NEW INFORMATION TECHNOLOGY — OLD INFORMATION HABITS?

Henry Lucas

1 PUBLIC SECTOR INFORMATION SYSTEMS

It has become commonplace in recent times to emphasize the value of 'information', both as an essential requirement for effective and efficient management, and as a basis for medium and long term planning. The establishment of 'information systems' and the introduction of 'the new information technologies' are widely presented as providing a possible solution to the apparently intractable problems associated with the lack of basic data on key areas of policy concern in many countries (see for example IDRC 1989).

The increased interest in information systems, which is clearly to a large extent a result of the possibilities opened up by micro-computer technology, has arisen within the context of a fairly general consensus that many of the data collection activities that are at present undertaken within developing countries are essentially useless (or worse) in terms of providing an input to either management decisions or policy formation. De Kadt (1987), for example, provides the following stereotypical description of the routine 'information system' to be found in many government departments:

> A helpful official takes us to the overcrowded office of a very junior clerk, or - more likely - to a dark corner of the building, a corridor perhaps. There, with a mixture of pride and despair, we'll be shown piles upon piles of dusty forms, stacked to the ceiling in half-sorted heaps. This is the result of the bureaucracy's demands for information from below: these are the forms which grassroots workers are laboriously taught to fill in so that their supervisors can have them processed and send them further up the line.

Working with such systems can be a daunting undertaking, and it is therefore not surprising that one frequently preferred option for both local policy makers and funding agencies is to simply by-pass the existing administrative systems and concentrate resources on the establishment of parallel information generating procedures. However, while the decision to adopt such an approach may be understandable, it is for many reasons unsatisfactory. In such circumstances scarce resources continue to be wasted on the routine collection and processing of largely unused data, while alternative sources, usually short-run, often project-specific and mutually incompatible, proliferate.

2 NATIONAL SAMPLE SURVEYS

A related strategy, one often favoured by the international agencies, has resulted in a series of initiatives focusing on the use of national sample surveys to generate policy relevant information. These have in some cases been aimed at improving the numerous existing surveys routinely undertaken in most countries and in others at developing new and ever more ambitious exercises. One obvious, and very recent example of the latter approach can be seen in the planned series of socio-economic surveys to be undertaken in association with the 'Social Dimensions of Adjustment' (SDA) project (IBRD 1989), which aim to offset the problems associated with what must be one of the most complex and extended survey instruments ever devised, by means of a highly intensive use of computer technology, with micro-computers being allocated down to the level of field supervisors.

Such exercises can perhaps again be seen to some extent as an attempt to avoid the central issue of essentially non-functional routine information systems, in this case by concentrating resources on the apparently more tractable problems associated with the collection of reliable survey data. At a recent workshop concerned with these issues, Duncan (1990), in a related context, suggested a number of reasons for the preoccupation with sample surveys.

> For the aid donors, it is easier to support a survey or census and to achieve success in these terms than it is to strengthen an institution. With a survey there is a fixed timeframe; the objective can be clearly specified; the incremental resources needed can be identified and earmarked for the job; and it is often possible to insulate the exercise from the wider civil service processes that bedevil routine statistical operations.

That there is indeed considerable scope for improvement in the design, implementation, and analysis of sample surveys, and dissemination of their findings is not in doubt. Chambers' (1983: 53) much quoted description of the fate of many such surveys is probably as true today as when first written: 'Much of the material remains unprocessed, or if processed, unanalysed, or if analysed, not written up, or if written up, not read, or if read, not remembered, or if remembered, not used or acted upon.'

It is also true that, given sufficient care and attention to detail, and if adequate resources are available, national sample surveys can be executed successfully even under relatively difficult conditions. This has been amply demonstrated, for example, by the first of the SDA surveys referred to above. However, there is an important issue here which is usually ignored. Given that there are serious gaps in the information required for policy, and that national sample surveys can in principle be sufficiently well executed to fill some of those gaps, the question remains: does this approach represent the most effective use of available resources?

3 THE ECONOMICS OF INFORMATION

The 'economics of information' approach to such issues is one that has been occasionally raised in the literature (Belshaw 1981; Eele 1990). This focuses on the idea that one should, in principle, appraise, monitor, and evaluate data collection exercises just as one would any other project. There should be an attempt to determine inputs, outputs, effects and impacts, in order to estimate expected costs and benefits, and an explicit comparison of the net benefit of the proposed exercise with that of possible alternative uses for the implied resources. Decisions to allocate capital or recurrent expenditure, or staff time, to generate information, should be made only if the expected net benefits arising from procession of that information exceed those to be obtained from an equivalent allocation to any alternative activity.

