REVIEW ARTICLES

INFORMATION, ECONOMIC ANALYSIS AND PUBLIC POLICY*

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* Review article of **A National Information Policy for Australia: Discussion Paper** (Department of Science, Canberra, 1985) pp. 94.

National Information Policy Workshop: Proceedings and Report of the Workshop, Canberra 3-4 December 1985 (Department Science, Canberra, 1986) pp. 70.

National Information Policy *by P.J. Judge,* Legislative Research Service Discussion Papers No. 2 1985-86 (Department of the Parliamentary Library, Canberra, 1985) pp. 115.

INTRODUCTION

The Department of Science discussion paper was designed to provide a framework identifying national information policy issues and their interrelationships and does not deal with details of planning and implementation. The December 1985 workshop was arranged as part of a consultative process involving divergent perspectives from government, academia, and the commercial and community suppliers and users of information. The Legislative Research Service discussion paper tries to identify the issues for governments. For the sake of brevity they will be referred to as Science, Workshop, and Judge respectively when cited in the following pages.

Such contributions to the debate are to be welcomed because national information policy is important. It extends to "What we know as a people, what we are doing to learn more, and the tools that we use to conduct individual transactions and to communicate on a person-to-person basis. . . . There is value in bringing together the ideas and issues involved in this set of national activities, because doing so calls to our attention the interrelatedness and importance in our lives. There are opportunities for improving the operation of the systems that provide information services. . . . . Many of these opportunities will be enhanced by taking an integrated view of this area".[1] To aid discussion the summary of the Department of Science discussion paper is attached here as an appendix. However, to welcome these contributions to the debate and the policy process is not to endorse their contents. They suffer from major deficiencies which stem from an inadequate appreciation of the economic characteristics of information.

INFORMATION AND ECONOMIC ANALYSIS

The economics of information has rightly been described as "the general framework of the present generation for formulating any problems about the efficient allocation of resources".[2] Its role was widened further as structural adjustment issues came to occupy centre stage. Even macroeconomic thinking is now said to have been influenced deeply in recent times by the new, and supposedly 'information based', theories of rational expectations.[3] While most textbooks and teaching and the policy process itself have yet to understand these new developments, it would seem to behove those directly concerned with information policy to master some of the basic ideas. The more important economic characteristics of information and propositions central to the economics of information are as follows:

1. There is a great deal of difference between personal and group or organisational use of information. The division of information gathering may well be the most fundamental form of the division of labour.
2. The cost of producing information is independent of the scale on which it is used.
3. The greater part of the cost of information is often the cost incurred by the recipient.
4. Learning takes time so that there is a limit to the rate at which decision-makers can absorb information.
5. There are usually significant information differentials in terms of possession of information, access to information and capacity to use information.
6. The stock of information and the organisations created to handle information have the characteristics of capital.
7. The output of the information sector is used to a significant extent by industry as opposed to consumers.
8. The demand for information equipment, e.g., telecommunications equipment and computers, is a derived demand, dependent upon the demand for information transmitted and computations performed.
9. The combination of uncertainty, indivisibility and the capital nature that characterises information and information channels leaves the behaviour of organisations open to random influences and, more importantly, the successful pursuit of efficiency is likely to lead to a loss of responsiveness to change.

10. The complexity of information activities makes information as a resource difficult to contain within the traditional production function mode of analysis.
11. The limitations on information as a commodity dictate resort to organisations as an alternative to markets.
12. Much time has been wasted in definitional debate. It is more fruitful to proceed as Arrow has done and say simply that "information is a descriptive term for an economically interesting category of goods which has not hitherto been accorded much attention by economic theorists".[4]

SOME IMPLICATIONS

Suppose that "Information policy is the basis for decisions by organisations and society, concerning the allocation of resources to the acquisition, production, and distribution of information".[5] Once the importance of the information sector has been established, it is impossible to separate information policy from industrial policy. Nevertheless, the Department of Science discussion paper puts aside policies aimed at development or regulation of commercial information industries because they form an integral part of industry policy (Science, p. 2). Judge deliberately omits "Communications (telephone or satellite), Freedom of Information, Privacy, Copyright, Transborder Data Flow, customs dues and sales tax on books" because "these are issues in which policies or legislation already exist, or which do not seem to require the same immediate attention as some others" (p. 2). He concedes reexamination may be needed "when an information policy is in place" (p. 2). By then it will be too late. These papers do not face up to the fact that information policy and industrial policy have to deal with the same issues — efficient use of resources, innovation, international competitiveness, and growth — in the same industries.

