Strategic Options in the Context of the International Data Services Debate

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Karl Sauvant discusses national policy for acquiring and using data resources

Data resources are considered to be strategically important: for those countries without sufficient resources, their acquisition is seen as crucial; while for those with well developed data resources, development of the nation's economy is seen to depend partly on the international growth of their data resources. This paper considers the means of acquiring data resources and the ways of maintaining an open international environment for transborder data flow, the conflict between the two situations and the approach of those countries in a mixed interest situation.

Keywords: transborder data flow, data resources

Given the strategic economic importance of data resources, those countries that believe they do not have sufficient data resources consider their acquisition as crucial. For instance, it has been observed for the semiconductor industry in the developed countries that, 'Apparently, most governments have concluded that a significant national presence in this sub-sector, combined with a ready acceptance of the new electronic innovations by the users of capital goods, are essential to the preservation of technological independence'. Similarly, the Ministry of Posts and Telecommunications of Japan noted that, 'Together with energy and food, the database is taking on the character of an important resource. It is necessary for this country to improve the existing databases ... so as to be self-sufficient in information resources'. Developing countries, in particular, see in this situation a new dimension of dependence, as do some developed countries. As the Japanese Ministry of Posts and Telecommunications said, 'Today information is vital for any country for its socioeconomic development; excessive dependency on one country for information needs to be reexamined'.

Those countries that possess well developed data resources (whether in all or some data industries) see their future development as being dependent on the international growth of their data resources. As a study prepared by the US National Telecommunications and Information Administration (NTIA) put it, 'Mature countries such as the United States increasingly rely on these industries [telecommunications and data-processing services] to offset the decline of low-technology sectors, and it has become virtually a requirement of US economic health for such industries to expand abroad'. This observation is also relevant in a broader context, since the free-trade potential of the 'sunrise' industries can help to offset, to a certain extent, the protectionist pressures of the declining 'smoke stack' industries.

The distinction between 'countries that lack sufficient data resources' and 'countries that possess well developed data resources' is, of course, an artificial one, as many countries are in mixed situations. This
dichotomy has been chosen for analytical purposes, to facilitate the identification of the principal policy objectives, policy rationales and policy instruments associated with the approaches chosen by different countries. As will be seen, given the nature of the competing values at stake, these approaches essentially counterpose national and international strategies.

ACQUIRING DATA RESOURCES

For countries that see themselves as having insufficient data resources, the question of how to acquire such resources naturally arises. Two basic options present themselves: physical acquisition and functional acquisition.

Strengthening domestic data resources: physical acquisition

The physical acquisition of data resources aims at building up national resources, with or without the participation of foreign capital. The principal objective of such a national acquisition approach is to obtain competitive capabilities in as many data resources as possible. This, in turn, would enable the country:

- to have a maximum of economic resources central to future development located on national territory,
- to capture the direct and indirect benefits (including skills) associated with the development of such industries,
- to stimulate the development of other industries because of the close links of data resources with the rest of the economy,
- to establish a basis for foreign-exchange-saving import substitution and foreign-exchange-generating exports, as well as participation in the world market for data resources.

The rationale for such a national approach lies in the belief that, in spite of the immediate costs of an infant-industry policy, the realization of hitherto underdeveloped domestic capabilities adds to national and international welfare in the longer run. This strategy is particularly attractive because of the strategic importance of data resources for development, and because distance-insensitive transport costs and the homogeneity of certain data services may offer specialization advantages that facilitate the growth of competitive industries.

The main policy instruments of this approach include subsidies, performance requirements, procurement policies and the favouring of national champions (i.e. chosen domestic corporations to advance national objectives) through which the growth of domestic data resources can be stimulated, as well as the wide range of traditional protectionist measures through which fledgling domestic industries can be sheltered against overwhelming international competition. Also crucial in the context of this approach are various forms of control of transborder data flow (TDF). The principal reason is that transborder data flows permit international access to data resources and may thus inhibit local development of such resources, either because there is no longer any need for such development or it is made difficult. In other words, since TDF can have an influence on the location of data resources, any comprehensive national policy aimed at strengthening domestic data resources has to pay attention to these flows. Often, it is also considered important that the data resources to be built up are not only located on national territory but also domestically controlled (i.e. not by transnational companies headquartered elsewhere). Under these circumstances, the countries involved may discriminate (e.g. in procurement policy) against foreign affiliates.

