

Characteristics of an Effective Statistical System

by
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0. Introduction

It is a signal honour to be able to deliver the Morris Hansen lecture of 1995. Throughout his life Morris was devoted to the ideal of illuminating public policy issues through statistical measurement. His earliest professional work was motivated by a desire to provide a good measure of the extent of unemployment in the United States in the late 1930s. And his tenure at the Bureau of the Census as a senior manager (I would say the defining manager of his era) was marked by a never ceasing quest to improve the nation's statistical system. It is with humility and tremendous respect that I dedicate to his memory this exploration of the essential features of effective statistical systems.

I was a personal beneficiary of the Morris Hansen "finishing school". In my early twenties I had the great good fortune of being invited to become a member of the Bureau's Methodology Advisory Committee -- a fabulous group chaired by Bill Cochran and including such luminaries as H.O. Hartley, Bill Madow, Fred Stephan, Nathan Keyfitz. But with all that external talent, the real intellectual motors were Morris Hansen and Bill Hurwitz, assisted by others from within the Bureau such as Joe Daly, Joe Waksberg, Max Bershad, Margaret Gurney, Ben Tepping, Barbara Bailar and many others. What I learned from participation in their deliberations, and particularly from Morris, has shaped my entire subsequent professional outlook. No other professional friend or associate had Morris' uncanny ability, when faced with a problem, to zero in instinctively on the underlying issues. As a distant echo of his approach, I will try not to be descriptive regarding good or bad features of statistical systems, but rather to identify their defining characteristics.

Developed countries are going through a period of turbulence and restructuring. The post-war period of optimism, the sense of knowing (or being close to having) all the answers, is now followed by a period of self-examination. The main social, economic, and environmental concerns are seen as exceedingly complex, multi-faceted, and having an enormous impact on our future. Those concerns are going to be tackled whether or not the relevant statistical information and analysis are available. Given the power of rational policy development, the availability of a strong and healthy statistical system can have a determining impact on the outcome of this process of re-examination and restructuring. In fact, one might assert that, given the magnitude of our problems, the leverage of the right kind of statistical information system has seldom been as great. But such an information system is characterized by its ability to illuminate issues, not just to monitor them; by its ability to evolve in response to needs; indeed, by its great ability to be aware of priority information needs and by its capability to set priorities. Such a system must have a high level of public credibility, since few in society can verify national statistics and therefore most have to rely on

the public reputation of the agency providing the statistics. As part of that credibility, the system must be free from undue political interference.

Motivated by the importance of national statistical systems, the paper will try to address the question: what are the conditions for the evolution and maintenance of a statistical system such as that described above. I mean systemic conditions, i.e. the circumstances and arrangements that represent the capacity of the system not only to function well, but to evolve in a healthy manner. I will not be looking, therefore, at indicators of current performance -- such as the reliability or timeliness of output. The major determinants of sustainable evolution shall be discussed under the following ten headings: the character of broad institutional and legal arrangements; policies to protect core values; arrangements to safeguard non-political objectivity; approaches to assess and meet national priorities; approaches to assess and meet provincial (state) priorities; approaches to assess and meet other users' priorities; mechanisms of coordination; systems and mechanisms used to balance overall priorities; dissemination approaches tailored to meet the different needs of client groups; and the character and success of efforts to generate a supportive environment. Each of these determinants will be discussed in the Canadian context -- the one I know best.

1. Institutional and legal frameworks

The first element of such a framework is, of course, the legal one: who are designated as the main players within the statistical system, what are their mandates, what legal enforcement powers do they have and, most importantly, how strongly and unequivocally protected is the confidentiality of individually identifiable information.

In Canada there is a Statistics Act which lays down several main points. It establishes a mandate for the statistical office -- Statistics Canada -- which, in terms of subject coverage, is virtually unlimited. It also identifies all information requests by the Agency as compulsory unless they have specifically been designated as voluntary. This applies not only to individuals and business, but also to representatives of all levels of government and other organizations. The Act provides blanket access for Statistics Canada to all records held by governments, and specifically identifies all taxation and customs records, as well as records of courts. These are very strong legal provisions and indicate the high importance that Parliament attaches to good statistical information. This strong power to collect and access information is counterbalanced by an ironclad guarantee of confidentiality: all employees of the agency are personally liable for the protection of statistical confidentiality, and not even courts can have access to individually identifiable statistical information without the informed consent of respondents. Over the years there were a few attempts to have other acts "supersede" the confidentiality protection of ours. These were invariably and successfully resisted. The attempts and their defeat actually contributed to a heightened awareness of these provisions. The Act is unequivocal in its requirement to publish the information collected. This has always been interpreted as ruling out the collection of information for specific clients on a privileged basis.

But the Statistics Act does not establish a central statistical agency as such. Rather, it authorizes and requires that Statistics Canada coordinate the national statistical system. As part of such a coordination effort, it permits the agency to enter into two different kinds of joint collection and data sharing agreements. One kind of agreement is with any government department provided that respondents are notified

and that they register no objection. The other is with the statistical agency of a province which has legislative confidentiality protection comparable to that of Statistics Canada itself.

The Act has a fundamental importance and it strikes the right balance. The provisions for compulsory collection are particularly important in the case of business surveys. The strength of the confidentiality protection has not only provided a safeguard for respondents over the years, but it resulted in a unique competitive edge for Statistics Canada: no other institution can match it. Similarly the ability (but not the requirement!) to share information, unless respondents object, has been a powerful tool to help avoid both duplication and fragmentation.

Legal framework

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Chief Statistician

The position of Chief Statistician is an equally important component of the overall framework. The Chief Statistician's role and authority, background, method of appointment and removal, standing in the government hierarchy, political independence, and public profile are key to the functioning of the system, as there can seldom be a system without someone being in charge of its management or at least of its coordination. Whatever title carried, this is the person who shall be referred to as the Chief Statistician.

A major role of the Chief Statistician is to coordinate the statistical system -- for which tools are needed. Some of the tools are formal, in that they derive from legislated authorities. In Canada the Chief Statistician has modest powers in respect of statistical activities outside Statistics Canada: they involve the authority to establish classification schemes, the establishment of arrangements for joint collections, and the authority to consult with all other agencies involved in statistical activities. But the Statistics Act gives the Chief Statistician enormously strong levers in respect of the operations of Statistics Canada and these, among other factors, represent advantages that, over time, led to Canada's highly centralized system at the centre of which is Statistics Canada. He is personally responsible for protecting the confidentiality of individual respondent records: while in all other respects the Chief Statistician operates formally under a designated Minister, the Minister cannot overrule him with respect to confidentiality issues. By established practice, the Chief Statistician also has full authority for setting priorities for Statistics Canada's programs within a single overall budget. Needless to say, this is a very strong lever which contributes to a number of objectives. For example, it permits him to guide the evolution of the statistical system along a set of medium term priorities; it provides him with flexibility to mobilize resources for priority objectives; it permits the elimination of duplication across the system and hence leads to substantial efficiencies; it gives him a substantial negotiating brief with other departments whether they are clients or suppliers of information; it permits the implementation of system-wide management initiatives, such as the application of strong leadership in the area of human resource development; and it represents a very important bulwark against politicization.

