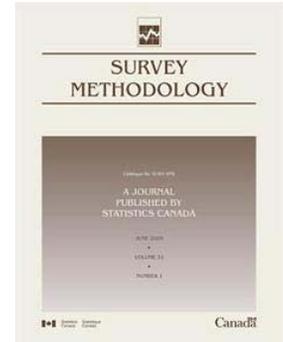


Article

Statistical services: Preparing for the future

by Ivan P. Fellegi



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Statistical services – Preparing for the future

Ivan P. Fellegi¹

Abstract

In this last year of the 20th century I propose to look forward: to the challenges facing statistical agencies and how to prepare for them. I will first of all review the context within which statistical offices must evolve: first the main forces at work that are modifying our economy and society; second, specific policy issues that need to be addressed; and third, changes in the nature of government and in expectations from it. I will then try to outline an internal strategy for statistical offices derived from the foregoing analysis. On the one hand, this will require the development of new types of data systems that are needed. I will illustrate these with reference to recent initiatives by Statistics Canada. While crucial, these new data systems will probably only account for a relatively small proportion of our expenditure. Hence a second important component of our strategy designed to cope with external social and economic changes must be to ensure a high level of adaptability of our core activities. Such adaptability requires specific initiatives. Finally, I will describe the elements of an “external strategy”: how to manage our interactions with the world around us. Three elements will be touched upon: achieving and maintaining a high level of relevance; the issue of political objectivity and its perception; and international collaboration. In each case I will try to outline specific measures that I consider essential.

Key Words: Statistical organization; Strategy; Planning; Conceptual frameworks; Relevance; Non-political objectivity.

1. Introduction: The policy challenges

An early version of this paper was prepared for the 1997 UK Statistics Users Conference (London, November 1997). It also formed the basis of the Gold Medal address delivered to the 1998 Annual Meeting of the Statistical Society of Canada.

Peering into the future and discerning relevant trends is never easy. Even more difficult is the derivation of a strategy for statistical offices.

Indeed, there is a saying that “forecasting is very difficult – particularly of the future.” I am therefore very fortunate that, by coincidence, I can rely on others for part of my job. Recently the head of the public service of Canada (the Clerk of the Privy Council) asked a group of senior policy analysts from major departments (I will refer to them as the Policy Group) to produce a paper “on the pressure points that are likely to arise in Canadian society by the year 2005 as a result of economic, demographic and social trends”. Statistics Canada played a major part in the events leading up to the commissioning of this report and in its preparation. The Chief Statistician was asked to chair an interdepartmental committee of senior officials to report on the current capacity for policy analysis of the government. One of its key recommendations was that such capacity is maintained in response to demand from the Cabinet and the clerk of the Privy Council for serious policy analysis. A specific follow-up action was the commissioning of the report from the Policy Group. The report drew extensively on an in-depth analysis prepared by Statistics Canada on important long-term trends. They reported in October, 1996 and I will start with an outline of their conclusions. While the report was

written from a Canadian perspective, I think their findings have relevance for most developed countries.

Next, I will touch upon some trends in the political environment and governance that are of relevance to statistics. The bulk of the paper is devoted to an outline of what I think might be a robust strategy for statistical offices.

2. Major policy challenges

2.1 Main forces at work

This part of the paper is based on the report “Growth, Human Development, Social Cohesion” prepared by an interdepartmental committee for the Clerk of the Privy Council Office, Canada, in October, 1996.

The Committee identified five forces at work with pervasive impacts on a broad range of policy domains.

2.1.1 Globalization

Globalization is the integration of production and distribution across national boundaries. In response to dramatic declines in shipping costs, customs barriers and the phenomenal evolution of computer communications, multinational companies and complex partnerships can operate as integrated entities, even though their operations span the globe. This enables them to exploit the relative advantages of each location with little loss to the traditional benefits of tight centralization. What is happening is not just a phenomenon of increasing exports, but altogether new production and distribution arrangements that render national boundaries increasingly irrelevant. Globalization affects not only the economy but all aspects of society and culture. Indeed,

1. Ivan P. Fellegi, Chief Statistician of Canada, Statistics Canada, R.H. Coats Building, Ottawa, Ontario, Canada K1A 0T6.

a major challenge will be to obtain the benefits of economic integration, while maintaining independence in other domains, such as social programs, culture, and the environment.

2.1.2 The information revolution

The speed of change of the so-called information revolution was well captured by *The Economist* (1996), “If cars had developed at the same pace as microprocessors over the past two decades, a typical car would now cost less than \$5 and do 250,000 miles to the gallon”. This is the development at the heart of the globalization of economic production which affects the delivery of services perhaps even more fundamentally than that of the production of goods. All sectors have made massive capital investments in information technology, but so far – and if we trust our productivity measurements – society’s return on these investments has been limited. Nevertheless, there is continued hope for major future productivity improvements, as a result of the information revolution, with a consequent and sustained improvement in economic performance.

However, technology will affect different people differently. So there is also a major risk that a new and pervasive social fault line might evolve, one which divides those with a mastery and access to technology from those who are ill equipped to do so. Technology also affects culture and social cohesion and it promotes the formation of interest groups which transcend national boundaries. Identification with traditional unifying entities such as nation or city have come increasingly under pressure.

2.1.3 Environmental pressures

We are all aware of a series of environmental pressures, such as the threat to the ozone layer, global warming, or the collapse of fishing in certain traditional areas. But our awareness is not matched by a thorough understanding of either the full risks, or of the linkages between changes in economic or social activity and the environment. This makes it particularly difficult to weigh potential trade-offs among economic, social, and environmental objectives.

2.1.4 Various demographic pressures

Most developed countries have a birth rate that is below the replacement level. Combined with continued progress in longevity, this results in societies in which the weight of the aged is increasingly felt. The trend will accelerate, at least temporarily, when the post-war generation of baby boomers reaches the retirement age.

The continued evolution of the family as the basic social unit poses a series of ill understood challenges. Not only has the role of women changed as the two-earner family became the norm, but different forms of family are gaining in prevalence (single parents, common law, same sex couples). The impacts of these changes are not fully understood but are certainly felt in such important policy domains as

poverty, labour market activity, child development, pension plans, and caring for the chronically ill elderly.