Developed (e.g. Canada, the European Community) and developing (e.g. Brazil, India, Mexico) countries alike pursue policies that contain some of the policy elements just mentioned. Many of these policies, especially in the developed market economies, begin with support for research and development in the data-goods sector, and centre (partly for defence, partly for core-industry reasons) on support for the semiconductor industry; considerable amounts of money are committed for this purpose. However, policy intervention addresses data services as well. The Canadian Foreign Investment Review Agency, for instance, disallowed five out of 26 applications for foreign direct investment (FDI) in software and six out of 15 applications in other data services between 1976 and 1983. Better known is the Canadian Banking Act, which requires that all banks operating in Canada maintain a minimum set of records related to their Canadian transactions in Canada (although copies of the set may be exported). This ensures that the Inspector General of Banks can have access to the records she needs to carry out her statutory duties. If such data left the country, it would no longer be under Canadian enforcement jurisdiction; this would entail a sovereignty risk. Preparation of the minimum set of records requires data processing in Canada. While sovereignty concerns may well have been the primary considerations in the adoption of this Act, it has had the (side?) benefit of strengthening data resources in Canada. An example of a different kind is the UK government's veto (in October 1984) of British Telecom's agreement with IBM to launch jointly a sophisticated electronic data network in the UK for such purposes as electronic ordering, billing and payments systems. Although possible negative effects on domestic competition were cited as the principal reason, it would not be surprising if a major consideration had been that this venture would significantly reinforce a foreign company's hold on the UK's computer market. Not surprisingly, ICL, the largest
UK-owned computer supplier, welcomed the decision. The incidence of such policies is likely to increase considerably as awareness of the importance of data resources rises. At the same time, however, only a few countries have the capacity to develop the full range of data resources: most will have to place the emphasis on selective import replacement, infrastructure development and improving access to international data resources.

Brazil is the country that has most clearly recognized, formulated and pursued this approach. It is an approach based on the recognition of the importance of data technologies for development, and the role that TDF can play in influencing the location of data resources. Therefore, within the framework of Brazil's industrialization programme, special attention is being given to the strengthening of domestic data resources. Virtually all policy elements mentioned earlier are used, including the explicit reservation of the production of certain data goods and services for domestic enterprises. An integral part of this policy, implemented by the powerful Special Secretariat of Informatics (SEI)\(^3\), is a series of regulations that govern the establishment and use of transnational computer-communication systems. The regulations ensure not only that the use of these systems does not conflict with national interests (particularly economic development) but also that they actually serve these interests where possible. The declared objectives of this policy are to maximize data resources located in Brazil, regardless of whether these are owned by national or foreign corporations; to acquire and maintain national control over the decisions and technologies relating to Brazilian industries where this is threatened through TDF; to ensure the broadest possible access to data; and to administer data resources in such a way that they enhance the country's cultural and political standing. These four objectives have led to considerable efforts to build the necessary infrastructure (an appropriate telecommunications network and a viable informatics sector), and they have given rise to clearly defined policies regarding telematics and TDF. The ultimate aim is to create data industries and links that contribute positively to Brazil's overall development within the context of the country's industrial policy.

With a view to serving these objectives, SEI has pursued a strategy to enhance the capabilities of national industry to manufacture increasingly complex data technologies. As part of this policy, foreign affiliates are encouraged to exercise their comparative advantage and to produce advanced state-of-the-art data goods and services, both for local consumption and export; they are also encouraged to improve local research and development facilities. Once a product can be manufactured with national capital, the respective market segments are reserved to domestic corporations so as to give the infant industry an opportunity to develop, while foreign affiliates are encouraged to shift toward more sophisticated products (instead of upgrading products in the same segment). The degree and type of protection is a function of the technological stage of the products involved. It is envisaged that, as soon as international competitiveness is achieved, protective barriers can be lowered, although some measures may still be necessary to ensure the continued improvement of local technologies and the permanence of national ownership of the country's informatics industries.

To protect this informatics policy against international leakages, SEI has adopted specific measures dealing with TDF. Most importantly, it was decided that the establishment of international data-communication links would require SEI's prior approval to ensure that such links are set up in accordance with the guidelines of the national informatics policy. (The content of messages, however, is not supervised.) Such links are approved for specific purposes only, and for fixed periods of time, which may be extended for up to three years.