The authority of the Chief Statistician derives from several factors besides the formal legal mandate. A major source is the level of the position within the government hierarchy. In Canada the position has the rank of deputy minister which, in United States terms, roughly corresponds to Undersecretary. However, in Canada by tradition deputy ministers are non-political appointees. Even within this non-political cadre, the Chief Statistician stands apart. While deputy ministers can and are regularly moved around among departments, the Chief Statistician is not: the position is regarded as one that requires special personal and professional competencies. As a result of his rank the Chief Statistician participates in regular (weekly) meetings of deputy ministers which provide him with an on-going appreciation of the evolving plans and priorities of government. Membership in the club of senior officials gives the Chief Statistician both personal and official access to the highest levels of decision making which is invaluable in acquiring a full appreciation of evolving major issues and which in turn improves Statistics Canada's ability to maintain the

relevance of its product line. It also provides opportunities to demonstrate the relevance of statistical information directly at the highest level of public service decision making.

An obvious factor related to the rank of deputy minister is that there must also be a minister. The relationship between the Chief Statistician and the minister responsible for Statistics Canada is an important one -- potentially very important. By law, Statistics Canada operates under the direction of the minister responsible and, with the exception of confidentiality protection, the formal authority of the Chief Statistician derives from the fact that he is the minister's deputy. In practice, the minister's mandate derives from instructions received from the Prime Minister on the minister's appointment. During the last ten years the long-standing arms' length relationship between the minister responsible and the Chief Statistician has become codified: it is now an explicit instruction of the Prime Minister. But this does not trivialize the Minister's role. He represents the agency in Parliament and within Cabinet. He has to initiate action in case of mismanagement or if the agency's activities violated public sensitivities in a serious manner. It is therefore important that the minister be a senior member of Cabinet, have other responsibilities in addition to statistics, and that his main portfolio be a substantive one so that he can be expected to have an analytic interest. In Canada the Minister of Industry is responsible for Statistics Canada; his duties overlap those of the Secretary of Commerce in the United States. However Statistics Canada is not part of the Department of Industry, it only shares the same minister.

Besides legal and hierarchical considerations, the authority of the Chief Statistician derives from his or her personal standing and public image. These are enhanced by speaking engagements designed to shed light on major public issues through statistical analysis and through proactive media relations. The Chief Statistician's personal standing is a matter of significance for the statistical system: he must be ready to place his job on the line as an ultimate protection against the politicization of the statistical system. But the deterrent effect of this implicit threat clearly depends on the level of his public profile.

A final consideration related to the Chief Statistician concerns the method of his appointment and removal. Here, one must balance conflicting considerations. Ideally, the method of appointment should be non-political and removal should not be easy. In Canada, there are certain positions whose incumbents are appointed by Parliament directly (e.g. the Auditor General and the Privacy Commissioner), usually for a fixed term. By contrast, deputy ministers are appointed by the Prime Minister, although typically from within the ranks of the public service. They can also be removed or, more likely, rotated into another position at his prerogative. The question has arisen on a number of occasions whether it would be preferable for the Chief Statistician to be a parliamentary appointee. The trade-off is between belonging to the community of deputy ministers, and having the extra safeguard implied by a parliamentary appointment. The former is a vital ingredient of anticipatory planning based on involvement, as well as a source of personal access to the highest levels of government; the latter is an extra safeguard against political pressure. The Canadian view is that the other elements of the position and its public standing provide ample powers to resist political pressure should it be necessary to do so. The Chief Statistician's removal or resignation would be a major public and media event (note, once again, the importance of a high public profile as part of the defence against the politicization of the statistical system). But there is no readily available mechanism to compensate for the loss of regular and direct involvement which would unavoidably be implied by a parliamentary appointment process. Accordingly, the Chief

Statistician's position remains a Prime Ministerial rather than a Parliamentary appointment.

National Statistics Council

A final element of the basic Canadian framework is the National Statistics Council. Many countries have some version of such a body. Their role, method of appointment, and accountability vary. They share the common purpose of providing high level policy guidance to the statistical system and of serving as yet another protection against politicization.

The Canadian National Statistics Council is oriented to both of these roles. Its members include eminent people from business, universities, research institutions, provincial government, labour unions, the media -- but not the federal government. While their explicit mandate is to advise the Chief Statistician about broad policies and priorities, members of the Council are appointed by the Minister responsible for Statistics Canada and have therefore access to him should they think that the agency is threatened -- either because of political intervention or lack of adequate funding. The Council's very significant influence and standing derives from the eminence of its members.

2. Protection of core values

The core values of effective statistical systems are legitimacy and credibility. By legitimacy I mean a social judgment that the activity of the statistical system is in the interest of the country, that it indeed serves an essential purpose. While legitimacy is the basis for public funds being expended on the activity, its role goes much deeper: it provides the basic coordinates for our activity. It is considerations of legitimacy that inform and guide the variety of policy trade-offs we have to make: among subjects to which we give priority attention, between the competing public goods of protecting privacy and informing society, in observing self-imposed limits to our analytic activities so as to avoid political and even policy advocacy, in setting limits in our dissemination activity between public and private goods, and so on.

Credibility plays a basic role in determining the value to users of the special commodity called statistical information. Indeed, few users can validate directly the data released by statistical offices. They must rely on the reputation of the provider of the information. Since information that is not believed is useless, it follows that the intrinsic value and useability of information depends directly on the credibility of the statistical system. That credibility could be challenged at any time on two primary grounds: because the statistics are based on inappropriate methodology, or because the office is suspected of political biases. Because statistical agencies must make daily choices involving program priorities, questionnaire design, release texts, and these choices are unavoidably value laden. It is all the more crucial that they should strive to make such choices demonstrably free of political biases.

The issue of core values is a pervasive one and its various dimensions will be the basis of practically all subsequent sections: political objectivity will be discussed in section 3, various aspects of priority setting in sections 4 to 6 and section 8, problems related to dissemination in section 9. The present section will focus on maintaining confidentiality, protecting privacy, and use of sound methodology. Each of these is a very broad topic on which the present paper can only touch briefly, highlighting some specific policies and mechanisms used in Canada

Confidentiality

The most important specific tool to deal with this matter is, of course, the Statistics Act which spells out the agency's obligations and the personal liability of all employees. This is reinforced through training, starting with an induction course; physical perimeter security, which reinforces the message daily; a specially secure computing environment which makes it physically impossible to dial in, and therefore prevents access by potential hackers; and an extremely strong tradition culture which is passed on from generation to generation.

The existence of uniform confidentiality protection covering practically the entire statistical system provides important opportunities. It permits the shared use of infrastructure, such as a common register of business. This leads to better integrated data. And, of course, it avoids duplication and hence represents a most important source of efficiency. Uniform confidentiality protection also makes the linkage of records between data systems more and publicly defensible. This, in turn, opens up the possibility of substantially expanded use of data holdings.

Privacy protection

All statistical surveys represent a degree of privacy invasion, justified on the basis of the need for an alternative public good, namely information. The relevant issues are the methods used to ensure that questionnaire content is minimally intrusive, that respondents are informed of the purposes to be served by the data collection, and that the total reporting burden imposed on the population is regularly measured, controlled, and equitably distributed.

A special issue relates to the very sensitive topic of record linkage, the formal review and approval methods used, and their likely success in maintaining a sensitive balance between the competing public goods of privacy protection and the value of the information that can be derived through linkage. Given the wide scope for record linkage within a centralized statistical system, particularly one with Statistics Canada's broad access to data holdings of other departments, the agency developed a multi-level review procedure, as well as extensive on-going consultation mechanisms with stakeholder groups and the Privacy Commissioner.

Use of sound survey methodology

The ideal involves maintaining a balance that represents, in some defined sense, an optimal balance between cost, quality and timeliness. The variety of technical tools and professional judgements used in different applications in order to approximate this balance goes clearly beyond the limits of the present paper. Only a few management and organizational approaches are mentioned which have resulted in the maintenance of a strong methodology function with a determining influence on survey design.