A second area of concern is the emphasis on the role of government and on the role of coordination as the primary means of implementation of policy. Policy in its most fundamental sense relates to planned guidance for action.[6] The relevance and effectiveness of government policy will, therefore, depend to a large extent upon policies pursued in the private sector. Unfortunately, governments do not seem to be well-informed on such patterns of decision-making. Nevertheless, there is little justification for ignoring the accumulated information stock in the private sector or that sector's information-handling capacity.

The emphasis on coordination raises deeper questions. Even if a predominantly free market economy is assumed to exist, there would

still be questions about the best forms of organisation and the informational efficiency of existing organisations, business or governmental. Surely information policy should concern itself with more than the coordination of existing, possibly obsolescent, organisations. The basic policy objective relates to the cost of organising[7] and policy must therefore extend to the design of organisations and their informational efficiency in operation.

This emphasis on coordination can be traced to the "information as oil" attitude that has coloured much of the policy debate. Information, so it is argued, lubricates and leads to better economic performance. Consumers make better decisions; the economy can be fine tuned; and democracy can function more effectively. This is simplistic reasoning. Information is a costly capital resource and there are significant information differentials. The actual outcomes may be far removed from those suggested by the lubricant model. The last decade brought an interesting shift from the study of the role of information in making markets work better to its role in shaping the form of organisations. Policy formation needs to reflect this shift.

Once information differentials are mentioned discussion must move to the 'information rich' and the 'information poor'. The three papers touch on this equity issue but have nothing new to say. There is still an emphasis on access, with virtually no attention to difficulties bound up with possession, with handling-capacity, and with the competitive aspects of the use of information. It is not at all helpful to take as premises:

- that we all need information to make our lives more enjoyable and more profitable, at home and at work, individually and as a nation;
- that Australia has many excellent information services which are generally under-used and un-coordinated (Judge, p. 3).

We all need a wide variety of good and services for these purposes. One could equally well argue that other resources such as machines, buildings and people are "under-used and un-coordinated". Information policy analysts need to make the case for information being different and giving rise to special policy considerations. This can be done but the solutions will have to involve much more than creating equal access, however the equality be defined. After all, equal access by individual or organisations of very unequal information-handling capacity can be expected to accentuate income differentials.

Too much attention is given in these papers to the new information technologies. For example, telecommunications is given pride of place in terms of infrastructure (Science, pp. 1-2). Here again we find the all-too-familiar neglect of organisational resources. The electronic is assumed to be more important than the non-electronic. This lack of a

balanced view is especially important because it clouds understanding of the very process by which the new technologies are being introduced. It leads also to a belief that, for example, transborder data flows are transforming the world. It is true that TBDF is important as the international dimension of the information economy. It changes tradeability and affects foreign investment; it enhances the role of multinational corporations and justifies fear of 'electronic colonialism'. But its growth must be kept in perspective: trade in both electricity and butterflies has also increased dramatically in recent years. The optimists who see it as bringing great benefits to all countries would do well to ponder Paul Strassman's *Information Payoff: The Transformation of Work in the Electronic Age.* He concludes that the payoff from the billions of dollars that have been invested in hardware and software, from the millions of electronic work-stations that will have been put in place by the end of the century, must come from people. The crucial decisions relate to organising, educating, training, designing, monitoring, measuring, and thinking.[8]

The policy problems and failures arise mostly from a lack of appreciation of the basic economics of information outlined earlier. The 'interrelatedness' of information activities with each other and with non-information activities, with the rest of the economy, is captured by the input-output form of analysis. This goes beyond summary statistics such as the information occupations being more than 40 per cent of the workforce. It seeks to explore and even measure the linkages of information activities to other parts of the economy.[9] Few resources have been available for such expensive economic research yet the detail yielded by primary and secondary information sector studies is an essential input to the national information policy process.

The plunge in oil prices may well hamper efforts to promote information policy. Already there are those that see this change of trend as proof that the Japanese economy is heading down the wrong track;[10] that the efforts to foster development of the information society were misguided. It would be a pity if this happened. In so far as the information society is intended to be more flexible and more responsive to change, Japan may well have created very valuable organisational capital that gives a capacity to get new things on to the national agenda and is more important than buildings and machines. Australia would do well to consider this possibility.