This regulation is based on the principle that data, and the means of treating it, are economic resources, subject to trade and crucial to socioeconomic development. Furthermore, data structuring is considered an activity closely related to national security. That any country has the right to regulate the nature of TDF is therefore a policy position supported by Brazil. The government of Brazil is of the view that the establishment of any link should not jeopardize the operations of the local units of a transnational corporate system in case of an interruption of the link; it should not lead to an outflow but rather an inflow of data resources; and it should not affect negatively the country's balance of payments.

Brazil's TDF policy therefore consists primarily of the application of criteria to evaluate the conditions under which, and the extent to which, individual applications for links fit with these overall and specific objectives and, hence, merit approval. The criteria are based on two dimensions of TDF: the categories of TDF (commercial and corporate), and the types of use to which information resources are being put in their transnational computer-communication systems (person-to-person data communication, database access, and data processing). Approval of transnational computer-communication systems for data processing, data communication and information storage and retrieval depends on which intersection of these dimensions is involved.

This policy extends also into the area of software where, as of September 1985, over 60% of the 7,437 software programs registered by SEI had been registered by US companies\(^5\). With the objectives of strengthening the competitive position of national hardware producers, encouraging technological development, improving the balance of payments, and, of course, fostering the
establishment of a local software industry, Brazil's policies for nourishing a software industry are centred on the establishment of a national software registry. Three categories of software are distinguished. The first category involves those software programs developed in Brazil by persons physically resident or domiciled in the country, or by corporations owned by citizens of Brazil residing in the country. The second category includes those software programs for which no national alternatives exist, but which are of economic interest to Brazil; however, the technology and proprietary rights related to these programs have to be transferred to a national corporation (open packages). The third category includes all other software programs. Registration in this last category is temporary; it would not be renewed when comparable category-one software has been developed.

The government of Brazil gives highest priority to the use of software from the first category, and all government agencies are required to use programs from that category whenever possible. Unregistered programs cannot be sold commercially and cannot take advantage of tax reductions available to buyers of registered software and to local software houses. Since the government is one of the most important users of data goods and services, the registry enables it to exert some control over the marketing of software products in the country and to encourage local production of them while reducing redundant imports. Software import contracts are subject to approval of both SEI and the National Institute for Industrial Property. In implementing this policy, SEI scrutinizes all requests for registry and approves only those conforming to its general guidelines and to its overall objective of encouraging local software generation.

The government of Brazil believes that its TDF policy has neutralized a number of the potentially negative impacts of transnational data links. This has been achieved through the rearrangement of some corporate data networks in the interest of enhancing the data resources of foreign affiliates in Brazil, be these affiliates in data industries or in other industries. In relation to Brazil's general objectives in this area, the country's TDF policy is seen by the government to have led to the increased location of computers, software, databases and skilled human resources in the country and to better national control over them. The government believes that, as a result of its policy, TDF links are not being used to export data resources, and they are not thought to increase the country's vulnerability since most foreign affiliates of TNCs are seen to have a reasonable degree of autonomy. In the few cases in which Brazil's objectives were at stake, negotiations between the applicants and SEI seem to have led to mutually satisfactory results. In addition, the country's TDF policy is seen to have contributed positively to the emergence of a national data industry, especially its database and software segments. By 1985, over 600 software houses had been established, of which one-fifth produced local software. A national catalogue of databases had also been compiled, including a detailed list of governmental databases. To encourage the diffusion of all databases, all databases are expected to be made accessible on-line in 1986.

Since the same policy has also strengthened data resources in other sectors of the economy, the government of Brazil sees its policy as having contributed to the country's overall socioeconomic development. The conclusion was, therefore, that: transborder data flow policies can be important instruments for the support of national development objectives. They can be used in a manner similar to that of a customs tariff policy to promote the growth of infant industries and to strengthen local industrialization in general. Thus, the policies have been used to ensure that the country's efforts to strengthen its domestic data resources cannot be evaded through TDF (hence data processing abroad is, as a rule, not allowed) and to ensure that transborder data flows are used to the advantage of the country when no reasonable local alternative exists (e.g. access to certain international databases is permitted). Moreover, the country has made great efforts to strengthen its intellectual and technical data-resource infrastructure.