Immigration has become, not only for Canada but for most of the OECD area, the dominant source of population growth. While it is generally regarded as a positive factor, the integration of people from a variety of cultures has implications for social norms, policy and collective identity. Illegal immigration, somewhat less of an issue in Canada, is a major source of current problems and a potential source of significant future social divisions in many developed countries.

These developments, and others, have cumulative impacts that extend well beyond the present time. The evolution of a child into a happy and productive citizen, the development of cancer or heart disease, the availability of a pension at the time of retirement are examples of processes that extend over long years and involve complex interactions. The supreme policy challenge is to gain a better understanding of causal factors, particularly those amenable to modification through social programs. Much better information can be of immeasurable help in gaining the necessary understanding.

2.1.5 Fiscal context

All the pressures described above, and the policy space available to deal with them, interact with the fiscal context, *i.e.*, the balance to be struck between reducing the accumulated debt of government versus the resources to be made available to deal with current or emerging issues.

2.2 Policy challenges

The Policy Group identified a number of specific policy challenges, many of them closely interwoven with the pressures outlined above. They grouped the challenges under three broad headings, of which I will touch on two: growth, and human development. I can only give here a brief indication of what they saw as areas of particular concern in Canada.

Growth

- *Economic growth.* The growth of real GDP per capita, as well as of real average family income has slowed considerably in the last twenty years from what it was in the previous decades.
- *Productivity.* In spite of the wide scale introduction of computer technology during the last twenty-five years, productivity growth rates have declined in several of the major industrialized countries. The reasons for this are ill-understood, in spite of the crucial importance of productivity for economic growth.
- *Adjusting to the so-called knowledge-based economy.* We are aware of a shift in the economic centre of gravity towards services and knowledge and technology-intensive industries. In terms of both employability and income, there are considerable and still

increasing returns to individuals from education, and perhaps even more from literacy and life-long learning. Similar findings apply to firms that innovate and adjust. But, once again, we have a very inadequate understanding of the relationships among such forces as individual skill acquisition, the business practices of firms, the growing shift to non-standard forms of employment, the use of technology, innovation, and productivity.

- *Environmental issues.* These interact with the economy, as well as with most other domains. There are basic questions, very poorly understood, that are loosely described under the heading of sustainable development.

Human development

- *Imbalances in time use.* The Policy Group drew attention to a number of what they called imbalances in time use.

Less time is used working, compared to being in retirement. The ratio of one to the other has declined by a factor of two in thirty years as the age of entry into labour force continued to increase even while the age of retirement continued to decline. This development, which appears to be part of a longer term trend rather than a simple consequence of the business cycle, places substantial pressures on both public and private pension systems.

The distribution of available work is getting more polarized: in the last twenty years the number of persons working both short and long hours has steadily increased.

Large scale unemployment coexists with a serious "time crunch" experienced mostly by young working couples with children – with potentially important but ill-understood implications for the quality of care received by their children and their elderly parents.

- *Labour market issues.* There are important visible signs of major changes in labour markets. Unemployment in most industrialized countries has increased from one economic cycle of the post-war period to the next; more jobs are non-standard (part time, temporary and self-employed); individuals change their status more frequently between employment, unemployment and spells of education; there is a polarization of both earned incomes and hours worked; education and perhaps even more so skills are becoming increasingly important. While we regularly monitor these changes, the underlying forces involved are poorly understood.
- *Transitions.* Besides those transitions occurring within the labour market, other key changes in life are from home to school, school to work, childlessness to parenthood, and from work to retirement. We have very little quantified knowledge

about the factors that result in successful transitions, or about the interaction of the various forces at play.

- *Increased polarization of incomes and the role of the tax/transfer system.* A significant finding is that, in Canada as in the United States, the polarization of gross family incomes has increased over the last two decades: those with high incomes increased their share in the total while those at the bottom of the income distribution have reduced theirs. Unlike the United States, in Canada this trend was fully offset by the progressive character of the tax/income transfer system – at least until now. There are important policy questions raised by these trends about the role of social safety nets, particularly in a period when a fight against government debt has a high priority.
- *Children and youth.* One of the most difficult issues relates to youth employment. The unemployment rate for young people is stubbornly high. Furthermore, this has persisted in the face of more youth staying in school longer, thus alleviating somewhat the pressure on the youth labour market. Even when they are employed, the real earnings of young workers have declined over the last twenty years, in contrast to that of their elder colleagues. Our understanding of causes and possible remedies is very incomplete. There are issues related to children that are even less well understood, e.g., the impacts on children of the socio-economic status of parents, their parenting styles, the education system, the teacher, the neighbourhood, the environment, or heredity.
- *Health.* Prompted by government expenditure controls, considerable public debate is focussed on cutbacks in hospital and physician services. Yet, there is mounting evidence that the formal health care system is only one of the factors affecting population health, and perhaps it is not even the most important one. Some of the others are life-style, socio-economic status, the environment. Even within the formal health care system, there are well documented and widely divergent practices (for example in the propensity to use coronary bypass operations or Caesarian sections), with important cost implications, but whose longer term impacts on health are poorly understood.
- *Aboriginal people.* A whole series of policy issues relate to the aboriginal population – a major issue in Canada. On almost any socio-economic scale they continue to score considerably worse than the rest of the population.
- *Law and order.* Opinion surveys show high and still growing public anxiety about crime. Perhaps in response to public anxiety, the rate of incarceration is growing much more rapidly than any measure of crime – even though there is no evidence that more incarceration results in less crime.

The list above is not exhaustive, nor does it need to be. I hope it suffices to indicate the broad concerns which dominate our public policy agenda. I believe it also demonstrates that, while our current statistical system largely succeeds in describing the phenomena of concern, more often than not it does not provide nearly sufficient help to understand them.

3. Trends in governance

Without any doubt the single most important role of statistical agencies is to assist the public policy process. Consequently the role that governments play, and the public expectations regarding such a role, have a crucial relevance for us. It is therefore worth reviewing briefly recent trends and likely developments.

During much of the post-war period, the economic concerns of the governments virtually everywhere in the OECD area were macro-economic, and their attitude was interventionist. The statistical response to interventionism in fiscal, monetary, industrial and trade related affairs was to develop a comprehensive system of economic accounts supported by an equally comprehensive system of business and household surveys.