We find it useful to manage our survey methodology staff in a matrix mode. They are part of a centralized functional organization, but most of their work is carried out within interdisciplinary teams whose project manager typically comes from the client area. In this way they receive their personal stimulation and development within a specialized professional environment, but they are explicitly accountable for their

output to their project managers. Project team members are expected to respect each other's professional competencies, accept the direction of the project manager, but yet preserve the right in exceptional circumstances of professional disagreement to trigger a higher level review. No project of any significance is launched without an approval of its objectives, broad methodology, and total cost. The review is carried out by the senior management team of the agency which includes several people with methodology backgrounds. The estimated project cost must reflect the inputs needed from all functional areas, certainly including methodology.

Another technique used to embed quality considerations fully into the practice of the agency involves the use of a management committee on statistical standards. It is jointly chaired by the Assistant Chief Statistician responsible for the methodology function and one of the main subject matter Assistant Chief Statisticians. Members involve selected senior staff from the methodology, subject matter, analytical, geography, and standards functions. Issues discussed include policies (e.g. on the dissemination of information about the methodology and data limitations of surveys), significant new initiatives with broad implications, changes to classifications.

It is important to maintain a reasonable level of funding for methodology research, indeed to try to ensure that methodology research is integrated with methodology practice. While the bulk of the methodology function is assigned (and annually reassigned) to specific approved projects, there is also a so-called block fund that is provided for methodology research. The latter, as its name implies, is approved as a block and is not justified project by project. It is managed by methodology staff and is available for the conduct of research projects. We try to ensure the relevance of such research and its direct feedback to practice by not separating organizationally the research methodology research group from the practitioners: most research is carried out either part time, or as a temporary assignment. Methodologists are encouraged to submit research to refereed journals and to present results at professional conferences. We also find it very useful to have an external expert advisory committee which discusses all major design issues. This is a very prestigious committee which, until his death, was chaired by Morris Hansen.

Other on-going and recent measures include: formal quality assurance processes for all major series; a multi-year mobilization of resources to improve significantly our economic surveys through the use of a single well maintained business register; and an extensive analytic program which is strongly encouraged to provide feedback regarding problems of data quality.

3. Non-political objectivity

Information is a very special commodity: few users can validate directly the data released by statistical offices. They must rely on the reputation of the provider of the information. Since information that is not believed is useless, it follows that the intrinsic value and useability of information depends directly on the credibility of the statistical system. That credibility could be challenged at any time because statistical agencies must make daily choices involving program priorities, questionnaire design, release texts, and these choices are unavoidably value laden. It is all the more crucial that they should strive to make such choices demonstrably free of political biases.

The ability of official statisticians to resist pressure from Ministers or policy departments depends, first and foremost, on the broad institutional and legal framework, on how confident the agency is of its own worth, the standing of the Chief

Statistician within the government hierarchy, and his public profile (how credible is the implied threat of putting his job on the line). Other policies and practices include the following:

- (a) Full allocation authority within an overall budget is an important safeguard against undue political influence. In Canada (except for the content of the quinquennial censuses which require Cabinet approval) the Chief Statistician does have such authority -- but, of course, must be ready to account for his judgements to his Minister, to Parliament, to data users and to the public (via the media).
- (b) Whether or not budget allocation control is provided to the statistical system, the survey content and questionnaire design must remain under its control. This should be the case even for surveys which are client-sponsored and client paid since the results of such surveys should certainly be placed in the public domain and they carry the imprimatur of the statistical agency involved.
- (c) The existence of a transparent planning process, including a strategic plan which explicitly identifies longer term priorities for public scrutiny. The Canadian planning activity is described in section 8.
- (d) The legal requirement to publish is a significant safeguards against possible pressures to keep some findings away from the public eye. A policy of pre-announced release dates provides additional protection. In Canada we have both. Some years ago the practice of pre-announcing release dates was extended from a handful of "major" series to the majority of them.
- (e) An arm's length relationship between the Chief Statistician and his/her political masters is, of course, critical. The particular relationship between the Chief Statistician of Canada and his Minister has been described in section 1.
- (f) All elected representatives should be served without preference or privilege.
- (g) The public profile and standing of the statistical system is an important safeguard against its politicization. A significant contributor to such standing is the regular provision of analytic output which reinforces a public image of relevance and helps to make the statistical office stand apart from "the government". In Canada we have placed substantial emphasis on increasing the quality and range of analytic output. We also have a policy that all data releases must be accompanied by a media friendly analytic summary which outlines the significance of what has just been released in the context of broad economic and social developments.
- (h) Analytic outputs are very important tools to highlight the relevance of statistical information. However, without special care they can put at risk the image of political neutrality. It is therefore important to have formal and well managed peer review and institutional reviews designed to ensure objectivity. Objectivity involves exploring all sides of an issue, avoiding policy advocacy, stating assumptions, and

highlighting major findings whether or not these reflect well on the current or the preceding government.

For a fuller discussion see [1].

4. Approaches to assess federal priorities

Within an overall budget, priorities for the statistical system should be set by the Chief Statistician. But it is essential that his judgement be based on a very broad understanding of the needs for statistical information, as well as all special considerations that should affect priorities. The greater the authority of the Chief Statistician, the more important it is to have a variety of mechanisms through which the different needs of different client groups can be determined. Sections 4 to 6 deal with such mechanisms as they relate, respectively, to federal, provincial (state), and other users' priorities.

National (federal) needs should receive particularly high priority, since it is in the public interest that the major issues facing the country be decided on the basis of relevant information, available for all to analyse and discuss. Nevertheless, not all those needs can be satisfied, so priority decisions are unavoidable. In our experience the following approaches have proven to be productive.

- (a) Full access to Cabinet documents. In the Canadian system of government, all significant issues are decided collectively by the Cabinet. Decisions are taken on the basis of discussion papers setting out options, and formal submissions seeking approval for one of them. Access to these documents provides a singularly useful mechanism for the monitoring of evolving national policies. The rank of the Chief Statistician within the hierarchy of public servants usually has a lot to do with such access.
- (b) In the Canadian system every minister has a deputy minister -- his or her chief advisor who is also the administrative head of the department. Unlike the minister, the deputy minister (Permanent Secretary in British terminology) is not a politician but a public servant. Direct access by the Chief Statistician to deputy ministers is the most useful method to become aware and understand the issues and ideas which are being considered by senior officials even before they reach Cabinet. Given the long lead times involved in developing new statistical information, the earlier this takes place the more likely the capacity to respond.
- (c) Effective information exchange works in both directions: the Chief Statistician can brief deputy ministers individually and collectively about social and economic developments based on the analysis of statistical information. Such personal presentations, as well as personal briefing letters sent to interested deputy ministers whenever a special release of particular significance occurs, provide excellent occasions to highlight the analytic usefulness of statistical information. These occasions are also ideal to draw attention to the gaps in information and how these gaps handicap the formation of public policy.

- (d) One of the most beneficial approaches to assess federal priorities is to maintain a close and formal bilateral relationship with key departments. In our experience multilateral committees are not nearly as productive. It is only within a bilateral context that both parties can ensure that the right people participate, and that the interaction is perceived as important and productive to both sides. In multilateral fora only a fraction of the issues is of direct interest to individual participants, and pressure of time often prevents their full exploration.
- (e) It is a particularly challenging task to maintain productive relationships with departments having operating responsibility for administrative records of major statistical interest. It is sometimes possible to provide reciprocal services (such as the provision of statistical summaries that are useful for policy development and management of the department). More often the influence of the statistical agency over key administrative record systems depends on its overall standing, especially that of the Chief Statistician, and on the level of understanding, among fellow Deputy Ministers of the importance of good statistical information.
- (f) Generally, the interactions described above are far more productive if supported by a strong analytic capacity. Good analysts are needed to understand client requirements and to convey statistical findings in a manner which users can relate to their policy concerns.