Until 1984, this policy was implemented through regulations. On 3 October 1984, however, the Brazilian Congress approved, nearly unanimously, an informatics law which codified and extended the country's informatics policy and gave it a higher standing. The principles furnishing the basis of the law are as follows:

- The government has to set priorities and give direction to the national data industry and the application of data resources.
- Infant data industries need protection.
- Economic concentration or monopoly in data industries must be avoided.
- Informatics is not mainly a commercial, but rather a strategic and political issue.
- The development of data resources should be subordinated to the welfare of the Brazilian society.
- The right of privacy (to know what data is stored and to correct it if necessary) must be respected.
- A certain balance must be achieved between increased productivity and employment in the light of increasing automation.
- Brazil's technological capabilities ought to be strengthened.

The scope of the law extends to the research, development, production, trading, and operation of electronic components; digital data collection, processing, structuring, storage, switching, retrieval, and presentation; software; databases; and data services in general. Through this broad definition of its scope, the law brings together industrial policies related to informatics and
telecommunication and, thereby, substantially increases the applicability of SEI's pre-1984 policies. In fact, virtually any product that embodies digital components is covered by the law, including computers, electronic telecommunication equipment, terminals, peripheral equipment, scientific instruments, software and, in principle, any high-technology industry using digital components. As far as policy instruments are concerned, the cornerstone of the law's implementation is the market reservation scheme mentioned above for a wide range of products. Its main instrument is a mechanism through which the import of certain data resources is restricted. This instrument has been extended for eight years and is being administered by SEI. Also important is the required disclosure of certain technical standards and norms. Most importantly, technical information on subscriber-line unit interfaces of stored program control (SPC) switching systems must be disclosed by manufacturers, in order to permit the connection of equipment produced by other manufacturers. In addition, government procurement is made so as to support the country's informatics law, and certain (mostly tax) incentives are offered to encourage the development of a domestic data industry.

To oversee the implementation of the informatics law, a National Council for Informatics and Automation (CONIN) has been established, chaired by the President of Brazil. It is composed of a number of ministers, as well as representatives of Brazilian informatics associations, industry associations, employees and the academic community. CONIN's functions cover all aspects of informatics, and explicitly include the task of 'setting norms for the control of transborder data flows and for granting channels and means for the transmission of data to effect a link with databases and networks abroad' (art. 7(x)). The principal vehicle through which CONIN implements its policy is a national informatics plan. By the end of 1985, the draft of such a plan had been submitted to Congress for legislation. Formulated for a period of three years, its provisions require that foreign informatics affiliates dedicate at least 5% of their sales revenues to R&D, and that government investments in informatics R&D and education during the plan's duration amount to $60M, approximately one-third of what the private sector is expected to spend during that period. The plan gives direction for the development of microelectronics, software, data processing, industrial automation, teleinformatics, digital instruments, office automation, and informatics services in general. In short, it is a blueprint for the further development of Brazil's data resources.

To be sure, to date Brazil is the only country that has such a well-developed, detailed policy on data resources and that implements and monitors it vigorously. However, if data resources are as important for economic development as they are generally believed to be, it is only a question of time until other countries emulate the Brazilian example, even if they are more selective in choosing the industries in which they can develop national capacities.

Securing access to international data resources: functional acquisition

The second way of acquiring data resources (and especially data services) is to rely on transborder data flows. In other words, data resources are not physically, but only functionally, acquired. While the actual resources remain located abroad, access to them is gained via transnational computer-communication systems. For instance, instead of creating local databases or having copies of databases located in the country, it is considered sufficient to have access to databases located elsewhere.

Under such an access-oriented data-resource acquisition approach, the principal objective is to have the widest possible access to the use of data resources located elsewhere. This, in turn, requires an environment in which:

- uninterrupted access to international data resources is guaranteed (this is, in fact, the precondition for this approach),
- barriers to trade in data services and other measures that could disrupt TDF are reduced or eliminated (barriers to FDI in data service would be of little interest, however, because presumably no important domestic data-resource firms exist).

Beyond this, and to the extent to which data resources are needed for international transactions (e.g. banking), the objectives are, in many respects, similar to those of countries that possess well developed data resources (see below), especially with regard to the desire to benefit fully from the application of data services in international transactions.

The rationale for such an international acquisition approach is the desire to avoid the opportunity costs entailed in the development of domestic capacities and to benefit from international specialization by using imported data resources for other economic activities in which the country is considered to have a comparative advantage. The principal costs of this approach are dependence on critical resources located elsewhere and the learning benefits and spin-off effects foregone in the development of domestic data resources.