In the social domains, the post-war years saw the establishment of great universal programs in the fields of health care, access to post-secondary education, unemployment insurance, pensions, and so on. These programs imposed relatively less stringent demands on the statistical system. We were asked (perhaps) to measure their cost, other major inputs (*e.g.*, health and education personnel), key operating ratios (students per teacher, population served by each physician), “raw” measures of output (students graduating, number of people discharged from hospitals), and so on.

The situation has changed – gradually in the eighties, and much faster in the nineties. A number of factors were responsible for these changes. Slower economic growth, apparently ineffectual macroeconomic policies, and the cost of universal social programs which almost invariably exceeded the initial estimates, resulted in mounting deficits. At the same time, globalization of financial markets increased the pressure on governments to “deal with the deficit”. The issue, therefore, rose to the top of the national agenda, implying substantial cuts to established programs that necessarily lead to questions of “what works”, and “for whom is the program essential”. The statistical system was not well prepared to answer these difficult questions.

The retrenchment of government programs is always a politically difficult task. It was particularly so in the midst of slow growth and persistently high unemployment. The combination exacerbated the concerns of the public – already cynical about the role of government and indeed about government itself.

All these developments lead to a search for evidence about the real impacts of government programs on society and the economy. The interest was spearheaded by governments themselves who wanted and needed

information for their own analysis prior to making controversial decisions about the elimination or major modification of established public programs. But they also needed new and detailed information as objective support in public debates. Indeed, a new movement emerged requesting from government that it identify and officially adopt performance indicators with a focus on outcomes, as opposed to processes. The combination of increasing intellectual rigour and limited financial means to initiate major new programs has actually lead to a view according to which it is a core function of governments to ask the right questions, and to ensure the availability of information needed to answer these questions.

These developments clearly have major implications for statistical offices. In the economic domain a high priority continues to be placed on the monitoring of macroeconomic developments. While maintaining their macro-economic interest, recent Canadian governments have been paying much greater attention to microeconomic considerations, *i.e.* understanding the factors that account for successful business outcomes and attempting to underpin macro-economic intervention with coherent policies designed to help business at the micro level.

Daunting as this task is, the new requirements are even more demanding in the social domain – and for several reasons. First, outcomes are typically the results of long term effects, for example in the health and education domains. These cannot be traced back unambiguously to unique causes. At best one can hope to identify factors that tend to move outcomes in different directions. Furthermore, policy interest shifted from considerations of broad social impacts to the examination of impacts on particular groups – an intrinsically difficult task. And to make the task even more difficult, the weighing of policy alternatives unavoidably involves an examination of their expected future impacts (a form of simulation). In effect, we are asked to provide the rich statistical data base needed to identify the policy levers which, at an acceptable cost, are likely to result in some specified desired outcomes (Fellegi and Wolfson 1997).

Even as official statistical agencies are called upon to become much more policy relevant, they must do so in a manner that preserves both their political independence and reputation for professional competence. Indeed, this has become more important than ever before, precisely because of the heightened impact of official statistics, combined with an environment in which the government is trying to convince a sceptical and insecure public of the wisdom of its actions, making use of evidence that must be accepted as “objective” (Fellegi 1991a).

4. Implications for statistical offices: An overview

One can argue whether the Policy Group correctly identified the forces that are most likely to have a large

impact on our evolving society, and whether they correctly deduced the particular areas of policy which will require the greatest attention. I submit that this would not be particularly productive. After all, societies do not have a particularly good record of forecasting the challenges that will face them in a few years' time. Nevertheless, there are some important implications for us that we ignore at our peril.

Even though I would not propose the uncritical acceptance of their specific list of expected policy challenges, I think that it is possible to identify broad domains in which major challenges can be anticipated (the issue of unemployment, the evolving character of employment, productivity, the causes of health and illness, the role of education and training, *etc.*). After all, we are developing major statistical systems to illuminate a broad policy area, and not to support some specific policy initiative. The domains, together with the nature of the information that is likely to be needed, should give us considerable guidance regarding the statistical developments that are needed.

It is clear from the work of the Policy Group that many of the areas that they identified are characterized by fundamental gaps in understanding. Garnet Picot (Picot 1997), for example, analysed a variety of government measures designed to deal with the issue of high unemployment and showed that their likely effectiveness depends on which of several possible causes we think are primarily responsible for the problem. There are a number of plausible contributing causes: low economic growth, disincentives to accept low paying jobs (due to the character of social transfer systems and unemployment insurance), high payroll taxes which render hiring of new employees more expensive, a mismatch between skills needed and available, high minimum wages, *etc.* Disentangling their relative importance is a prerequisite of sound policy remedies. In turn, he describes the statistical data systems, some of them quite innovative, that are needed to accomplish this goal.

I would also take as a good working assumption that the political environment will continue to evolve broadly along the lines discussed in the section on trends in governance – with clear implications about the general character of the statistical service that the country needs.

In summary, therefore, we can foresee major challenges. In some instances we must improve existing data systems, and in others start monitoring phenomena whose priority has increased (*e.g.*, the environment). I expect that the greatest challenge will be to devise new data systems designed to go beyond monitoring and with an explicit orientation to shed light on the underlying dynamics. While we might well be able to identify the domains in which such information will be needed, there will be considerable uncertainty about the precise policy issues which we will be called upon to illuminate – with great insight but also with great objectivity. In the face of these challenges our strategy must be bold, but also robust – hence evolutionary. The three ideals that we must pursue are: relevance, adaptability, and objectivity.

These three themes will be the themes of the rest of the paper which will be divided into the following sections: prerequisites and approaches leading to essential new data systems required to illuminate policy domains and to inform public policy discussions; strategies with respect to our core programs and the organizational flexibility needed for their further evolution; and finally a section devoted to what might be called an “external strategy” to ensure and safeguard both program relevance and non-political objectivity.