It is of course well recognized that estimation of the benefits of data collection is inevitably a highly subjective undertaking. Information is very much an intermediate good, of value only to the extent that it is used as an input to decision-making, which in turn is only of value if net social benefit arises as a result of the decisions taken. Evaluating the contribution of the original data to the final benefits will obviously, except under very exceptional circumstances, be an extremely elusive undertaking. The objective in using this approach is therefore primarily to ensure that questions as to costs, expected benefits and appropriate resource allocation are at least explicitly considered, even if serious quantitative estimates are not attempted. In the present context, it is possible to raise a number of issues in relation to the use of the sample survey approach.

4 LIMITATIONS OF THE SURVEY APPROACH TO POLICY INFORMATION

The first point to note is that the true cost of most sample surveys is often seriously underestimated. The decision as to whether or not to undertake a survey will usually be based on the actual cost of inputs, which will probably be considerably less than the appropriate measure, which is opportunity cost. Almost all data collection and analysis activities in developing countries face major resource constraints, both in terms of equipment and facilities, and, most crucially, of trained and experienced manpower. The introduction of any new area of survey activity often raises major problems in terms of staff allocation, and may well have unrecorded detrimental impacts on far more important activities undertaken by the agencies involved.

This is of particular concern in relation to surveys backed by one or other of the international agencies, such as those described above, which may well be very little related to existing national data collection priorities. Many of the countries which agreed to collaborate with the survey programme of the World Fertility Survey, for example, were probably more strongly influenced by the resources available from that source, than by any positive decision that a demographic sample survey would be the most appropriate use of available resources at that particular point of time.

There is indeed a real danger that the understandable desire by those involved with the planning and execution of surveys within developing countries to obtain improved equipment, training and funding, allied to the preference for sample surveys by the international agencies referred to above, may lead to an overly ambitious extension of existing activities. For example, Lipton (1985) suggests that the implementation of the Rural Integrated Development Survey in Kenya, which has been claimed as one of the successes of the UN National Household Survey Capability Programme, had a considerable adverse

impact on the quality of what had previously been a fairly reliable crop output survey.

The value of the benefits of the output from a particular sample survey is, as discussed above, very difficult to estimate. There is one situation, however, where the benefits can be known precisely: outputs that are not used have no value at all. This is unfortunately not an unknown or even rare phenomenon. The next line of the previously quoted passage on sample surveys from Chambers reads: 'Only a minuscule proportion, if any, of the findings affect policy, and they are usually a few simple totals.'

The non-use of survey data is sometimes attributed to a failure by decision-makers to appreciate their potential value. Indeed, the lack of effective demand by decision-makers is widely seen as the key underlying reason for the general shortcomings in data availability in developing countries (see for example Chander 1990). Essentially, those in a position to effect a major improvement in the present situation are seen as either being unaware of the benefits of improved data collection, or giving it very low priority in comparison with more tangible policy issues.

There is clearly much truth in this proposition. However, it is also arguable that the use of sample survey data, even if decision-makers could be fully convinced of their value, and even if their reliability could be radically improved, appears in many areas of policy analysis to be inherently limited by two factors.

Firstly, the difficulty of producing information from surveys sufficiently rapidly to provide a picture of the current situation, or to generate the time series which are often necessary to monitor and understand processes. The time scale for many socio-economic sample surveys tends to be measured in years rather than in months. Moreover, because of the resource costs of mounting such surveys, they will frequently be conducted only once every two or three years.

A policy maker will thus rarely have access to survey information that is less than two years out of date, and will usually not be able to examine the kind of time series data that might give valuable clues as to current and future trends. Bienefeld (1984), for example, in the course of an employment mission to Fiji, notes that a recently conducted and apparently highly reliable national household survey, which was expected to be the most important source of data available, was in practice virtually useless, simply because policy recommendations were crucially dependent on acquiring a knowledge of recent employment **trends**, about which a one-off survey could provide no guidance.

Secondly, the impracticality of collecting data on large enough samples to allow the level of disaggregation necessary for detailed analysis by region and population-group, which will frequently be an essential requirement for effective policy implementation. Even the best conducted national sample survey can be a very crude instrument in policy terms. The National Sample Survey in India, for example, which is in many respects a model of its type and carried out on an enormous scale, does not claim to provide good district level estimates of crop output, even though a district in India will typically have a population of well over one million people.