Of the many other aspects that could be discussed here, one more deserves mention. Research activity is said to be "usually concerned with one or more sectoral issues" (Science, p. 59). This remark is applied to "academic centres with research interests in information science and the economics of information". This can be disputed. The

first general anthology on the economics of information[11] originated in Australia as did *The Information Revolution* 1974 issue of The Annals of the American Academy of Political and Social Science. [12] The latter was classified by the NCLIS National Information Policy Report to the President of the United States as "a milestone in the evolution of information policy issues".[13] Much of the work of the Information Research Unit, University of Queensland, that is responsible for the publication of this journal, is directed to the role of information in the economy.[14] As such it should be viewed as contributing to the policy process. Whether this would be classified by the Department of Science as "research into broadly defined information related issues" (Science, p. 59) is a moot point. To conclude it is not, however, would seem to be contrary to any genuine interest in both detail and interrelatedness. Of course, all such research has been hampered by lack of funds. The ARGS has not shown interest comparable to that of the US National Science Foundation in supporting research in information science, information economics, informatics, and infometrics. One might argue that this quite outdated approach to information policy research, which all three papers would seem to say is of great importance, merits review — hopefully by some more appropriate body than ASTEC.

NOTES AND REFERENCES

1. Donald A. Dunn, 'Developing information policy', *Telecommunications Policy*, 6, 1, March 1982, p. 38.
2. C. Christian von Wiezsäcker, "The costs of substitution", *Econometrica*, 52, 5, September 1984, p. 1085.
3. See, for example, Robert E. Hall and John B. Taylor, *Macroeconomics: Theory, Performance, and Policy*, W.W. Norton, New York, 1986.
4. K.J. Arrow, *Collected Papers, Vol. 4 The Economics of Information*, Blackwell, Oxford, 1985, p. 138.
5. Robert M. Hayes, "Introduction", in Robert M. Hayes (ed.), *Libraries and the Information Economy of California*, GSLIS/UCLA, Los Angeles, 1985, p. 17.
6. Cf. G.L.S. Shackle who defined policy as "the generic name for any formulation, simple or complex, vague or exact, general or special, discretionary or detailed, of guidance for action in face of circumstances which, lying necessarily in the future, can be approached only by conjecture and imagination" (*Expectation, Enterprise and Profit*, Allen and Unwin, London, 1970, p. 39).
7. See M. Jussawalla, N. Karunaratne and D. McL. Lamberton (eds), *The Cost of Thinking: Information Economies of Ten Pacific Countries*, Ablex, New Jersey, forthcoming); D.M. Lamberton, "Economics of information and organisation", in Martha Williams (ed.), *Annual Review of Information Science and Technology* (ARIST), Vol. 19, American Society for Information Science, Washington, D.C., 1984, pp. 3-30.

8. Paul A. Strassman, *Information Payoff: The Transformation of Work in the Electronic Age,* Free Press, New York, 1985.
9. See Jussawalla, Karunaratne and Lamberton, op. cit.; D. McL. Lamberton, "The information sector in developing countries', Invited paper for 10th World Computer Congress, Dublin, Ireland, September 1986.
10. E.g., S. Nakagama, 'Fallout from the oil plunge', *New York Times,* 16 February, 1986, p. F3.
11. D.M. Lamberton (ed.), *Economics of Information and Knowledge,* Penguin Books, Harmondsworth, UK, 1971.
12. D.M. Lamberton (ed.), *The Information Revolution,* The Annals of the American Academy of Politican and Social Science, Vol. 412, 1974.
13. NCLIS (National Commission on Libraries and Information Science), National Information Policy: Report to the President of the United States, US Government Printing Office, Washington, D.C., 1976. See insert between pp. 10-11.
14. A report of the IRU research program is contained in D. McL. Lamberton, Stuart Macdonald and T.D. Mandeville, "Information and technological change — a research program in retrospect', in Peter Hall (ed.), *Technology, Innovation and Economic Policy,* Philip Allan, Oxford, 1986, pp. 231-243.

APPENDIX

A NATIONAL INFORMATION POLICY FOR AUSTRALIA: DISCUSSION PAPER, 1985: SUMMARY*

BACKGROUND

In October 1983 the Caucus of the Australian Labor Party called for implementation of the National Information Policy contained in the ALP Platform. In response, an Interdepartmental Meeting (IDM) of relevant departments recommended a framework for action for development of the policy. The framework for action, which was approved by all Ministers whose departments were involved, included preparation of a discussion paper.

This paper has been prepared by the Department of Science with the support of a number of Government departments and agencies.

AIMS OF THIS PAPER

This paper is one of a number of steps in the development of a national approach to information policy. It is intended to promote discussion of the issues by providing a framework which identifies the issues and their interrelationships. Details of planning and implementation are not provided, but the paper does suggest the kinds of options open to Government. It is a discussion paper, not a Government policy document, and has no immediate budgetary implications.