There is a general remark that applies to bilateral contacts in decentralized statistical systems: statistical offices have a potential advantage in dealing with those departments in which they are located. However, there is a risk: while most of the productive exchanges are bilateral, most of the important issues to be addressed are horizontal (multilateral) in character. Therefore even where the issue is *prima facie* agricultural, environmental, or health related, its full exploration must take account of other relevant substantive and departmental perspectives. Bilateral departmental consultations, important as they are, must never become the sole determinants of statistical priorities.

5. Approaches to assess provincial (state) priorities

An important determinant of the success of statistical systems in federal countries is the extent to which they succeed in meeting the priorities of the federated governments, i.e. the extent to which they manage to become a national as opposed to only a federal statistical system.

Statistics Canada distinguishes between those areas where the provinces have major constitutional responsibility, and the others. In each of the areas of major provincial jurisdiction (health, education, and justice) the Chief Statistician has a forum for discussing statistical priorities with the appropriate provincial deputy ministers.

These fora are also used for another purpose. In the areas of health, education and justice large portions of the statistical system depend on provincial administrative records. Harmonization of provincial administrative systems is therefore a prerequisite for the compilation of consistent national statistics in these areas. Meetings of the responsible provincial deputy ministers provide occasions for applying peer group pressure as and when required. In each of these domains an

elaborate working level mechanism exists to develop practical program options and to give effect to the decisions reached by deputy ministers.

Understanding provincial priorities in all other areas takes a different form. Every provincial government appoints a senior official to interact with Statistics Canada on behalf of the government. This official, the "provincial focal point", attempts to provide an integrated picture of provincial priorities. The Chief Statistician and the focal points constitute a federal-provincial council which oversees about a dozen federal-provincial committees dealing with particular subject matter areas or cross-cutting issues.

6. Approaches to assess other users' priorities

There is a school of thought that government statistical offices should only aim to meet the needs of government -- indeed, only of the first level of government. By contrast, the policy of Statistics Canada is to illuminate significant public policy issues -- wherever the demand for statistical information comes from. While the main current policy issues tend to be determined by the agenda of governments (plural!), this is not always the case. Furthermore, even when an issue arises as a result of the agenda of governments, the range of information needed to illuminate it cannot and should not be determined by governments alone: all the main stakeholders deserve to be listened to. This is desirable in order to guard against partial information that, by virtue of the choices made, might bias the resulting analytic conclusions.

For these reasons this paper argues that non-government users need separate attention and that there are a number of specific and productive mechanisms which can be used to keep abreast of their needs. The extent to which these are actually used is an intrinsic characteristic of a statistical system.

The range of non-government client groups is, of course, varied, so a large variety of mechanisms have to be used to gain an understanding of their needs. Statistics Canada uses the following approaches.

Professional advisory committees. About a dozen advisory committees operate in such diverse fields as demography, social conditions, health, agriculture, service industries, price measurements, science and technology statistics. Their membership is selected on the basis of individual expertise without regard to issues of "representation". Their role is to challenge the status quo in terms of both content and broad methodology. Typically they meet twice a year for two days, and members serve without remuneration. The head of the substantive program most directly concerned serves as the secretary, but meetings are widely attended by staff. Most of the committees' contribution is channelled through the informal interactions provided by this arrangement, but written recommendations to the Chief Statistician are encouraged. There is also a link with the National Statistics Council since the latter, by design, includes at least one member from each of the advisory committees.

Client oriented program evaluations. It is desirable and feasible to carry out a systematic and thorough evaluation of the extent to which existing statistical programs meet the needs of key clients. Statistics Canada carried out such a systematic evaluation over a five year period. For this purpose its total program was divided into some forty areas. These were chosen so that each evaluation topic involved an area narrow enough for clients to be expected to be knowledgeable about it, yet broad enough to focus on concerns ranging beyond a particular survey. Each evaluation was carried out, under contract, by an external expert, typically an

academic or a particularly knowledgeable consultant. The experts were required to provide their own signed evaluations, based on the views of the major clients of the program that was evaluated. Every contractor met twice with the senior management of Statistics Canada: once to ensure that the evaluation issues were clear and sharp; and once to present findings. The director of the program being evaluated was required to present a plan which addressed those recommendations which were accepted by management. If the corrective measures involved significant expenditures, their approval for implementation was reserved for the agency's annual planning exercise (see section 8).

Interactions with professional and business associations. Agency staff participate actively in numerous professional associations. They also have a program of liaison with major business associations. An explicit goal of these contacts is to seek out the views of actual and potential clients about their statistical information needs. Market feedback. Section 9 and [2] contain an extensive discussion of the role of marketing. Market signals are particularly useful in guiding the packaging and delivery of existing statistical information. Nevertheless, market orientation involves a commitment to understanding and satisfying client needs and can therefore also provide useful feedback to the determination of priorities for new information development.

Analytic program. A strong internal analytic program contributes to an improved understanding of the needs of external analysts -- in or out of government. In turn, such an understanding is a critical prerequisite of support for new initiatives. Furthermore, good analysts have a strong personal motivation to explore issues, and can therefore champion the development of new products within the agency. They do so by drawing attention to the role that potential new information could have in illuminating an issue of public policy. In our experience this is a vital contribution to maintaining the relevance of statistical information.

7. Mechanisms for the coordination of the statistical system

The purpose of coordination is to permit the components of the statistical system to act as a coherent system. Such coherence includes the ability to mobilize budgetary resources to meet broad priorities, to deploy people according to overall needs, to exploit possible synergies (e.g. creating new information through record linkage), to take advantage of possible efficiencies (e.g. using common tools, registers, field staffs), to ensure that the outputs of the system are coherent where they need to be, and to defend the system against political interference.

Coordination is intrinsically important in all countries, but is clearly more difficult to achieve in decentralized statistical systems. Most countries have a Chief Statistician who is formally responsible for such coordination. In centralized systems he can accomplish most of these functions on the basis of his line authority. In decentralized systems other mechanisms are needed. Possibilities include:

- budgetary control (or significant influence over constituent budgets);
- control over classification systems;
- control over reporting burden (approval of statistical forms, i.e. the "clearance" function as it is called in the United States);
- inter-agency personnel management (elements of this exist in Britain).

In the United States the office of the Chief Statistician, being located in the Office of Management and Budget, has a degree of influence over the administration's

statistical budget plans and this undoubtedly provides some leverage to influence overall priorities. However, the office is hamstrung by virtually no direct links to ultimate clients, and hence is likely to be less prepared than operating statistical agencies in understanding these needs and in responding to them. Its clear control over classification systems is an important authority, but it is offset by limited control over the implementation and use of these systems. It has a clear control over forms clearance and this, too, provides useful authority. Unlike Great Britain, where the Chief Statistician is consulted about and sometimes initiates senior statistical appointments, there is no such formal requirement in the United States. There are difficulties in exploiting synergies, partly because of the lack of a common legal framework for data sharing and confidentiality protection, and partly because there are few incentives for inter-agency cooperation.

The Canadian Statistics Act formally assigns a variety of coordination tasks, but it is largely silent about mechanisms. Given our highly centralized statistical system, however, the relevant mechanisms are almost all internal. Some years ago the agency had a formal right of first refusal on all federally funded surveys, as well as a requirement to review their proposed methodology, but this formal "power" was voluntarily given up. We feel that we should and are able to compete on our merit. Actually, practically all large scale government sponsored surveys are carried out by Statistics Canada.