5. Implications for statistical offices: New data system

5.1 Elements of a strategy

It is at the heart of our challenges to try to develop the new types of statistical systems that are needed to inform public policy discussions in key fields. Policy development is a complex process. It involves politicians, the public, special interest groups, as well as researchers and policy analysts within and outside government. Experiences and views of all these groups, as well as political ideology, combine to arrive at policy proposals. It is essential, however, that there should be relevant empirical and theoretical evidence to both nourish and to temper the views of all participants. What is needed is a concerted effort to try to understand the forces at work, to be able to anticipate with confidence the likely performance of alternative policy levers. This does not usurp the role of the political process, but rather helps to inform it (Fellegi and Wolfson 1997).

We must be clear, however, that helping to understand economic and social phenomena, as opposed to monitoring their impacts, is a task that is at least one order of magnitude more difficult. In this section I will outline the elements of a broad strategy that we have attempted to follow in Statistics Canada. I will then provide some illustrative examples of new data systems implemented at Statistics Canada.

(i) Development must be rooted in relevant outcome measures

A key end objective is to help the public policy process to discern the relevant “policy levers” that are likely to be most effective in moving us toward the achievement of desirable social and economic objectives. It is logical, therefore, that the development of new data systems should start with an attempt to understand the key outcomes that policies in a given domain would like to promote. This does not imply either policy advocacy or a politicization of the statistical system: it is in the common interest that the goals of government be carried out on the basis of the best available information, and that the same information be made equally available to others who might wish to promote different policies.

A source of major difficulty is that in many areas, particularly in the social domain, there are no broadly accepted outcome indicators. For example, while we all agree on the objective of wanting to improve education, there is no general consensus on what this should involve and how progress should be assessed. Do we want the outcome of a good education system to be people who are successful in the labour market, who are well rounded individuals, who have acquired the skills to continue to educate themselves in an adaptive mode, who embrace the values of good citizenship, or some combination of the above? Difficult though these questions are, they are clearly essential to the development of a truly relevant and useful system of education statistics.

(ii) Connecting outcomes and policies is a major objective

High quality and operationally measurable outcome indicators represent the first step in developing useful data systems. They are fundamental to monitoring progress toward objectives, telling us whether or not improvements can be detected. But good outcome indicators alone are insufficient since, at least in democracies, society's ultimate objectives seldom lend themselves to direct intervention: *e.g.* sustained employment cannot be generated directly, nor can the health of the population be improved by any direct measures. Truly useful statistical systems must therefore allow observers and analysts to discern the relationship between outcomes and public policy interventions: the so-called policy levers.

We cannot assume that the traditional policy levers are necessarily the most important ones. For example, there is growing recognition that class size or pupil-teacher ratios do not have a particularly large influence on student outcomes. Similarly, health may have as much to do with family income as with the medical interventions of the health care system. The implication is that policy relevant data systems should be based on broad views of the relevant causal factors, and the ways they relate to each other – in other words, they should be based on a conceptual framework.

(iii) Conceptual frameworks are prerequisites

There is no widely shared agreement about what constitutes an adequate conceptual framework for a statistical system. A conceptual framework is not, in and of itself, a theory. It is, rather, a carefully constructed reflection of our present understanding of the forces at work which have a potentially significant impact on our selected outcome indicators. I believe that one of its essential features has to be the attempt to reflect, at least schematically, the forces at work within a given domain, including their interactions and the direction of their effects.

A useful conceptual framework is neither abstract, nor static. It gains both its empirical and adaptive usefulness

from being dynamically coupled to a measurement system. On the one hand, conceptual frameworks should guide the evolution of those data systems which quantify the interactions displayed by the framework. On the other hand, data systems should have a profound influence on the evolving conceptual framework: they should lead to the elimination of insignificant or irrelevant relationships (for example, of ideological dogma!), and to the further elaboration of those that are most important. Furthermore, data analysis might bring to light altogether new relationships and insights and in due course may lead to a revision of the framework.

(iv) Partnerships are a necessary condition for progress

The type of statistical evolution outlined here represents a very ambitious undertaking. The effort is justified by the overwhelming need to improve our understanding of the forces at work underlying the most pressing and vexing social and economic problems. This is clearly a necessary condition for more effective policies and programs. The cost, while not negligible, is dwarfed by the cost of government programs designed to deal with ill-understood problems.

The major effort that is required cannot succeed without an intensive tripartite collaboration involving the sectoral policy department concerned, the statistical office, and the social science community. The policy department's support must take at least three forms: moral support, direct financial support (or alternatively, support for the financial requirements of the statistical office), and effective collaboration in exploiting existing models and data systems in the course of analysing existing government programs and policy options.

The participation of the social science community is fundamental to ensuring that prevailing theories are brought to bear, helping to design the instruments for shedding light on the relevant phenomena, testing and modifying theories. Their analytic work should play a critical role in highlighting missing statistical information needed to test existing theories. At the same time, social science benefits from availability of quantitative information which can be used to sort out idle speculation from empirically validated hypotheses.

Of course, the role of statistical offices in such tripartite collaboration is highly significant. They must take the lead in convincing decision makers of the critical importance for them – the decision makers – of launching the long term developmental process that the provision of the right information at the right time requires. They must also take the lead, with help from policy analysts and social scientists, in identifying and, if funding can be secured, implementing the needed data systems. In our experience, these systems tend increasingly to be longitudinal surveys or administrative systems in domains such as health, education, and labour market and income. Longitudinal data, to a much greater extent than cross-sectional, can

associate outcomes with a range of possible causal variables – a prerequisite for the identification of causal links.

It is fundamental that the required extensive collaboration occur and that it be productive. The leadership drive to start the process may come from anywhere – including, I should emphasize, official statisticians as well. We do not need to wait for others to come to us for our help. On the contrary, we should have a well developed analytic program on the basis of which we are able to articulate not only what are the data gaps, but also what are the areas of public policy where so-called “evidence based decision making” is not possible because of missing conceptual frameworks and supporting data systems.

Statistics Canada, in collaboration with our government and academic partners, did take a number of significant initiatives to develop data systems designed to lead to significantly improved understanding in several important public policy domains. In a subsequent part of the paper I shall briefly describe a few examples.