* Science, pp. 1-6

THE IMPORTANCE OF INFORMATION AND THE IMPACT OF INFORMATION TECHNOLOGY

Information is of great social and economic importance. Individuals need a great deal of information to function effectively in today's complex society. Information is also a key support to the democratic process and to success in social, economic and political life. Australian businesses need ready access to up-to-date scientific and technological information and to financial, economic and market information from both domestic and overseas sources if they are to innovate and compete internationally. A high proportion of the workforce is now employed in information-related occupations, and information goods and services represent a high proportion of Australia's gross domestic product (GDP).

The importance of information has been highlighted by developments in computer and communications technologies. These information technologies (IT) have greatly facilitated access to and means of applying information in practically every sphere of activity.

INFORMATION, ECONOMIC GROWTH AND DEVELOPMENT

Government has a broad complex of interests in the development of policies and programs that promote the effective supply and use of economically valuable information.

The telecommunications infrastructure represents the Government's most direct involvement in ensuring an efficient availability of information. Telecommunications issues raised in this paper include:

- the extent to which the infrastructure will allow efficient access to domestic and overseas electronic information resources and will permit expansion of the Australian electronic information industry; and
- the conditions, including restrictions due to technical or policy considerations, under which IT equipment can be attached to the public switched telecommunications network.

Libraries of all kinds represent a potent resource for the storage and transfer of information in both conventional and electronic forms. There is an identified role for the Commonwealth in coordinating the planned development of library and related information services.

Government has a role in ensuring that the public education system generates appropriate skills in the workforce to meet future employment needs in the 'information society', as well as more aware citizens capable of soundly based choices in such a changing society.

Scientific and technological information (STI) is an important component of the information that must be accessible to researchers

to avoid wasteful duplication of effort, and to users for commercial application. Many of Australia's scientific and technological library and information services are of world standard, but many potential users are inadequately provided for, or fail to take advantage of existing services. Although most research and development is undertaken by the public sector, evidence suggests that the public sector is not extensively used as a source of STI by industry.

Various options open to Government for improving STI services are discussed in the paper, including establishment of a new STI coordination and referral body.

The increasing computerisation of public sector operations has led to a diversity of electronic databases in various fields within the Commonwealth and State governments, much of it economically valuable. Some is already publicly accessible, but much is not. It has been suggested that the availability of this information should transcend State boundaries if it is to be used in the best national interest. Many policy and technical problems may beset attempts at coordination. While some initial investigation is now underway into electronic publishing and Government information concerns, at present there is no body that might appropriately examine the feasibility of 'networking'.

The information sector is a key growth sector nationally and internationally. Information industries are expected to achieve growth in production and employment, enhance the range of skilled jobs and improve the balance of payments. Aspects of existing or potential Government involvement in Australia are:

- specific policies aimed at development or regulation of commercial information industries. These policies form an integral part of Government industry policy and are not addressed in any detail in this paper;
- the nature of the relationship between public sector and private sector providers of information services, including possible networking or interconnection: when should Government provide information, and when should it leave information provision to the private sector?
- whether Government should encourage or impose regulations (eg codes of conduct) on the information industry in the interests of data privacy, social equity, national security, intellectual property protection, or consumer protection.

INFORMATION AND THE CITIZEN

One concern of governments is that the community not be unduly divided into groups which have access to resources such as

information and those which do not, ie the 'information rich' and 'information poor'.

Government action to address this issue may be of several kinds:

- programs designed to improve the supply of and access to information;
- education and awareness programs; and
- measures to 'arbitrate' between the citizen and 'information rich' bodies (such as governments, media and corporations).

The Commonwealth Government is one of the major sources of the information to which people, particularly the 'information poor', need access. Most departments and agencies conduct campaigns and provide information for the public as integral parts of delivery of their services.

Supply and access

The Government is committed to the provision of telecommunications services in accordance with the principle of 'uniform services at uniform prices', ie cross-subsidisation. The preservation and development of a telecommunications system which is a publicly-owned and integrated national network is a fundamental part of this policy.

Developments in information technology are leading to a change in the role of the public library from a stand-alone, book-oriented service to a component of a larger network of information storage and delivery systems. Public libraries have also been expanding their community information role. Technological developments may make it possible both to increase further the range of information which can be offered by community information services, including libraries, and to coordinate the services offered.

The relative roles of the various levels of government and of the private sector in provision of community information is an important issue. A tendency for libraries to become information resource centres with greater emphasis on non-book material such as computer databases, and thus the need for greater coordination of services, suggests that the Commonwealth may be required to take a more active role than previously.

