Gerhart Stadler, 'From technology to law', *InterMedia*, Vol 9, No 1, 1981, pp 26-8.

⁵⁹John Fiske, *Introduction to Communication Studies*, Methuen, New York, 1982; David Ritchie, 'Shannon and Weaver: unravelling the paradox of information', *Communication Research*, Vol 13, No 2, 1986, pp 278-98; Claude E. Shannon, 'A mathematical theory of communication', *Bell*

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functions in the world of some concrete economic realities and offers a means by which the commoditization process itself can be resisted.

The problems that arise from the non-materiality of information when treating it as a resource are multiplied with the attempt to treat it as a commodity. Economists find pragmatic difficulties in identifying those areas that should be considered part of the economics of information (Machlup⁵⁴ counts 17), and in accounting for information in economic terms. Despite efforts going back at least to Hayek⁵⁵ or, in Porat's⁵⁶ view, all the way back to Adam Smith, information, as Stigler says, 'occupies a slum dwelling in the town of economics'.⁵⁷ Stadler⁵⁸ suggests that it may be failure to cope with these difficulties in the past that accounts for the contemporary paucity of coherent policy dealing with information.

Because of the *meta*-economic nature of information, another problem with definitions of information that treat it as a commodity is that they do not reach many of the critical phenomena in which information is involved, or effects of information creation, flows, processing and use. Still, the scope of the notion of information as a commodity is wider than that of information as a resource, for it incorporates the exchanges of information among people and related activities as well as its use. The social structure, too, is more articulated and therefore complex, comprising buyers, sellers and the organization required in order to sustain a market, rather than simply entities struggling individually for survival. With this type of definition, information is granted at least economic power.

Information as perception of pattern

Definitions of information that treat it as perception of pattern broaden the concept of information by adding context. Information from this perspective has a past and a future, is affected by motive and other environmental and causal factors, and itself has effects.

Definitions in this category range in complexity. The simplest definitions focus on the capacity of information to reduce uncertainty. In the classic statement by Shannon and Weaver, information is a measure of the predictability of the signal, or the number of choices open to the sender.⁵⁹ Entropy is thus equated with ignorance, and in turn with less stable forms of organization, while stable social formations are considered to have low entropy. Rogers describes uncertainty as 'the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probabilities of these alternatives'.⁶⁰ Reduction of uncertainty is important from the economist's point of view because it reduces the cost of search and increases the 'productivity' of decision-making.⁶¹ Mathematicians and engineers treat information flows as pathways which can be valued by the degree to which uncertainty is reduced.⁶²

More complex definitions of information as perception of pattern centre on context. In semiotics, context is the codes, or systems of meaning, within which any information exists.⁶³ Context has also been important in understanding information within the policy-making setting.⁶⁴ There is varying awareness of this perspective among governmental and quasi-governmental agencies, however. While the Nora/Minc report to the French government insists that, 'Information is inseparable from its organization and its mode of storage',⁶⁵ the

MacBride Commission report was specifically criticized for failing to emphasize the importance of the context.⁶⁶

It is a strength of this type of definition that its exemplars come closer to tapping the real-world environment of information creation, processing, flows and use. Events during which information is treated as a resource or as a commodity inevitably occur during ongoing processes which are not incorporated into those simpler types of definition.

Another advantage of defining information as perception of pattern is that it provides a starting point for quantifying and valuing information, making this type of definition attractive from the engineers' and economists' point of view.

The primary disadvantage of this approach is that it is highly relativistic. Perception of pattern and context shift from observer to observer, so that any use of such a definition must make explicit the point of view from which it is being applied. The consequence is that while these definitions have intuitive appeal, they are difficult to use in a policy-making context.

Defining information in this way again broadens the scope of phenomena and processes covered, and such definitions are capable of application to a highly articulated social structure. For the first time in moving up this hierarchy of definitions, information is clearly granted power of its own, although its effects from this perspective are isolated in themselves – uncertainty, for example, is reduced as it regards a specific single question, without concern for trends or structural effects.

Clearly, there is a power differential weighted in favour of those perceiving information within the widest possible context. If knowledge is power, contextualized knowledge is greater power. It is not a far step from this point to the final category of definitions, those that treat information as a constitutive force in society.