Some useful tools are provided by the Statistics Act to assist in the minimization of reporting burden. I recognize the possibility of provincial (state) statistical agencies wishing to have access to identified or identifiable micro data. It permits the sharing of such information with those among them who operate under an act comparable to the national Statistics Act in terms of compulsory collection and confidentiality protection. But even in such cases, the sharing is at the discretion of the Chief Statistician who has to be satisfied that the physical and organizational requirements for credible confidentiality protection are met. The Act also permits the Chief Statistician to share identifiable information with non-statistical government agencies provided that respondents are advised about the intended sharing, that they are provided with an opportunity to object, and that identifiable information is only shared in respect of those respondents who did not object to it. This latter provision is a useful tool to prevent the proliferation of essentially similar collections: some for statistical, others for administrative or enforcement purposes.

An important dimension of coordination relates to administrative records used for statistical purposes. Few if any countries have effective formal tools to ensure that changes to administrative records will not do irreparable harm to statistical information derived from them. There are some less formal safeguards, however. The most important of these is the standing of the statistical office and its head: the higher these are, the more likely it is that information about possible changes will be known at a time when intervention might still be productive. Similarly, the higher the standing, the more likely that the intervention will at least be seriously considered. And finally, the higher the profile, the more likely it is that important allies can be mobilized, should it be necessary.

8. Balancing priorities

In the final analysis, everything is the result of priority decisions -- whether or not these are explicit. They determine what part of the current output should be continued, at what level, with what frequency. They also determine what new initiatives can and should be pursued. Just as important, in the long run the

cumulative impact of priority decisions determines the character of the entire statistical system: both its realized outputs and its intrinsic capacity. For this reason, this paper explores in some detail the priority setting process. Four issues are discussed: does the statistical system lend itself to establishing overall priorities; what prerequisites are essential for priority decisions to be implementable; what are the longer term priorities which must be given weight on a permanent basis; and finally what can be said about planning as a process?

Does the statistical system lend itself to establishing overall priorities?

A centralized statistical system has a major advantage in priority setting. While it may be operationally easier to plan in a decentralized system where each component covers only a part of the whole, there is little likelihood that the sum total of several constrained optimizations is equivalent to an overall optimum. One might envisage a decentralized system where overall planning and priority setting would be possible. Indeed, the Bonnen Report [3] tried to outline such a design -- a decentralized system with a strong capacity for effective overall guidance. At the centre was an influential coordinating office, headed by a Chief Statistician with substantive system-wide functions.

The Bonnen Report borrowed some aspects of the British statistical system of the day. The British Central Statistical Office at that time was in the Prime Minister's office, had overall responsibility for standards and classification, a formal role in the training of the professional corps of statisticians, and in the appointment of the senior statisticians in the different agencies. Most importantly, it had substantive responsibility for compiling the system of national accounts which it used to exercise influence over the full range of economic statistics. The system worked effectively during the period when resources were more readily available and while the implementation of the system of national accounts was a sufficiently high priority to effectively coordinate the design and production of economic statistics. During the 1980s the British system sustained a number of criticisms regarding the accuracy of the system of national accounts and balance of payments, revisions to the concepts used in its employment statistics, the appropriateness of some components of its consumer price index, the level of independence of its agencies from political interference, etc. Since then there has been a substantial centralization of the British system. With the exception of labour statistics, the larger components are in the process of being brought together in one organization.

Today, there are few, if any, decentralized systems with a strong capacity for even articulating, let alone implementing, system-wide priorities. Indeed the relevant literature identifies as the main advantage of a decentralized system its responsiveness to the policy priorities of those departments in which the component parts of the system are located. Accordingly, building an effective system-wide planning capacity remains one of the main challenges of decentralized statistical systems.

Essential long term priorities, particularly in the face of budget reductions

Longer term priorities have a paradoxical character. Statistical offices exist in order to provide current statistical information. But their long run survival and prospering depends, first and foremost, on their ability to evolve and adapt. Therefore, particularly at a time of budget cuts, special attention must be paid to those structural priorities which contribute to survival -- even at the price of significant reductions in current output. There are four categories for such special attention: continuing to support analysis, innovation and experimentation, maintaining professional

infrastructure, keeping the operational infrastructure in good repair, and ensuring a strong capacity for client sponsored surveys.

Maintaining a spirit of innovation is essential. It is also very difficult when the resources required to do so compete with needs of current statistical series, each having a vocal and supportive client group. Yet one must safeguard the relatively small margin of resources needed for conceptual and developmental work, experimenting with new methodology, trying out new analytic and dissemination approaches, and implementing pilot surveys to demonstrate the workability and relative advantages of collecting new types of information. A failure to do so guarantees longer term decline.

Maintaining a strong professional capacity is a prerequisite for enabling the statistical system to recover from adversity. Indeed, without such a capacity it is difficult to prevent a downward spiral in credibility and resources. At an elementary level what is involved is keeping the professional staff who can develop future programs as and when needed and funding is secured. But professional staff also contribute to the creation of informed demand. They do so through analytic work which highlights the relevance of statistical information (and, whenever appropriate, identifies important missing evidence). Strong professional capacity is needed for the development or refinement of conceptual frameworks. Such a capacity is essential to build analytically useful information systems to meet today's major demands in such domains as health, education, the functioning of social safety nets, globalization, and the information revolution [4].

Operational capacity means ensuring that the field organization, business registers, classification staff, methodology capacity, geography, informatics -- are all in a good state of repair. Maintaining a healthy capacity does not mean slack. Most of the elements of this capacity are made up of a variable component and a "fixed" component. The priority decisions relate to the "fixed" components, so that there is neither an unplanned deterioration in the quality of on-going work, nor a significant reduction in the organization's ability to accommodate additional work as and when the demand materializes.

There are compelling reasons to maintain a strong capacity for client sponsored and paid surveys, even though, for a variety of reasons which go well beyond the scope of the present paper, regular statistical information about public policy issues should be part of the budgets of statistical agencies. The following are some of these benefits:

- special surveys result in new information being placed into the public domain, often in new areas. Furthermore, if the contracting departments are willing to spend money on them from their own budgets, the resulting information is likely to be relevant to serious policy concerns and as such it serves the public interest;
- typical special surveys relate to one of the following types of client need: exploration; periodic but not on-going need; and/or fields for which the statistical system has not been able to set aside regular funding. They therefore represent safety valves through which demand, which could not otherwise be satisfied, is met;
- such surveys, if they are well conducted and are responsive to client needs, increase client satisfaction with the statistical system and with its responsiveness;

- special client sponsored surveys in new areas regularly involve innovation and therefore contribute to an overall atmosphere of openness to new ideas; and
- to the extent that their charges involve full costs, including overhead, they contribute to the maintenance of the operational capacity described above.

Over the years some of the most innovative surveys of Statistics Canada were pioneered through its special surveys activity, such as a major longitudinal survey of children assessing the factors that influence their development, a longitudinal survey of family and income dynamics, randomized social experiments, an in-depth survey of violence against women.