The main policy instrument is to secure international agreement guaranteeing access to data resources. This option has not yet received much attention as a separate and distinct approach to acquiring data resources, although Canada initiated a discussion on some of the relevant issues at the Second OECD Symposium on Transborder Data Flows (London, December 1983): 'We do not believe that, in general, flow per se is an issue. Instead, what we are
dealing with is the right of access to data, information, and related services and the circumstances or conditions which may apply to limit access. We are concerned with individual access, corporate access and multinational corporate access. ... In our view, "users access"—or denial of that access—is an overriding element in any discussion on transborder data flows.12

The aim here is to establish an obligation for countries having data resources to permit access to these resources by parties located in other countries. This matter has been put into focus by such developments as the Dresser case; the prohibition of access to certain commercial databases by socialist countries13; and tendencies in the US administration to limit the export of certain technological data and data goods. It has found its expression in the 'Communique' adopted in April 1985 by the OECD Council of Ministers, which observed that, 'Initial conclusions from ongoing work show that access to markets for high technology products and access to high technology itself are both important. Open markets and free access provide the same advantages in this domain as in all other areas of trade.'14 The OECD declaration on TDF also made reference to access. Furthermore, France has seized this concept and made it a centrepiece of a proposal presented at a meeting of the OECD Working Party on Transborder Data Flows (November 1985) to develop 'a certain number of principles which could constitute a start for international negotiation.'15 'Access to information' and 'guaranteed continuous access to sources' are two of the four elements specifically mentioned in this context. The concept has also received support from the FRG which seems to advocate an 'international right of access to databases' by improving the scope of access 'in the spirit of the "free-flow-of-information" principle.'16

However, this issue is not without complications. At the micro level, a right of access is particularly important when it concerns, for instance, the location of data within a corporate transnational computer-communication system (precisely the Dresser case). In a sense, the 'right of access' complements the 'right of presence' (and especially one of its components, the right of non-establishment): unless access is guaranteed, a right of presence, which implies that critical data resources may be located elsewhere and are merely available via telecommunication lines, may become a risky undertaking for countries. In fact, TNCs may increasingly have to locate (for security reasons) critical data resources in several countries to maintain the functioning of their corporate systems in cases of (political) disruption (again the Dresser case).

More general considerations of vulnerability17, such as disruption of critical data flows because of a breakdown of computer systems, strikes, national disasters or acts of terrorism, may have the same effect. For the same reasons (further accentuated by fears of dependence), countries may increasingly require that critical resources be located on their own territories (the Canadian Banking Act, mentioned earlier, was inspired by considerations of this sort), although countries may also pursue broader developmental objectives with such requirements, as in the case of Brazil. Furthermore, the lines between security and developmental considerations may blur, as is perhaps the case with the Canadian Banking Act.

On a general level, such a right of access is a *sine qua non* for all those countries willing to forego the development of domestic data resources and/or are willing to rely on TDF for obtaining access to such resources. This holds true regardless of whether the countries involved are developed or developing countries, and regardless of whether they are pursuing this strategy because they do not wish to build up local data resources or because certain data resources cannot reasonably be developed locally. In a sense, right of access is actually an integral part of the concept of unrestricted flow of data; for without a right of access, data flows are actually restricted. The concept also draws attention to the fact that, while barriers to trade are traditionally established on the import side, in the case of data resources barriers can effectively be established at the export side. A concern with access is therefore fully compatible with an interest in unrestricted data trade: it is just that the emphasis is on the export side.

It is on the basis of considerations of this sort (including the implications that uncertainty in this area may have for the prospects of US data service exports) that an important business group in the USA concluded that: 'The development of internationally acceptable terms of access to information and information-based services is therefore clearly in the US interest. Such terms of access would likely include: (i) well defined conditions for denial, disruption, or termination of access; (ii) procedures for appeal; and (iii) sanctity for contracts between private parties.'18 While right of access is, in any case, a constituent element of the unrestricted flow of data, and thus not necessarily a major trade-off (unless protectionist tendencies in the USA grow stronger), a codification of this right, and guarantees in this respect, could be an important step toward alleviating the concerns of a great number of countries poor in data resources. This would be of particular interest to those countries that wish, for instance to become regional TDF centres or to build export-oriented information-intensive service industries (e.g. databases, software). However, it must be kept in mind that right of access is no solution for those countries that, for broader reasons, want to strengthen the data resources located on their territories; for them, right of access only makes data flows (and perhaps dependence) a little more tolerable.