Information as a constitutive force in society

Definitions in this category grant information an active role in *shaping* context. With definitions of information that treat it as a constitutive force in society, information is not just affected by its environment, but is itself an actor affecting other elements in the environment. Information is that which is not just embedded within a social structure, but creates that structure itself. In Krippendorff's words:

In the input-output table for an economy in which exchanges between and transformations within industries (categories of industries, sectors of an economy or geographical regions) are entered, information participates in the process by changing the table. It may change the transition function within one cell (eg, when information is geared toward a more efficient organization of the process), it may change the interaction between cells otherwise considered independent (eg, when industries, etc, become more informed about each other and coordinate their production and consumption) or it may add new cells, rows or columns (eg, when information introduces new technologies, communication technology for example, that cause structural changes in the economy). In such an analysis information is seen to be about or superordinate to the economy. It guides, controls and rearranges the economic activities and has, hence, the characteristic of a meta-economic quantity that cannot easily be built into a system of analysis that is essentially flat and provides no opportunity for self-reference.⁶⁷

It is striking how much support the use of this type of definition of

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System Technical Journal, Vol 27, 1948, pp 379–423, 625–56; Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication*, University of Illinois Press, Urbana, 1949.

⁶⁰Everett M. Rogers, *Diffusion of Innovations*, 3rd edn, The Free Press, New York, 1983, p xviii.

⁶¹*Op cit*, Ref 57; *op cit*, Ref 45.

⁶²Martin A. Rothblatt, 'The impact of international satellite communications law upon access to the geostationary orbit and the electromagnetic spectrum', *Texas International Law Journal*, Vol 16, 1981, pp 207–44; Shannon, *op cit*, Ref 59.

⁶³Fiske, *op cit*, Ref 59.

⁶⁴John P. Bennett, 'Data stories: learning about learning from the U.S. experience in Vietnam', in David Sylvan and Steve Chan, eds, *Foreign Policy Decision Making*, Praeger, New York, 1984, pp 227–29; Rob Kling, 'Value conflicts in computing developments: developed and developing countries', *Telecommunications Policy*, Vol 8, No 2, pp 127–47.

⁶⁵Simon Nora and Alain Minc, *The Computerization of Society*, MIT Press, Cambridge, 1980.

⁶⁶MacBride Commission Report, 1980; *op cit*, Ref 32.

⁶⁷Klaus Krippendorff, 'Information, information society and some marxian propositions', paper presented at International Communications Association, San Francisco, 1984, pp 15–16.

⁶⁸Karl W. Deutsch, *Nationalism and Social Communication: An Inquiry into the Foundations of Nationality*, MIT Press, Cambridge, 1953; David M. MacKay, 'The wider scope of information theory', in Machlup and Mansfield, *op cit*, Ref 4, pp 485-92; Frederick Suppe, 'Toward an adequate information science', in L.B. Heilprin ed, *Toward Foundations of Information Science*, Knowledge Industry Publications, Inc, White Plains, NY, 1985, pp 7-27; Bruce H. Westley and Malcolm MacLean, 'A conceptual model for mass communication research', *Journalism Quarterly*, Vol 34, 1957, pp 31-8; Norbert Wiener, 'Some moral and technical consequences of automation', *Science*, 1960, pp 1355-8.

⁶⁹Peter L. Berger and Thomas Luckmann, *The Social Construction of Reality*, Doubleday, New York, 1966; Thomas Luckmann, *Phenomenology and Sociology*, Penguin, New York, 1978; George Herbert Mead, *Mind, Self and Society*, University of Chicago Press, Chicago, 1934; C. Wright Mills, *The Sociological Imagination*, Oxford University Press, New York, 1959; Robert E. Park, 'Reflections on communication and culture', *American Journal of Sociology*, Vol 44, 1939, pp 191-205; Robert E. Park, 'News as a form of knowledge: a chapter in the sociology of knowledge', *American Journal of Sociology*, Vol 45, No 4, 1940, pp 669-86; Anselm Strauss, *George Herbert Mead on Social Psychology*, University of Chicago Press, Chicago, 1964.

⁷⁰Gaye Tuchman, *Making News: A Study in the Construction of Reality*, The Free Press, New York, 1978.

⁷¹Todd Gitlin, 'Media sociology: the dominant paradigm', *Theory and Society*, Vol 6, 1978, pp 205-53.

⁷²Bernard Berelson and Morris Janowitz, eds, *Reader in Public Communication*, Free Press, Glencoe, IL, 1966; Shearon Lowery and Melvin DeFleur, *Milestones in Mass Communication Research: Media Effects*, Longman, New York, 1983.