(v) Practical and useful approaches are sectoral

In spite of the increasing recognition of the inter-relatedness of social and economic phenomena, there are both substantive and practical reasons for preferring the development of new data systems along either sectoral or functional lines. There are separate ministries and other organizations dealing with policies in the fields of human resources and labour markets, trade, industry, welfare, health, education, justice, *etc.* Data systems can only become policy relevant if there is a constituency for the information, one whose function is to consider the implications of the findings. But beyond this “mundane” consideration, it is almost always the case that outcome measures are formulated as sectoral (The word “sector” is used here to connote a domain which is the subject of particular government policies and programs: health, education, labour markets, macroeconomic policies, and so on. Typically, a government department is assigned either sole responsibility or at least a lead role in respect to policies and programs in that sector.) objectives: to reduce unemployment, improve population health, improve the effectiveness of the education system, and so on. If the data systems are to shed light on our performance, they must specifically be developed to improve our understanding of the given sector (Fellegi and Wolfson 1997).

We know that there are important interactions among the sectors: for example, both income and education are known to affect health, while also health affects education. But these effects can be accommodated within the sectoral models as exogenous variables.

5.2 Examples of new data systems in Statistics Canada

Statistics Canada is engaged in the development of new data systems in a number of domains, broadly in line with the areas of policy challenge identified by the Policy Group.

A common characteristic of these initiatives is the goal to illuminate a given policy domain, *i.e.*, to identify the main forces at work and to measure their relative importance. Where a broadly shared understanding exists about what these forces are, the main task consists of quantifying their respective strengths in affecting the outcomes of interest. This is the case, for example in the area of income and labour market dynamics. In other instances a major initial effort is needed to outline a conceptual framework which is subsequently fleshed out with data and modified through use. This is the case with health, and science and technology. In the case of education and child development we could only identify what we, in collaboration with our partners, thought is a reasonably comprehensive list of all possible forces (but without the complex interactions among them). In this case we decided to start with a very comprehensive survey, hoping to elaborate a more complete conceptual framework through the analysis of the resulting data.

Most of these initiatives take the form of longitudinal surveys. This is not surprising since cross-sectional surveys can monitor phenomena, but only longitudinal surveys are capable of linking outcomes to their correlates – an essential prerequisite for the analysis of the relative importance of alternative “policy levers” and other (exogenous) variables.

(i) Labour, income and family dynamics

In the socioeconomic domain the single dominant problem facing most of the G7 countries is the persistence of high unemployment, the attendant poverty, and the possibility of a semi-permanent underclass (those caught in the “poverty trap”). More generally, the issue is the relationship between income, labour market participation, and personal as well as family circumstances. There are a number of important questions: under what circumstances do poor families manage to escape poverty? What personal characteristics and what government programs appear to help single parents to cope successfully? Under what conditions do unemployed youth, particularly those without post-secondary education, manage to break out of the vicious cycle of “jobs require experience but experience can only be acquired on the job”? What factors account for successful and unsuccessful transitions from school to work, from job to unemployment, from work to retirement?

In Canada we have started an on-going program to shed light on this complex of issues. It is based on a sample of families, each of whose members will be tracked for at least six years as they move through various labour market and income experiences, as some members move out of the original family and perhaps form new families, and so on. Key characteristics of the program are its longitudinal dimension and the explicit objective of trying to link causes and effects; the close collaboration in its development between Statistics Canada, the main policy department, and the academic community in the conception of the survey

and its analysis; and the explicit objective of maintaining a capacity for the further evolution of the survey. It was felt that, in this domain the existing literature had already identified the main forces at work, and what was needed were suitably organized data on how these forces play out themselves in Canada.

The survey includes core questions on incomes, labour market experiences, and family characteristics, but there is also room for supplementary questions to explore new hypotheses that the analysis of the data might suggest.

(ii) The interaction of business performance and employee outcomes

There is increasing suspicion that productivity outcomes can only be studied at the micro-economic level and that a number of business practices may be ultimately related to output per unit of labour. For example, at what rate and with what effects is information technology used in the workplace? Does the effective use of technology imply a higher investment in skills upgrading? Do employees with lower level skills risk becoming “disposable”? Is the use of flexible labour market practices (increasing use of contracting out and of temporary or contingent workers) a significant contributor to business success?

We have carried out a pilot to establish the feasibility of an on-going longitudinal survey of business establishments, including a subsample of their employees who would be tracked for at least one extra year after their employment with the selected business comes to an end.

The survey we expect to take would provide information on the extent of use of new technologies, on training available to employees, business strategies pursued (*e.g.* the extent and role of R&D; the emphasis on new products; expansion into new geographic markets; collaboration with other firms in R&D, in production, or in marketing; *etc.*), labour market strategies (*e.g.*, downsizing, re-engineering, greater reliance on part-time or temporary workers, increased use of overtime in place of new hiring), degree of market competition, change in the occupational composition of employment. The information collected in this fashion will be related to “objective” business performance indicators such as value of production, sales, exports, profits, *etc.* It will also relate the firm’s behaviour to impacts on employees: their training and the acquisition of new skills; the relationship between the use of technologies and wages; training and other worker outcomes; and the relationship of all these factors to employment stability.

(iii) Survey of children

We have an incomplete understanding of education and child development, even more so than of the dynamics of incomes and employment. What are the key influences that lead to the development of productive and happy members of society? My third example involves a very ambitious longitudinal survey of children, initially of 0 to 11 years of age, which attempts to shed light on this rather basic

question. Because of clear indications from existing research that causal factors in this domain operate over very long time periods, the objective is to follow the same sample of children well into young adulthood – up to 20 years. However, the survey is arranged to provide important analytical and policy-relevant results on a continuing basis. We are collecting a wide range of possibly relevant explanatory variables related to them: mother’s health during pregnancy, socioeconomic conditions of the family, parenting styles (the nature of parent-child interactions and stimulation), early signs of emotional or learning problems, socialization (relations with peers and potential friends), scholastic tests, teacher’s assessment of the child, and the principal’s assessment of the school.

In this case we did not have a fully developed conceptual framework to guide our survey development. However, working in the closest possible collaboration with relevant researchers and academic staff, we could identify a long list of variables which could have a material impact on child development. This resulted in the exceptionally wide range of variables that are included in the survey. Rather than starting with a fully developed conceptual framework, we plan to approach its refinement through analysis of the survey data. Indeed, we have arranged a wide range of contracts and other forms of collaboration to ensure a full exploitation of the data base.