Before turning to the next strategy, it is important to note that both data-resource acquisition options have one common denominator: the need for an adequate
national physical and intellectual data infrastructure (telecommunications, informatics and skills) to place the country in the best position to use data resources. Countries with an inadequate infrastructure may have to put at least initial emphasis on the development of such an infrastructure. At the same time, there may be room for import substitution and/or the very selective application of data resources, be they produced locally or imported. Countries with a reasonably developed infrastructure may be in a position to embark on broader import replacement and/or broader efforts to diffuse data technology for domestic applications and use. Import substitution can, of course, also become the basis for exports; and the diffusion of data services, be they produced locally or imported, can strengthen the competitiveness of established industries.

MAINTAINING AN OPEN INTERNATIONAL ENVIRONMENT

Countries that possess well developed data resources are, of course, in a different interest situation from those lacking them. They are the first to be affected by a legal void which permits governments to take any (especially restrictive) action they deem desirable as regards trade and FDI in data services. Their approach to this subject flows from their desire to benefit as much as possible from their technological and commercial lead in data industries.

Accordingly, their principal objective is to promote an international environment in which

- barriers to trade and FDI in data services, and other measures that could disrupt TDF, are reduced or eliminated,
- data-service transactions and applications can take place as freely and securely and in as non-discriminatory a fashion as possible, so that data industries can grow internationally through exports and FDI,
- other international transactions (especially trade in goods and services) can benefit fully from the application of data services,
- corporations can develop trade in services based on data technology,
- the functioning of corporate transnational computer-communication systems (i.e. the operation of TNCs) is not hampered,
- the worldwide technical infrastructure for TDF is as efficient as possible to permit smooth transactions in data services.

Most of these objectives are also shared by the major users of TDF, especially TNCs.

The rationale for this approach lies in the conviction that an international framework will increase the stability and predictability required for a rapid and smooth growth of international transactions in data services and so important for long-term corporate decision-making, particularly in an area that involves capital-intensive expenditures with possible fundamental implications for corporate organization (e.g. the extent of centralization or decentralization). Furthermore, the proponents of this approach believe that, as with trade in goods, the world as a whole gains from growing trade and FDI in data services, because it contributes to a more efficient international allocation of resources and increases the efficiency of doing transnational business, and that trade in data services, like trade in goods, is an engine of growth. It is an approach that highlights a classic dilemma in the international political economy in that it places more emphasis on the efficient increase of global production and less (at least initially) on the appropriate distribution of production.

The objective of this approach cannot be obtained in a national context but requires rather an international approach: other countries have to be persuaded not to establish barriers to international transactions in data services. Accordingly, the main policy instrument is to seek the adoption of an enforceable liberal international regime that specifies the responsibilities of countries as regards trade and FDI in data services or, short of that, the conclusion of appropriate bilateral and regional agreements. The latter, in any event, are seen to bring about immediate improvements of the situation and, in addition, encourage multilateral negotiations.

MIXED INTEREST SITUATIONS

The strategies described so far are, in their pure form, ideal types seldom to be found in the real world. Even the USA, as the exponent of an open international environment for data flows, restricts the outflow of certain data. Similarly, the country that comes closest to the first option, Brazil, pursues a mixture of strengthening domestic data resources and seeking access to international data resources. Thus, Brazil's market-reservation scheme applies to the microcomputer and minicomputer sectors only, and is limited to eight years. Furthermore, as discussed earlier, data processing within corporate systems is allowed abroad if no reasonable local alternative exists, and even commercial data processing is permitted abroad in exceptional circumstances. As regards information storage and retrieval, the Brazilian preference is to have copies of databases used located in the country, although, as this formulation indicates, exceptions are certainly not unknown. Finally, as regards software, the Brazilian policy clearly recognizes that, for some software, no reasonable national alternative exists and it must therefore be imported. In other words, while the Brazilian policy is clearly aimed at strengthening national data resources, it relies on access to the international data market where no reasonable domestic alternatives exist and where a
strict implementation of a national policy would therefore be too costly.

A number of mixed strategies are possible. A country may, for example, try to strengthen its domestic capacities for certain segments of an industry (e.g. microcomputers) or for an entire industry (e.g. databases), but rely on access to international data resources for other segments (e.g. mainframes) or other industries (e.g. software). There are, of course, links among these strategies. For instance, a country that wishes to develop an export-oriented software industry may have difficulties in forbidding imports of certain computers, because state-of-the-art hardware is required to develop competitive software.