Education and awareness

Competence in communication skills, both written and oral, and organisational and research skills feature prominently in the educational requirements of the 'information society'. Familiarity with keyboards, procedures for assessing or transmitting information

and the ability to handle and generate visually presented information are also on the list of information-related skills that are becoming more necessary for the individual, particularly in the interests of obtaining employment. Public awareness of information providers and services in Australia also seems necessary.

Measures to arbitrate

The paper provides details of the development and operation of freedom of information (FOI) legislation in the public sector, as well as details of the Australian Law Reform Commission's recommendations on privacy.

New information technologies offer the potential means to maintain surveillance on individuals very easily and to obtain illegal access to information, raising the questions of whether additional measures are necessary to protect the accepted civil rights of the individual citizen.

PROTECTION OF NATIONAL SOVEREIGNTY AND SECURITY

Technical barriers to the international exchange of electronic information have been broken down by developments in information technology, enabling the internationalisation of information services and other information-related commercial activities. It has been suggested that although the growth in such transborder data flows (TBDF) brings many economic benefits, it may be outpacing the development of intenational conventions, rules and procedures.

TBDF can result in increasing quantities of information about Australian citizens being available in countries without adequate privacy safeguards. Due to different freedom of information laws, information that remains exempt in Australia may be obtained in other countries. If TBDF allows a person in one country to manipulate data held in another, whose laws or safeguards will apply when fraud or error is involved?

Any obsolescence in Australian copyright and commercial law caused by new technologies immediately becomes of international concern due to TBDF.

Australia is heavily dependent on foreign-sourced business and technical information. Such dependence on TBDF to link international databases affords those controlling the databases considerable leverage over the economic potential of others.

Australian laws and other controls may become ineffective if transnational corporations or others are allowed access to data flow channels outside the public telecommunications system.

One concern of Government is how to achieve a balance between the potentially conflicting aims of increased economic efficiency on

the one hand and maintaining Australia's sovereignty and security and the privacy of its citizens on the other.

INSTITUTIONAL ARRANGEMENTS

Implementation of a national information policy may require some more formal and enduring means for coordinating government activity.

It has been estimated that in the next decade, Australian governments will spend a total of over $4 billion on computer-based information systems and databases in a diverse range of areas. There is need to consider the role of formal consultative mechanisms at the national level to avoid duplication of effort and the proliferation of incompatible services, and to encourage national networking of public information systems. The Australian Libraries and Information Council (ALIC) is not seen as an appropriate body to undertake national coordination of the full range of information matters.

Within the Commonwealth Government, responsibility for the elements of information policy is spread among different portfolios. An interdepartmental meeting (IDM) has been established, but this is concerned more with initial policy development than with ongoing coordination of Commonwealth information activities. A greater degree of formal coordination may be appropriate.

There is also no adequate formal mechanism for involving industry, professional and community groups in Government planning in regard to information issues.

The paper considers some options for development of new institutional arrangements for information policy, including:

- a newly constituted Commonwealth-State information coordination body;
- a mechanism for coordination of information policy matters within the Commonwealth Government, such as a standing interdepartmental committee; formal allocation of responsibility for information policy to a minister, supported by a bureaucratic structure; and a representative committee to advise on information matters;
- an Australian Information Utility, established as a statutory body with wide-ranging information provision and advisory functions;
- a consultative body or bodies to link Government, industry and the community; and
- new institutional arrangements in the area of scientific and technological information provision, such as a coordination, referral and marketing body which would act as a link between information repositories and users.

THE VALUE OF INFORMATION POLICY

Information policy would provide a broad framework within which the wide range of information-related activities undertaken by the Commonwealth and States can be reconciled. The policy would lead to the development or recognition of policies, principles or practices which cut across portfolio boundaries. Such an approach may be crucial, given the universal importance of information and the pervasiveness and rapid growth of applications of information technology.

Where policies are being, or have already been, developed, the national information policy would serve to indicate where these policies fit into the overall context. It would also provide a basis for identifying links between different policies and for wider application of policies developed in specific areas.

Coordinated effort should lead to the establishment of collaborative links and useful networks amongst individuals and interest groups in both the public and private sectors.

Perhaps most importantly, information policy would draw attention to the fact that Australia is an 'information society' and stimulate productive debate about the issues involved.

The ultimate aim of this policy development activity is to produce a document, endorsed by Cabinet, incorporating a framework for the Government's information policy. Other possible outcomes are:

- policy initiatives in specific areas arising from the endorsed policy (for example an improved system for marketing and dissemination of STI);
- improved community-wide information services provided by the public and private sectors;
- institutional changes aimed at improved handling of information matters by government; and
- consciousness raising about information related issues.