- Some prerequisites of effective planning

Having a Chief Statistician with the required power or influence to take system-wide priority decisions is one of several prerequisites for an effective planning system. Another obvious one is the existence of a variety of channels through which the statistical system keeps itself informed about current and emerging user priorities. As described in previous sections, this involves a multitude of arrangements which must be nurtured consciously. Good information on project costs is another prerequisite. Without such information, it is clearly impossible to estimate the savings brought about by the elimination of current activities. It is also unlikely that the cost of proposed new activities can be estimated reasonably without good information on current project costs based on a culture which encourages and requires keeping track of costs. This is stating the obvious, but it is surprising how few statistical offices have the internal information system needed for the purpose. Such a system must be comprehensive, i.e. cover all costs: field operations, computing, mailing, telephone charges, etc. It must be detailed, i.e. it must identify all projects about which decisions might have to be made. For example, it is not sufficient to know the total cost of monthly industry surveys since one is very unlikely to make a global decision about them. Instead, one needs to know the cost of each of them, as well as a sufficient decomposition of the total to permit the simulation of alternative cost cutting measures, such as the reduction of sample sizes, making some of the monthly industry surveys quarterly, others annual, etc. Such an information system has existed in Statistics Canada for well over twenty years (although it is still far from perfect!). It is based on a comprehensive list of projects (involving a necessary compromise between the desire for ultimate detail and the need for an implementable reporting system), and a series of specific cost components. Every cost must be attributed to an identified project, from employees' time to field costs, computing, mail and telephone charges, methodological work, etc. Indeed, we rely increasingly not only on cost accounting, but on real financial transactions to pay from project budgets the cost of all supporting activities (field collection costs, mailing costs, computing, etc.).

Mechanisms to redeploy personnel as required by new priorities and planning decisions constitute another prerequisite. A planning system is an empty shell if management cannot carry out its conclusions. A variety of mechanisms are needed to encourage and facilitate the flexible and regular redeployment of staff -- partly to assist them in their own personal development, partly to give

effect to the changing mix of project priorities. Such personnel flexibility is advantageous from another point of view. It is typical for statistical offices to have a large part of their staff spend much of their career in one organizational unit. There is an apparent efficiency in this as the organization reaps the benefits of specialization and minimizes the job training costs. However, it can also lead to narrow perspectives, flagging motivation, a federation of little fiefdoms which may or may not work together harmoniously, and an inward looking orientation. But our clients are increasingly interested in cross cutting information designed to respond to their problems, and not in statistical releases narrowly based on individual surveys. Such demands cannot be satisfied by a traditional statistical office with overly focused, though highly competent staff. The variety of mechanisms used by Statistics Canada to bring about the desirable level of personnel development and flexibility are described elsewhere [5]. Here it will simply be noted that at any point in time about ten per cent of our staff is working in a division other than their home base; probably once again as many people are working on project teams brought together for the duration of a large ad hoc project, often developmental in character. A well developed training and development program is a critical element [6].

The planning system

Ultimately all priority decisions are subjective. They are conditioned by inputs from the variety of "listening devices" described in sections 4 to 6 and they typically represent responses to internally articulated proposals. A planning system is clearly needed that brings together for consideration the relevant external signals (including budget parameters) and the proposed internal responses to them. Whatever its specific characteristics, it should adhere to the following principles.

- Broad guidelines should be articulated at the beginning of the process. Such guidelines include the identification of priority areas for development, areas to be de-emphasized, as well as procedural guidance (e.g. how large an efficiency gain is expected from each area, how large a slice of the program must be identified as having relatively lower priority, what are the rule for requesting investments needed in order to realize the efficiencies, etc.).
- Individual line areas prepare responses to the planning request. Most of these are articulated in terms of projects and their full costs -- whether they involve funding requests for new proposals or identification of lower priorities in each area. There is also room for requests that involve changes to what we call "block funds": monies allocated to a variety of research functions whose specific output cannot be identified in advance.
- The planning proposals received from line areas are subjected to a broadly based structured review. The purpose is to draw out all important considerations, and to build consensus for the eventual decisions. However, the decisions themselves are not large group decisions.
- Comprehensive and explicit planning decisions are communicated to all within the statistical system. Some of these will involve reallocations in line with broad medium term priorities, others will represent an annual probing of the program envelope in an incremental adjustment mode.

- The planning decisions should favour innovations, pilot surveys, demonstration projects which might enhance the likelihood of external funding for important new initiatives, and investments in specific future efficiency gains.

The planning system used in Statistics Canada is described in [7] and [8].

9. Client orientation in dissemination

The ultimate test of the statistical system must be its ability to satisfy the needs of its clients. Sections 4, 5, 6, and 8 dealt with planning to ensure that the basic product line evolves in response to the changing needs of society. In this section the focus is on meeting the particular dissemination requirements of different client groups. The following questions are put forward as tests of the client orientation of the statistical system:

- Can clients avail themselves of a single point of access, whatever their statistical information needs?
- How easy is it to search the data holdings of the statistical system in order to identify the information that might be relevant to particular requests?
- What incentives are there to foster client orientation?
- Is there a single point of access to the statistical system?

Having a single point of access is clearly important for nearly all clients, particularly for the large majority who do not have a detailed knowledge of the internal roles and responsibilities of different components of the statistical system. A single access point maybe thought of as an overall data bank which holds all the non-confidential data of the statistical system and has a good search capability. Whether or not such a concept can be implemented comprehensively, partial versions of it certainly exist: e.g. a single data bank covering all frequently used time series. Another practical version of the single access point is an organizational entity that performs the necessary search on behalf of clients (perhaps for a fee) and pulls the needed information together for them.

It is undoubtedly more difficult to implement such a concept in a decentralized statistical system. Yet a system-wide function could certainly be envisaged to perform this service, located either within the statistical system or in the private sector. But a single access service does not happen automatically in a centralized system either. In Canada we are approaching the issue from several directions. First of all, there is a fail-safe single access point in the form of a widely advertised toll free telephone number. It is designed for all those who have little advance knowledge of the system or its outputs. Next, macroeconomic analysts and others primarily interested in time series can avail themselves of a data bank containing some 500,000 series and distributed by Statistics Canada both directly and through the private sector. There are special arrangements for those clients who wish information provided to them that is tailored to their needs. Indeed, there is a proactive program in place to work with larger clients so as to identify with them the information packages that would be of greatest benefit for them. In the case of private sector clients these proactive arrangements are usually carried out

by our regionally distributed marketing service; in the case of federal and major provincial departments they are typically handled, on behalf of the entire system, by the head of a designated subject matter program.

While a variety of different arrangements are needed to meet the needs of different client groups, all access points should act as overall entries to the entire system.

Ease of searching the data holdings

Well developed statistical systems hold far too much information to be effectively searchable in an ad hoc manner. In recent years the issue of information about data holdings (metadata) has received increasing emphasis. Australia is working systematically towards the implementation of a single comprehensive metadata system and is probably ahead of most other countries in this domain. The cost and long term maintainability of a single centralized system is not yet fully evaluated. Canada is working in a more evolutionary manner pursuing developments along several lines. We have some metadata systems but they lack the complete functionality that is needed. We also collect systematically a variety of machine readable texts which, through key word searches, lead users to relevant information bases. And we are encouraging the development of different implementations of sectoral metadata bases, with a view to testing of them each in concrete settings.

Ease of access involves more than the ability to identify what relevant information is available. It also involves the capability to retrieve needed information and to do so fast. However, statistical offices of developed countries are much better at retrieval than at identifying the data relevant to a particular need. Accordingly, the latter remains the focus for current attention.

Fostering client orientation

Client orientation has always been part of the accepted culture of statistical offices. But, until a few years ago, it was an abstract concept: one "knew" what clients wanted, indeed "one knew better" than the clients. Improving client orientation has been the explicit preoccupation of Statistics Canada management for the last fifteen years and substantial progress was achieved in relation to federal and provincial departments. Attitudes to other clients changed significantly when we were allowed to keep revenues earned from the sale of products and services and could provide incentives designed to motivate our staff to be more client oriented.