⁷³Raymond Aron, *Main Currents in Sociological Thought*, Vol 1, Penguin, New York, 1965; Nicholas Garnham, 'Contribution to a political economy of mass communication', *Mass Communication Review Yearbook*, Vol 2, 1981, pp 123-46; Nicholas Garnham, 'Toward a theory of cultural materialism', *Journal of Communication*, Vol 33, No 3, 1983, pp 314-29; David Held, *Introduction to Critical Theory: Horkheimer to Habermas*, University of California Press, Berkeley, 1980; Oskar Negt, 'Mass media: tools of domination or instruments of liberation? Aspects of the Frankfurt School's communications analysis', *New German Critique*, Vol 14, 1978, pp 61-80.

⁷⁴Of course, such gross generalizations gloss over many distinctions among ways in which this general approach is developed. The body of critical theory, for
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information receives from a variety of radically different theoretical and substantive approaches. In cybernetics and information theory, information flows shape systems and form the means by which they adapt to their environment and influence other systems.⁶⁸ To social psychologists, information creation and flows literally construct reality.⁶⁹ Sociologists such as Tuchman⁷⁰ and Gitlin⁷¹ seek to operationalize these concepts as they play out in specific fact-creating situations. These and related ideas from social psychology and sociology have played a large role in the development of mass communication theory, both directly and indirectly.⁷²

This approach provides the base for diverse political perspectives. The base/superstructure preoccupation of critical theorists⁷³ demonstrates a focus on the idea that information is a constitutive force in society.⁷⁴ Libertarian thinkers also see information as a constitutive force in society. The notion that the truth emerges not as a dictate from above but from discussion of facts among men and women, including those facts gathered by the men and women themselves, lies at the heart of work by thinkers such as Locke,⁷⁵ Mill⁷⁶ and others.

A second characteristic of this type of definition is that policy analyses that use it are necessarily teleological. Making any policy decision about information when defined as a constitutive force in society is making a decision about how society is to be structured – how classes are to be distinguished and how they may interact, the balance between the rights of the individual and those of the community, and the structure of communal decision-making processes. Every information policy decision supports a particular vision of how society should be. Because of this characteristic, a definition of information as a constitutive force in society should be used at the beginning of each decision-making process – and provide a standard for judgement during the policy evaluation process as well.

It is a strength of this type of definition that it is relatively friendly, enlarging the context in which users of other definitions work. Thus it is particularly easy to use this type of definition in the first step of a policy analysis that in subsequent stages chooses to use another or other operational definitions as appropriate.

It is difficult to quantify events and effects when dealing with information as a constitutive force in society, however. Thus, it is an area that does not invite empirical research. This itself has policy implications. International funding organizations such as the International Monetary Fund and the World Bank base their decisions to fund projects on projections of expected return in financial and development terms. A major reason there has been little funding by these organizations of projects to contribute to the building of information infrastructure throughout the Third World is that there are no reliable data about what kinds of returns can be expected. Results vary enormously from culture to culture, and the figures are astounding, sometimes in the order of 1:240 in financial return. Cultural, political and social impacts are even harder to quantify reliably and validly.

It seems on the surface also to be a problem that the use of definitions of information as a constitutive force in society invites ideological manipulation more directly than do other types of definition. This is, however, *only* a surface effect. Any definition of information can be used in the service of ideology. This is yet another reason to urge use of more than one definition in the course of a complete analytical process.

Definitions that treat information as a constitutive force in society are at the top of this definitional hierarchy – they apply to the entire range of phenomena and processes in which information is involved, can be applied to a social structure of any degree of articulation and complexity, and grant information, its flows and use an enormous power in constructing our social (and ultimately physical) reality.

Using definitions of information in policy-making

Each of these types of definition has its own use, determined by three closely related factors. The first is the perspective from which one views an information policy issue. The entity, whether individual, organization or state, that views itself as isolated and concerned only for its own survival will most naturally view information as a resource or, perhaps, a commodity. The policymaker, on the other hand, should be working from a perspective of concern about the shape of society as a whole, including all of its parts, and should therefore be drawn towards definitions that treat information as a constitutive force in society.