As in the case of the previous examples, the survey can be adapted from one round to the next to reflect our gradually improving understanding, or simply to collect some additional information in a cost effective manner.

(iv) Population health

Most G7 countries spend on health 7 to 10 per cent of their GDP. Health is also a policy area that is consistently near the top of the list of greatest concerns to Canadians. Yet, here again, the substantive policy challenges far outstrip our ability to provide information that would support “evidence-based decision making” regarding the determinants of population health and the long term impact of health interventions. Our third longitudinal survey is designed to gain some insights in this domain.

The survey follows a sample of individuals for a period of years yet to be determined. It contains a core set of questions, including those on health status, disability, health care utilization, health problems, family situation, and labour market participation or other major activity. In addition each survey also contains a series of questions that delve into a specific topic for that cycle only (the initial cycle focussed on mental health). There is also an arrangement for linking respondent records with provincial records of health care administration in order to incorporate into the data base the encounters of sample persons with the formal health care system.

Prior to the development of the survey we did invest considerable effort to develop an explicit conceptual framework to guide us. As in the other examples, the design

of the survey instrument and the supplementary inquiries incorporated into each round have been developed in close and continuing collaboration with the main federal and provincial stakeholders of the health field, as well as with a broadly representative group of advisors.

(v) Science and technology

The need to understand the impact on society of science and technology has risen high in our policy agenda. Much has been written about the importance of adequately investing in science and technology – but much of it is unsubstantiated. Is it true that there is a close link between a country's investment in science and technology and its rate of economic growth? What are the impacts on employment? On the physical environment? On social cohesion? What is the relative contribution of different sectors of society (government, university, business, *etc.*) to the generation of knowledge and what are the results? What can we say about the storage of knowledge (both informally, in people's heads, and in formally accessible devices such as books, diskettes, *etc.*)? How is it used, with what effects? How is knowledge generation financed?

In order to attempt an answer to these questions we are proceeding along several tracks. With the help of an external advisory committee, we began to develop a conceptual framework. As this framework is defined, we are reviewing existing information to assess which parts of the framework it supports and where are the important data gaps. At the same time, we are trying to understand the main policy questions which ought to be answered. This will allow us to outline a multi-year program of information development in order to improve our understanding of key questions affecting our economy and our social organization. And even while the conceptual work is proceeding, we are beginning to collect relevant information that will clearly be needed: on innovation, on the adoption of advanced technologies, and on knowledge flows to business from universities.

(vi) Productivity

My final example deals with the issue of productivity. Collectively, we are investing heavily in the new technology embodied in computers and related telecommunications and software. The September 28, 1996 issue of *The Economist* estimates this combined investment at 12% of total capital stock, the same as the level of investment in railways at the peak of the railway age in the 19th century. Normally, when heavy investments are made in a new technology, one expects significant productivity returns. Yet in most G7 countries there is a decline in the measured rate of productivity growth during the last twenty years compared to the previous twenty. *The Economist* calls this finding "a statistical black hole".

Many believe that, to the extent there is a measurement problem, it has to do with the measurement of the output of several high growth service industries: banking, telecommunications, consulting, and so on. The problem in these sectors is that it is hard enough to define the unit of output, let alone the quality improvements to which these outputs are subject at an increasing rate.

This area also provides an example of effective international collaboration. Statistical offices of several countries decided to work together, drawing on the relative strengths of each. In fact, their representatives agreed to develop a conceptual framework and corresponding "model surveys" for particular service industries, often in collaboration with leading businesses in their respective countries. These model surveys have been piloted in other volunteer countries and experiences compared. Not only are improved measurement techniques developed in this manner, but as a byproduct international comparability of data is also achieved.

6. Implications for statistical offices: Adaptability as key strategy

6.1 The core program

Even while new policy domains gain prominence, most of the problems of the postwar years continue to be relevant. Undoubtedly, we shall continue to collect data on economic growth, inflation, employment and unemployment, the evolution of incomes, education levels, health, *etc.* – phenomena whose monitoring remains intrinsically important even if our level of understanding of how to improve our performance in each of these domains is relatively limited. We do not stop taking the temperature of the patient just because we do not fully understand the reason for the fever, or how to cure it. For example, we may not have succeeded in understanding how to cure unemployment, society learned to make a variety of accommodations to it. Some of these involve adjustments of individual behaviour. Others are more programmatic and try to alleviate its worst effects (*e.g.*, unemployment insurance), or try to bring about improvements (*e.g.*, labour market training programs). We may adjust the patient's diet, try to bring down the temperature to avoid secondary complications, and so on.

While our core function will certainly continue, we can expect important challenges – both old and new.

First, the challenge of finding the right mix between preserving continuity and adapting our concepts to changing reality will continue to be with us. Here, as in so many other places, international collaboration is needed and productive. Indeed, in the face of conceptual difficulties we can speed up progress by pooling our respective strengths. Furthermore, where the conceptual underpinnings are weak, international practice and convention confers a degree of legitimacy. International standards are all the more important since an increasing proportion of our clients

operate in a global context and want information on the basis of which valid comparisons can be made of the performance of different countries in different domains.

Second, this being our core program, it is where the bulk of our expenditures are spent, and where we must look for efficiencies. And we will certainly need to find savings since we are inevitably called upon to contribute to the funding of new statistical initiatives. In my experience, necessary conditions to obtain new government funding are to be seen as efficient in carrying out our core program, and to be able to show that we have identified and eliminated programs of lower priority. But to do so we must have an effective planning system (Fellegi 1992).

The third challenge with respect to our core activities is to improve our dissemination program, particularly as it affects the needs of the general public, most of whom receive their statistical information via the media. We have to do much better in informing them about findings, as opposed to releasing data. Emphasizing findings as opposed to releasing data has an enormous impact on how the public perceives our relevance (Fellegi 1991b).

6.2 *Ad hoc* survey capacity

The need to conduct special surveys arises when a client requires some information which cannot be met from the regularly funded program of the statistical agency. The capacity to respond to ad hoc requests, provided they are accompanied by the required funds, represents an important form of flexibility/adaptability of the statistical system. The requirement may take a number of forms, but I will restrict my attention to surveys or pilot surveys. As I indicated in (Fellegi 1996), there are compelling reasons to maintain a strong capacity for client funded surveys.