During a period when decentralization and increased autonomy for regional administrative bodies are widely advocated, and policy is increasing concerned with particular sub-groups of the population, the generation of information which in many countries is reliable only at the national level, for the population as a whole, seems to be increasingly irrelevant to the realities of decision-making.

5 ADMINISTRATIVE INFORMATION SYSTEMS

In principle, neither of these limitations need apply to data from administrative sources. Data will usually be recorded on all those with whom institutions come into official contact, which in some instances will include a considerable proportion of the population, and it should be available on a more or less current basis. In this case, the main problems are usually said to relate to the nature, coverage, and quality of that data.

Firstly, it is often suggested that the type of data available from administrative sources is simply too limited in scope to allow for serious policy analysis. For example, client data records on those attending a health clinic will frequently provide little more by way of background information than the name, sex and, possibly, age of the individuals concerned, thus precluding any attempt to consider the relationship between the reason for their attendance and their economy or social circumstances.

Secondly, the coverage of administrative data is often limited by the fact that those who come into contact with the institutions in any given area of social activity will often be a small and highly selective sub-group of the population in which one is interested. Thus in most developing countries government employment agencies in an urban area will not be used by the great majority of those seeking employment because they will assume, almost certainly correctly, that such agencies will not be able to assist them.

Moreover, the population groups least likely to contact agencies will typically be those who are or should be priority targets of government social policy. Further, rural primary health care institutions will be least frequented by the poor, remote, or otherwise disadvantaged groups who probably have most need of them.

Thirdly, as described above, it is generally accepted that the quality of much administrative data is at present so poor as to render it completely unusable, even for the purposes of the agency collecting it.

It can be readily accepted that all the above concerns are perfectly valid. However, it is by no means clear that they represent insurmountable obstacles to the effective use of administrative data for decision-making.

On the question of content, if it can be realistically argued that major improvements in decision-making would result, the costs involved in modifying and possibly extending the data recorded during routine administrative procedures might be justified, though such judgements should be made with considerable care, as discussed below.

Limited coverage certainly implies that extrapolation of findings based on institutional data to a wider population must only be done with great caution. However, as previously indicated, in many instances the most useful data for policy makers is that which gives some indication of trends. It may frequently be the case that the changes over time in the institutional population will reflect similar changes in the broader population, or at least provide valuable indications of likely related changes in that population. Such relationships will clearly need to be examined periodically, possibly by means of sample surveys, but this may represent a much more effective use of available resources than attempting to establish an on-going survey-based monitoring system.

Finally, there is no obvious reason to believe that the poor quality of administrative data is less amenable to improvement than the poor quality of data collected by sample survey. Indeed, given that those involved in the recording , processing and dissemination of administrative data are usually permanent public sector employees, it seems plausible to argue that it should be easier to implement appropriate monitoring and control procedures for improving and maintaining data quality in this situation than where a considerable section of the personnel involved are typically employed on a short-term contract basis.

It should also be noted that data 'quality' is a relative concept. In the example from Bienefeld referred to above, it was found that the local Employee Provident Fund, though a source of doubtful quality in many respects, including coverage, proved extremely valuable because it gave at least some indication of changes in the structure of the labour force over time, information that was central to the exercise and not otherwise obtainable. The primary 'quality' of information is existence, and in many areas of policy concern, the use of administrative data may be the only possible source.

6 IMPROVING ADMINISTRATIVE INFORMATION SYSTEMS

To date, attempts to increase the usefulness of administrative information systems, particularly where these have been initiated by the international agencies, have usually focused on the first of the issues discussed above, that relating to the types of data collected, with particular emphasis on issues of presentation and analysis.

Typically they have involved proposals for the development of indicators aimed at assessment or performance monitoring, the specification of procedures whereby the data required for the calculation of such indicators should be obtained, and the provision of additional training and equipment, in particular micro-computers, for data collection and analysis. Funding agencies in particular have shown a marked preference for the 'technical fix' approach based on the rapid introduction of computer facilities (Daly 1992). It must be suspected that all too often they have also involved the collection of a considerable volume of additional data in situations where

the quality of that already collected is highly suspect.

Decisions on 'what to measure' are of course extremely important. The development of appropriate analytical procedures for the derivation of relevant indicators can be a major factor in encouraging the use of information for decision-making. However, there is no point in framing information requirements in such a way that there is, realistically, little possibility of them being satisfied. Indeed there is a very real risk that, just as in the case of sample surveys, being overly ambitious may prove highly counter-productive.