Among other measures, we established net revenue targets for different line areas. These targets had as their broad objective to recover the full cost of dissemination and marketing activities. But net revenue can only be increased through increasing prices, reducing cost, or increasing sales. While price increases can give an important initial boost to net revenue, a continuing program of improvement must be based on the other two factors. Simultaneous attention to costs and sales volume quickly leads to a conscious effort to try to understand what products and services clients really need and are willing to pay for.

Specific revenue targets assigned to different line areas can also have a harmful side effect. They tend to incite rivalry for crediting sales and can lead

to unhelpful attempts to undercut each other. We are trying to counteract these tendencies through a variety of measures: a central staff to provide overall guidance to marketing, a regional sales support organization which conducts proactive marketing on behalf of the entire agency, guidelines on the pricing of products and services, various revenue attribution and sharing policies and, last but not least, continuing senior attention.

The successful implementation of net revenue generation must be accompanied by a strong commitment to the public good component of our products and services. This follows directly from the mandate of statistical agencies, but it is also a prerequisite for the maintenance of public and political support. In Canada widely used information summaries are considered as public goods. Accordingly, our publications are available, free of charge, in a network of public libraries; we take special care to provide good analytic summaries to the media (where most people obtain their statistical information); we have a toll-free telephone answering service; we provide heavy discounts to educational institutions; etc. Conversely, private copies of publications, the right to access on-line services, and custom designed packages are private goods for which we charge market prices.

Meeting specific client group priorities

The next few paragraphs summarize the different dissemination requirements of some major client groups and illustrates how Statistics Canada is trying to respond to these needs. Additional detail is available in [9].

Government policy analysts.

Their interest lies in monitoring major social and economic issues, understanding the factors that influence them, and predicting the outcomes of alternative policy interventions. Their statistical needs include timeliness, consistency, and large volumes of data needed for simulation exercises and for assessing the impacts of different policies on a variety of population groups. Anonymous micro data files are also required.

Meeting the needs of policy analysts is of particular importance given the influence they collectively have upon government policies and priorities. As described in section 4, these bilateral arrangements were designed primarily to gain an understanding of their needs for changing statistical product line. They are also exploited, however, as windows on the dissemination needs of policy analysts. Our on-line time series data bank, with its one stop shopping facility for this kind of information, is extensively used by them, as is our library of anonymous micro data files, machine readable census releases, etc. They are also among the largest clients of special custom tabulations.

Government clients are charged for statistical information on exactly the same basis as all others.

General public.

While the detailed statistics we release each day are of substantial interest to a relatively small number of users who depend on them for their work, the Ageneral public@ has little need or motivation to use them. On the one hand,

this realization is underlying our market oriented charging and dissemination approach. On the other hand it also led to a much greater awareness of the very special dissemination needs of this, the largest segment of our clientele. Since we could not assume that the free availability of all the information we produce would automatically lead to its wide utilization, we needed to devise an explicit strategy designed to inform the general public about important social and economic developments as revealed by new statistics.

The main elements of the strategy are the following:

providing a new orientation for statistical releases emphasizing insights about the economy and society rather than the provision of detailed information;

- focusing on the media, the source of statistical information for the vast majority of the population;

making special arrangements with and for small but important subgroups which are heavier users of general statistical information but who cannot afford to pay market prices for them: students; academic researchers; the well educated and broadly interested generalists; special interest groups.

The most important component of our strategy for the public good component of our product line is attention to the media. We had for many years a publication, called The Daily, which summarized new statistical information released on that day. We have completely refocused this release, away from the purely descriptive ("this went up and that went down") and towards an emphasis on insights and significant new findings ("what is the story line"). Over a period of one year the Chief Statistician and some of the agency's best analysts spent several hours each week reviewing critically the releases of the previous week. This represented a strong motivation for all agency staff involved to adopt the new orientation. It also resulted in a widely used guide on how to write for The Daily. Since the implementation of this program we have noticed an increase in verbatim quotes by the media and hence a more accurate transmission of information from the agency.

Some other measures involving the media include: free access to all agency releases; inclusion with all releases of the name of a contact person; responding in writing to all erroneous or misleading articles; availability of all senior staff for media interviews; provision of local detail in releases where this would likely enhance coverage by regional media.

In addition to trying to reach the broadest cross section of the population via the media, we must also pay attention to other special groups who are relatively intensive users of statistical information but for whom the commercial rates we charge might be prohibitive. Special measures are designed to look after their concerns.

- Generalists with a broad interest. We publish a series of thematic compendia for them. Of widest interest are Canadian Social Trends, a magazine style quarterly, and the Canadian Economic Observer, a monthly overview of the state of the economy. Somewhat more specialized are the quarterly Health Reports, Focus on Culture, Perspectives on Labour and Income, Education Quarterly Review, Services Indicators.

- Academic researchers. The same time series information that is commercially available on-line is also released quarterly on CD ROM -- with an unavoidable production delay. The large volume of data they contain, combined with their low price, make CD ROM an ideal vehicle to meet many of the needs of academic researchers. At the same time, because of their lack of timeliness, they do not compete with the commercial potential of the on-line service. The same time series information is also available for academic subscribers on Internet. Additional services provided to academics include heavy discounting of all publications that have been superseded by more recent issues; and access, at marginal cost, to our large library of anonymous micro data files (a planned new service).
- Students. It is in our interest to encourage the quantitative education of our future clients. We have therefore invested considerable effort into developing another special CD ROM based product containing the most widely used time series, Census based area profiles, and software. The marketing approach relies heavily on providing curriculum assistance to teachers on how to use the package within the context of specific courses. The product is now used in the schools of nine of our ten provinces.

Special interest groups. The main help they would like to get from the statistical system is a compilation of all relevant information that bears on their concerns. We believe that it is in the public interest to shed light on issues that are widely discussed. We have therefore established a small group whose sole responsibility is to integrate data and produce compendia on such topics as women, the youth, the elderly, the disabled, aboriginal peoples, etc. The choice of topics is often influenced by forthcoming major public events, such as United Nations thematic summits.

Business clients.

To the extent there are distinguishing characteristics of business clients, we would expect them to be looking for: very good timeliness, speed of delivery, and highly targeted relevance. Of these, targeted relevance is the area where statistical agencies have the best relative advantage. It involves bringing together a customized package designed to address the specific information needs of the particular business. However, in order to capitalize on our potential advantage, we found it necessary to establish a knowledgeable sales staff whose task is to identify potential business clients, find out their requirements, and bring together the needed information for them. A second prerequisite is good access by such a staff to the data bases from which they can retrieve the required information, as well as the availability of good supporting meta-data information. We have made considerable progress in this direction but more is needed. Thirdly, it is essential that the incentives and motivation of the head office staff should strongly favour a client service orientation and cooperation with the regional sales staff. A series of measures have been instituted at Statistics Canada to help in this respect [10].

Speed of delivery (measured in terms of elapsed time between the receipt of a sales order to the receipt of data by the client) is a second potential advantage of national statistical offices. The needed technology certainly exists. Once again, the key is good internal access to and good documentation of frequently used data collected anywhere within the statistical system, so that whoever is the primary contact with a given client can assemble the requested information.

Statistics Canada currently derives a revenue of \$ 12.8 million from the sale of its products and services, excluding revenue from client sponsored special surveys. Of this amount 52% comes from business clients.

10. Generating a supportive environment

Statistical systems are intrinsically vulnerable: they vitally depend on a variety of active support. Whatever legislative authority they might have, they ultimately depend on the willing cooperation of tens of thousands of households who are the primary source of social and demographic information. They similarly depend on business for the large majority of input needed to produce economic statistics. They also depend on elected representatives for general political support and for the allocation of the funds needed to carry out their functions. And given the hundreds if not thousands of releases they produce annually, they are vulnerable to accidents. The effectiveness of measures taken to generate a supportive environment is certainly an important determinant of the success of national statistical systems. Some of the measures are positive in character, while others are defensive. Realized performance alone can be the basis of robust support. Its core determinants have already been discussed: non-political objectivity, maintaining the relevance of the product line, upholding professional practices and reputation, service orientation in delivery. Some additional considerations are discussed below.