Special surveys result in new information being placed in the public domain, often in new areas. Charging for the development of ad hoc information provides a type of market test: if a contracting department is willing to spend significant funds from its own budget, then the resulting information is likely to be relevant to serious policy concerns. Since all official statistics, irrespective of the source of funding, should always be available to the general public, the external funding of policy relevant information is clearly in the public interest (While a strong capacity to respond to the ad hoc requirements of client departments is important and unambiguously beneficial, there are strong reasons of both statistical policy and efficiency to prefer that the regular statistical needs of clients be met from the regular budget of the statistical office.).

Additional benefits of having a capacity for client funded surveys include the following:

- client-sponsored surveys are safety valves for demand which cannot be satisfied within the budget constraints of the statistical office. The flexibility to respond, therefore, has a major impact on client satisfaction with the statistical system;

- special client-sponsored surveys typically relate to new areas and hence involve innovation. As such they contribute importantly to the maintenance of an environment that is open to new ideas. Indeed, some of our cost recovered surveys are pilot surveys designed to test new approaches prior to seeking regular funding for them;
- to the extent that charges include full costs, including overhead, they contribute to the maintenance of an operational capacity;
- Statistics Canada has established two divisions, both capable of rapid expansion whose budget derives entirely from client-sponsored surveys. The staff work very closely with major client departments and have learned to “market” not only their operational capacity, but also their ideas. These divisions necessarily evolve a culture of client orientation whose benefits are far reaching.

How to create and maintain a special surveys capacity? After all, to a limited extent every statistical office is able to carry out one-time work by mobilizing the needed resources. However, I think that we need to go well beyond that. We need to create an organizational culture that welcomes, indeed seeks out such work – otherwise it risks becoming an extra chore accepted grudgingly. The principal means used by Statistics Canada to achieve this broader objective were:

- the creation of the two divisions mentioned above, which operate respectively, in the households/social domain and in business statistics. Both entities have to “earn their keep” through contract work;
- a marketing orientation for the entire organization, including explicit revenue targets;
- a personnel and financial management environment that encourages the deployment of people for specific tasks and specific periods;
- a strong set of central operational capacities which are capable of expanding and contracting on the margin, according to need. I will return to the issue of operational capacity later.

While we strongly encourage client-sponsored survey work, some ground rules are enforced:

- no client-sponsored work is carried out on a privileged basis, *i.e.*, with results that are kept private;
- Statistics Canada maintains full professional control, subject only to having to meet the substantive needs of the client. Professional control includes questionnaire content and design, sample design, the collection operation, and processing. It also reserves the right to use the resulting information in its own analytic publications;

- Statistics Canada will not carry out surveys in certain fields which are incompatible with its mandate.
- These include political polling, as well as questions which the public might regard as offensive;
- Finally, Statistics Canada is not in competition with the private sector: it is engaged in large scale surveys with high quality requirements which the agency is in a better position to carry out cost-effectively and for which the agency's stamp of professionalism and legitimacy is important.

6.3 Elements of professional and operational capacity

Maintaining a strong professional and operational capacity is a prerequisite of adaptability. It is particularly important to safeguard it consciously during periods of budget reduction because infrastructure represents a tempting target whose weakening has no immediately visible impact on outputs. Research, analysis, and a methodology capacity are particularly vulnerable.

A strong professional and analytic capacity is particularly necessary for being able to recover from adversity. Indeed, without it we may start a downward spiral of both credibility and resources. We will need our professional staff to develop programs as and when the opportunity presents itself. In addition, they may be able to create informed demand through analytic work which highlights the relevance of statistical information and, whenever appropriate, identifies important gaps in the empirical base needed to support significant conclusions. The analytic capacity of professional staff is also needed for the development or refinement of the conceptual frameworks. In turn, as discussed earlier, such frameworks are prerequisites for the development of relevant new data systems.

Methodology is part of the essential professional capacity of the agency. Our reputation depends on the solidity of our statistical methodology. It might be argued that in times of budget constraints we do not need to have a strong survey design capacity since we are not very likely to launch many new surveys. Yet we have found that improving scientific method can be an important contributor to overall efficiency. This can come about through better survey design and through the development of generalized measurement and processing tools. While it can be destroyed in months, it takes years or even decades to build a strong methodological capacity.

Much the same can be said about the mix of tools and competencies that add up to operational capacity. A well maintained and classified register of businesses; the core supervisory staff of operational entities around which we can build up or reduce operational staff, according to need; the full range of skills needed to maintain a flexible, demand driven informatics capacity; and so on.

It is not enough to simply "preserve" each of these capacity areas. Each must prepare itself for the future by

adapting its processes to handle new technology, new methodology or changing respondent attitudes.

Beyond any of the particular elements of operational and professional flexibility, what is needed is particular attention to preserving a spirit of research and innovation at all times. No statistical agency can survive for long without it. Simply carrying on with the same programme, perhaps periodically reduced in response to budget cuts, is a recipe for eventual irrelevance. Yet innovation is particularly difficult to maintain in periods of budget stringency when experimentation has to compete for funds needed to preserve important existing outputs. It therefore requires particular attention. In Statistics Canada we have a planning system (Fellegi 1992) which facilitates this process. Good year or bad, we set aside 2-3 per cent of our budget to support new initiatives. Such a reallocation helps to maintain the intellectual curiosity and ferment that is so characteristic of healthy organizations. A portion of the reallocated funds are used to support pilot surveys and small scale tests which can be used to demonstrate to key client departments how new information could help them anticipate, decide, and monitor policies and programs.

An element of organizational flexibility relates to making multiple exploitations of data as easy as possible. To describe fully the elements of a strategy would take us too far from the theme of the present paper (Fellegi 1991a). Here I would only emphasize the need for three broad approaches. First, we need to create and maintain a single electronic window on all publicly available (*i.e.*, non-confidential) national statistics. This should be the infrastructure supporting all dissemination, from publications to Internet access. Second, behind a publicly available data base of aggregate statistics, we should create and maintain an internal micro data base that encompasses all survey holdings, is fully accessible to all internal staff, and which is well documented. Finally, I would favour all measures designed to place micro data in the public domain – of course, subject to confidentiality. Given the skewness of most of the relevant distributions, we have not found a way to release micro data from most economic surveys. But, after suitable treatment, we release most household and social surveys in this form. This facilitates their use by external researchers, including those in policy departments, as inputs to policy models.