The character of many such exercises can be described as prescriptive and 'top-down'. They will often pay little regard either to the detailed organizational structure of the institutions concerned, or the extent to which additional data collection activities will impact on existing procedures. They frequently entail very strong, and usually unexamined, assumptions as to implementation, in particular with respect to the cooperation of those at lower levels within the institutional hierarchy. Such assumptions appear to run counter to experience. As de Kadt (1989) suggests: 'administrative innovations tend to be resisted by staff if they are seen to involve extra work. They are also likely to run into trouble if they look risky: officials do not like uncertainties and the chance of possible trouble with superiors.'

It is in practice likely to require considerable effort to establish effective and useful information systems within public sector institutions which generate operational and administrative data. One major factor is that the great majority of individuals within such institutions who are expected to collect, transmit, and use data are often, at best, doubtful as to its value and indifferent to its quality. It is not necessary to endorse the strategically self-interested conception of human behaviour adopted by the 'new economics of organizations' (Moe 1984) to accept that such attitudes may often best be understood, not as an indication of ignorance or deliberate obstructiveness, but rather as a perfectly reasonable response to employment conditions and the general working environment within which they are expected to function.

Information systems based on the assumption that because procedures are specified they will necessarily be followed, and which fail to take into consideration the perceptions and motivations of those expected to implement those procedures, can be expected to run into serious problems, and it is of little use at that stage to attribute blame. Chambers (1979), commenting on the central role of administrative officers in rural development programmes, provides a useful illustration of the process whereby irrationality is often used as a convenient explanation for the failure of systems:

When things go wrong, administrators blame pastoralists for being ignorant and stupid; and social scientists hasten to explain how the behaviour of pastoralists is rational, an able adaptation to a hostile environment. Social scientists then transfer the blame ... to the administrators themselves, finding their behaviour stupid and arrogant in turn. That the behaviour of the administrators may be rational, an able adaptation to different sort of hostile environment, may not be investigated.

Enthusiasm for a newly introduced information system may be effective in promoting data quality for a time, but its impact will usually be short-lived. Effective monitoring and control procedures are an essential requirement. However, such procedures are difficult to design and may considerably increase the resource costs of data collection. If their introduction implies either an increase in the information system budget, or further restrictions on the range of information generated, there is a strong temptation to adopt a more relaxed attitude to data quality.

The development of a more effective approach to the design of information systems should start from a knowledge as to how existing systems function, not in principle but in reality. The need to understand systems at a level well beyond that available from a simple consideration of their formal structures and procedures is now well understood by many of those involved in the implementation of computer based management information systems, mainly as a result of the expensive failure of many early attempts. As Methlie (1978) indicates:

> knowledge of organization theory, social behaviour and management must be part of the systems analysts frame of reference. Far too much time is spent in adjusting computer systems to the organizational constraints **after** implementation. This is due to ignorance of organizational variables and the dominance of technological problems in systems design.

In much of the discussion on information systems there also seems to be a strong tendency to divorce information from other aspects of decision-making processes. Even where serious attempts have been made to design effective information systems, they have usually been established on the basis of the question: 'what information is required for rational decision-making?' The more interesting question is 'what is the real nature of the decision-making process and at what points would information have an actual impact on the decision reached?'

For example, the development of famine early warning systems in recent years has provided many examples of apparently excellent systems which indicate when action should be taken. However, in the absence of established mechanisms to trigger such action, or resources to carry them out effectively, possession of such information is of marginal value. It is only when all the necessary components are in place that information plays any important role. As Stewart (1990) indicates in relation to the system in Botswana: 'the close relationship between the collection of information and policy interventions has led to a system of information which is comprehensive, disaggregated, collected regularly with short intervals, and disseminated rapidly to a central point, ready to provide the basis for action.'

In many countries poor information systems are simply one aspect of a general lack of material resources, skilled manpower and infrastructure which severely constrain the possibilities for action of any kind. (The head of a district health bureau in one country was recently quoted to the author as complaining that the only real decision he had to make each month was whether he could risk signing the salary cheques.) Under such conditions, it is essential that any decision to collect information, which necessarily involves resource costs, is examined in terms of the reality of the context within which that information is to be produced and used. The primary task is often not to design an information system but to understand the nature of the decision-making and management system.

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