General population

The decisive determinant of public support for any government program is a perception that it is important. Continuing relevance is therefore a necessary condition for a positive public perception of the statistical program. But relevance alone is not sufficient to guarantee that the public is aware and consequently supportive of the statistical system. It is therefore essential to have an effective public information approach, such as that described in the previous section. Centralized systems have a clear advantage here: name recognition. Hardly a day passes without some major statistical release by Statistics Canada, accompanied by considerable media reporting. Daily mentions of the Agency's name in the context of important issues (such as inflation, economic growth, or unemployment to mention just a few), undoubtedly contribute to a perception of usefulness. This advantage is predicated on the statistical office having departmental or self-standing agency status, so that the statistical releases identify the Agency, and not some other department of which it might be a part.

Supplementing the positive approach of regular analytic information releases, the following are significant defensive measures.

- Confidentiality and data security. This is a bedrock of the social contract enabling the statistical system to request a wide range of possibly sensitive information, and to expect truthful responses. The legal confidentiality protection of identifiable statistical information should be clear, unambiguous easily communicated and rigorously enforced.
- Respect for privacy. This is a broad issue whose specific manifestations largely depend on the national context: different societies have different sensitivities and thresholds of tolerance. In Canada the most sensitive issue is record linkage. Consequently Statistics Canada developed an elaborate policy, with multiple safeguards, whose objective is to ensure that data collected under the Statistics Act is never involved in record linkage unless the objective is statistical, and unless the resulting public good clearly outweighs the concern for privacy.
- Survey topics and questions must be socially acceptable. There are always topics which, while legitimate subjects for government research, are nevertheless too sensitive for the official statistical system to collect

information about them. Indeed, there is always an invisible line which must not be crossed. But this line is not static. We must therefore balance awareness to public sensitivities and responsiveness to legitimate demands for information. Natural tendencies toward conservative attitudes can and should be checked through pilot surveys and wide ranging consultations.

- Respondent relations. There is generally a greater risk of offensive behaviour than of offensive survey questions. An active program of training interviewers in what we call "doorstep diplomacy" (with suitable modifications for telephone surveys) is a strong foundation for maintaining public cooperation.

Business

There is a genuine difference between the main concerns of larger and smaller businesses. Larger businesses want to be assured about confidentiality, as well as about the legal requirement to respond. Generally, however, we find that the overwhelming majority are willing to comply even with burdensome surveys so long as we convince them that important national interests are served and that we are thoughtful about respondent burden.

Smaller businesses are less often direct users of statistical information. They also have less resources to complete questionnaires so that their dominant issue is reporting burden. Statistics Canada deals with their concerns by:

- actively minimizing reporting burden, particularly on small business, through the exploitation of administrative records, sampling, and other means (e.g. abbreviated questionnaires);
- offering to small business optional reporting methods (mail, prearranged telephone interviews, FAX reminders, etc.);
- estimating at least annually the aggregate reporting burden imposed on business, particularly on small business and making its small business constituency aware of the results;
- otherwise maintaining active liaison with small business organizations so that they are aware of the measures taken to minimize and control burden.

Statistics Canada reduced the reporting burden imposed on business in every year since 1978, by a cumulative total of 66%.

Government officials

For purposes of the present section, their importance derives from the fact that they are in a position to advise ministers on budgetary questions. In our experience their views are often significantly conditioned by their perception of the quality of statistical agency management.

Indeed, most government officials are well aware of the wide range of products produced by the statistical agency, but are only genuinely aware of the importance of those relatively few outputs of which they are direct users. When they have new statistical requirements and difficulties of financing them are raised, it is therefore quite natural for them to think that "there must be something else that you do that is less important." Or: "try to find the needed resources through internal efficiencies."

Faced with the likelihood of this reaction, it helps if the statistical agency has a reputation for being tightly managed.

Statistics Canada has invested heavily to improve its internal management through a variety of concrete initiatives [11]. It has also made an effort to publicize its innovations. It now has a reputation as being one of the best managed departments in the Canadian government.

Elected representatives

Politicians are heavy users of statistical information. But, with few exceptions, they are not aware of the source of statistical information or of the issues surrounding the statistical system. Typically, they depend on the advice of their officials and on feedback from their electors. Their support is therefore largely predicated on that of others.

It may happen that politicians want to involve themselves directly in statistical issues, as has recently been the case in the United States in respect of both the next decennial census and the Consumer Price Index. The issue of defending the non-political objectivity of the statistical system was the focus of section 3.

11. Conclusion

Statistical systems are complex entities whose successful functioning requires a multiplicity of conditions to be satisfied. It is easy to identify three main indicators of success:

- a. How effectively does the system meet the priority information needs of its users? But this is a static question. The underlying dynamic question is how adaptable is the system in adjusting its product line to evolving needs?
- b. How effective is the system in exploiting existing data to meet client needs?
- c. How credible is the system in terms of the statistical quality of its outputs and its non-political objectivity?

While these might indeed be the ultimate determinants of success, the paper focused on the operationally significant issue of the determinants of these desirable outcomes and on how such outcomes may be brought about. Among the many considerations that have been outlined, the following emerge as having basic importance:

1. It is essential to have a single overall system which, however, need not be a centralized one. The word "system" implies a capacity to ensure
 - the adaptive evolution of program priorities, the mobilization of resources to attain high priority requirements;
 - the harmonization of concepts and outputs,
 - client convenience through "one stop shopping", and
 - generating internal efficiencies in order to fund the substantive requirements.
2. Self-adaptive systems may exist in nature, but not among human organizations. Hence it is important that someone should be in charge of the

system. Such a person, referred to as the Chief Statistician, need not have formal line authority over most of the system, as in centralized models, but he or she surely requires strong tools to be able to manage -- particularly strong ones if he or she does not have formal line authority. These tools, together with the personal and hierarchical standing of the Chief Statistician, determine the effectiveness of the management of the system. They also shape the character of his or her interactions with the outside world: as a conduit of information, as the main representative of the system, and as the chief protector of its non-political objectivity.

3. The greatest substantive challenge of the system is to foster the evolution of its product line in response to the most pressing needs of society. The key operational determinants of success are effective interactions with a multiplicity of client groups, and a planning system that is capable of synthesizing these needs and mobilizing resources to meet them.
4. Adaptive systems place high emphasis on their intrinsic ability to evolve. This involves giving very high priority to developing and maintaining a strong analytic and research capacity, as well as a healthy operational capability to respond to client funded surveys and other opportunities.
5. A high public profile is advantageous from many points of view: it contributes to a high level of awareness of statistical information and hence to their wider utilization as public goods, it helps in achieving high response rates and hence better data quality, it contributes to the effectiveness of productive feedback mechanisms with client groups, and last but not least it enhances the protection of the system from political interference. Effective public profile depends on name recognition achieved through repeated media references, the clear relevance of data and analytic outputs, the effectiveness of the Chief Statistician as spokesperson, and the extent to which media needs for statistical information are satisfied.
6. The single most important determinant of client convenience is the availability of one stop shopping. This implies not only a single formal point of access, but also effective tools and motivation to carry out the task.
7. From the perspective of minimizing overall cost, the statistical system should have effective means to avoid duplication of effort, profit from potential synergies and benefit from available infrastructure.

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