India has pursued such a policy mix and has begun to build up a rather successful software industry. Since the mid-1960s, imports of computers had been closely controlled and were tied to certain export performance requirements regarding software. Since 1981, these requirements include the provision that at least one-third of the operating time of imported equipment must be used for the development of software for export. More specifically, if equipment is imported by an Indian company in order to develop software for exports, the company has to export software in the amount equivalent to 300% of the c.i.f. value of the imported equipment. Indian software exports increased from $0.7M in 1975-76 to $24M in 1982-83. It appears, however, that this strict control has hampered the development of the software industry. This factor, apart from the broader desire to strengthen the country’s automation base, played a role in India’s switch, in early 1985, to a more liberal policy on equipment imports.

Another mix of interests arises if a country desires to strengthen its domestic data resources, but one of the country’s industries (e.g. banking) needs state-of-the-art data resources and, independently of that, needs an open international system for TDF to remain (or become) internationally competitive. In this case, a data-resource acquisition approach, based on physical acquisition, could be disadvantageous for maintaining the competitiveness of the industry involved; at the same time, an approach based on functional acquisition could be disadvantageous for building a domestic data-resource industry.

Many countries are likely to be in mixed interest situations of this sort. This is all the more likely to be the case when countries already have other industries that are dependent on data services, particularly countries that have information-intensive, internationally-oriented service industries, and countries that are the headquarters of TNCs. Most developed market economies fall in this category. France, for instance, is a relatively important exporter of software, and Canada has a few strong computer-service corporations (e.g. IP Sharp). In addition, most OECD countries have one or more important internationally active service industries which depend on data services as a core service. Thus, in shipping, such a service as the Reuters Dry Cargo and Tanker Service provides up-to-date shipping information; in air transportation, SITA has become indispensable; in tourism, the closed user-group network Holideq, for instance, allows the worldwide reservation of hotels; credit-card companies depend on central authorization systems; and, in the whole range of 'other private services', the new forms of international trade discussed earlier depend entirely on TDF. Countries that, in general, lack sufficient data resources may nevertheless play a leading role in these services and therefore depend, to a certain degree, on access to the international data market. There is also the fact that the major service exporters are also the home countries of most TNCs, for which transborder data flows are becoming the operational infrastructure. Therefore, while these countries have an interest in maintaining an open international environment for data flows, they have, at the same time, little interest in letting these flows impair the growth of their data industries as independent economic activities of central importance to their economic development. This dilemma arises precisely because of the position of data services as a core service.

The situation also arises for developing countries, although for most of them it appears to be simpler. Few of them are the headquarters of TNCs with transnational computer-communication systems; the overwhelming majority have no information-intensive service industries that are active internationally; and hardly any have internationally competitive data-service industries. These countries can therefore pursue national acquisition policies for data resources more easily. However, even here, a number of countries are exceptions, and some general caveats have to be made. For one, a number of developing countries participate actively in some information-intensive service industries; for example, most countries in the airline industry and such countries as Bahrain, Panama and Singapore in banking. Second, a few developing countries have certain export-oriented data-service industries; for example, India in software, Barbados in certain aspects of data processing. Third, data resources, as discussed earlier, are increasingly incorporated into other products and processes, and developing countries that wish to remain competitive on the international market for goods and services in general are likely to require data resources.

These conditions place virtually all OECD countries and a number of developing countries into mixed-interest situations. This places constraints on efforts to pursue strategies that are either directed strictly toward the strengthening of domestic data resources or founded entirely on access to international data resources. These constraints may be stronger for most developed market economies than for most developing countries, but in either case the situation calls for
differentiated policies. Countries that lack sufficient data resources have to weigh carefully the advantages that one set of policies can bring in one area against the disadvantages that they may entail in other areas. Furthermore, countries also have to be somewhat concerned about the acceptability of their policies to other countries. For instance, a policy mix that is obviously restrictive in one data-service industry, but relies on international access in another data-service industry, may create credible liberalization pressures from countries that are excluded from the first industry but relied upon in the second industry. Finally, the mix of interest situations is further complicated, especially for the developed market economies, by the fact that the discussion of data services is embedded in the general discussion of the need for a multilateral framework for trade in services, and that data services, as pointed out earlier, are a core service which provides the infrastructure for many other service activities.

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