The second factor is the utility of a definition for a particular situation. Cohen, writing for lawyers, elaborates:

Among the difficulties that stand in the way of a comprehensive view of the legal order is the naive view of definitions as propositions which are true or false Once we recognize that a definition is, strictly speaking, neither true nor false but rather a resolution to use language in a certain way, we are able to pass the only judgment that ever needs to be passed on a definition, a judgment of utility or inutility.⁷⁷

There are clearly times when it makes sense to treat information, or at least certain kinds of information, as commodities. It does not strengthen the argument of those concerned with civil liberties and other humanitarian values to deny the utility and appropriateness of such definitions for certain settings. For policymakers with responsibility for establishing the basic shape of society, however, definitions of information as a constitutive force in society should have the greatest utility for the first level of analysis and provide a standard against which decisions that treat information as a commodity or other entity should ultimately be judged.

The third factor is the relationship between a definition and the notions of power with which it is associated. The Lukes⁷⁸ distinction among types of power (instrumental, structural and consensual) have clear applicability to information, so often equated with power. Definitions of information as a resource or a commodity grant information, at most, instrumental power. With definitions of information as perception of pattern, the structural power of information is recognized. Definitions of information as a constitutive force in society incorporate not just instrumental and structural forms of power, but consensual power as well. Surely policy-making must take into account all of these types of power, so that according to this factor, too, policymakers should begin their work with a definition of information that treats it as a constitutive force in society.

Of course, at a fundamental level, any entity will continue to be concerned with the resource value of information even as it comes to view or treat it in other ways. Similarly, information can be treated as a commodity and as a constitutive force in society simultaneously. It should be possible for policymakers to use more than one definition of

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example, includes at least four distinct formulations of the relationship between information flows and society cast in terms of the base and superstructure.

⁷⁵John Locke, *An Essay Concerning Human Understanding*, P.H. Nidditch, ed, Clarendon Press, Oxford, 1979.

⁷⁶John Stuart Mill, *The Collected Works of John Stuart Mill*, University of Toronto Press, Toronto, 1963.

⁷⁷Cohen, *op cit*, Ref 6, p 271.

⁷⁸Steven Lukes, *Power: A Radical View*, Macmillan, London, 1974.

information in resolving a particular problem.

Often, the choice of which definition is used is political. Definitions of information that treat it as a commodity work to the advantage of those who win when the game is played on economic grounds, or for whom economic values are the only values. Definitions that treat information as perception of pattern begin to be sensitive to cultural, aesthetic or religious concerns. They can also be helpful in identifying ways of improving the efficiency of activities at specific stages of the information production chain, or identifying effects of information creation, processing, flows and use. It is definitions of information that treat it as a constitutive force in society, however, that incorporate all of the above concerns while acknowledging phenomena at all levels of the social structure.

Therefore, from this hierarchy the definitions that provide the deepest levels of analysis and should be used first are those that treat information as a constitutive force in society. The first decision that must be made is about the shape of the society that is desired. The next step is to determine what information policy principles are most likely to produce or support the desired society. Second or subsequent steps of analysis may choose to use other definitions of information as appropriate. Each such use, however, should bear in mind the fact that information so treated – as a commodity or as a resource – does so with effects that must be understood of information as a constitutive force in society. This definition provides the context, and ultimate analytical standard, of any decision made using other definitions of information.

In a way, the process of policy analysis, then, can be seen as pendulum-like, swinging back and forth between viewing decisions through the lens of information as a constitutive force in society and its other definitions. Policymakers may start, for example, with the notion of a marketplace-governed society in which information as a constitutive force in society serves critically as market governor. If at the same time information is then viewed as a commodity, a series of questions unravels. What happens when the governor of a process is potentially controlled by a subset of participants in the process? Are there different types of information, some of which can be treated as a commodity and some of which cannot? Should information critical to the governing of a process be held as a good common to all participants in that process? Should this be as true of a political governing process as of an economic one? What are the impacts on the ability of those affected by a process to participate in its unfolding when a particular type of information is treated as a commodity at each of the levels of the social structure?

Conclusion

To continue to battle over just what information is means encouraging the continuation of national and international policy-making that is characterized by conflict rather than cooperation, leaving open the door for evolution of an international information policy regime that is dominated by those most successful with brute force. Acceptance of a pluralistic and hierarchical approach to defining information, however, not only encourages cooperation but also focuses attention on what is actually going on here – information policymakers are making decisions about how society as a whole is to be shaped, not just simply to guide individual transactions. That society is intricate, multilevel and global in nature.