As mentioned before, a major determinant of organizational flexibility is a planning system (Fellegi 1992). In turn, planning must be supported by a detailed project based cost accounting system. These two systems are indispensable to our ability to review regularly the cost structure of our products, to assess the current priority of each product, and to estimate the cost of adding or eliminating particular activities. It would have been exceedingly difficult to manage effectively our response to the last fifteen years of regular budget cuts, punctuated twice by a major injection of funds, without the facility to assess regularly both the substantive and cost implications of modifying our product line.

Perhaps the single most important determinant of organizational flexibility is its human resource strategy (Statistics Canada 1997). Planning decisions invariably imply the reallocation of resources, and people invariably represent the largest single component of project expenditure. We lose the effectiveness of our planning system if we cannot successfully and easily redeploy them according to need. Statistics Canada, like most other statistical agencies, used to be characterized by narrow vertical career paths: if you started work in health, education, labour or manufacturing statistics, it was highly probable that you also ended it in those same fields.

About ten years ago we realized that, for a number of reasons, we simply could not afford to continue along the same path.

- We could not afford the rigid allocation of resources that this implied. On the contrary, it was imperative that we should be able to adjust our programmes in line with client needs and with the available budget, but without the extra concern of having to redeploy people possessing non-transferable skills.
- The regular reduction of budgets substantially reduced the opportunity for advancement, so we had to find an alternative way of maintaining interest and motivation. We found that, for most people, the opportunity and active challenge of new assignments worked well.
- In spite a long series of budget reductions, we wanted the agency to have a degree of robustness enabling it to respond to new challenges. This could only be achieved by acquiring a well trained and flexible staff for which accepting new assignments is a way of life. During the last several years we have developed and implemented a thoroughly integrated training program. We also tripled our training expenditure: from about 1% of total budget to 3%.

Indeed, our organizational robustness is currently subjected to a major test. We have received a substantial injection of new funds to carry out a major expansion of our economic statistics program. The total new funds represent 10 per cent of our total budget but involve as much as doubling the staff in a few divisions. Furthermore, the new statistics are needed for the administration of a high profile government program and, as usual, needed urgently. We simply could not have mobilized the required staff in the short time that was available to us without the preceding ten years of staff rotation and large scale training program.

7. Implications for statistical systems: Elements of an external strategy

Just as important as the internal preparedness to meet the challenges ahead, statistical agencies need an “external

strategy” as well. Of course, the two sets of strategies interact closely and must be in harmony.

The external strategy should have at least three pillars. The first one, which is so well understood that I will not discuss it here, involves our “core values”: maintaining the scientific integrity of the statistical system; safeguarding the confidentiality of identifiable statistical returns; respecting society’s privacy norms; and minimizing reporting burden (particularly on small business) through the exploitation of administrative records, sampling, and other statistical techniques.

The other two pillars of the external strategy are relevance and political independence. There is the potential for conflict between these two basic objectives: the closer the statistical system is to the policy process, the higher its potential for relevance – or so it is argued; but such closeness can result in diminished political objectivity, or at least the perception of it. The best solution of this potential conflict depends on national circumstances.

7.1 Achieving a high level of relevance

Abstract goals like relevance are achieved through reliance on particular mechanisms. The following are the ones that are most important for Statistics Canada.

(i) Close and productive interaction with the highest levels of the bureaucracy

I do not subscribe to the theory that official statistics should aim to satisfy only the needs of the national government, or even those of all levels of government. But I do believe that our priority should be to provide an information base for public policy. The open provision of objective information about public policy issues is of benefit not only to the government, but also to the opposition, to interest groups, indeed to the entire public. It is therefore very important to be well connected with the makers of government policy at the highest level in order to obtain the earliest possible indication of evolving concerns and future government priorities.

The close and productive interaction that is needed does not occur by itself. It evolves over time in response to organizational arrangements and personal initiatives. For example, in Canada the Chief Statistician is a full member of the deputy minister (Permanent Secretary) community and participates in their regular weekly meetings, in periodic retreats designed to “brainstorm” the implications of government priorities, in numerous working groups formed to explore specific issues in depth. Membership in the “club” of deputy ministers opens opportunities to make issue oriented presentations based on statistical information, or to draw attention to important new insights as and when they are released. The primary objective is to ensure that the policy development process takes full advantage of insights that can be derived from statistical information. A not negligible secondary objective is to generate an awareness, at the highest level of the bureaucracy, that statistical

information is essential for the policy process and that its usefulness is enhanced, not diminished, by its non-political objectivity.

While there is no substitute to the high level interaction, it is not sufficient. It is essential that, in addition, there should be a web of bilateral interactions (Fellegi 1996) with all major policy departments, as well as those who are guardians of significant administrative record systems of potential statistical interest – such as the customs and taxation authorities.

(ii) Analytic activities

A strong internal analytic program contributes to an improved understanding of the needs of external analysts – in or out of government. Such an understanding is needed to identify priority data gaps, *i.e.*, information which, if it were available, would make a signal contribution to the understanding of key public policy issues. Such insights are prerequisites of broad support for new initiatives.

Good analysts have a strong personal motivation to explore issues and, more often than not, their explorations result in either data development or in the identification of important gaps. Either way, they will champion the cause of further improvement of information or of a more fruitful conceptual framework.

(iii) A wide network of “Listening posts”

Priority setting is, in the final analysis, subjective. It is all the more important that our assessment be based on broad and balanced information, secured through a variety of formal and informal consultation. Given Canada’s federal structure, we have close consultative mechanisms with the provinces in all fields in which they are interested. External expert opinion is received from over a dozen advisory committees, each devoted to a specific subject. Additional views from the business community are sought through marketing efforts by our account executives appointed to work with major clients. Active liaison is maintained by major business organizations and with representatives of the small business sector. At the apex of consultative mechanisms stands the National Statistics Council – a blue ribbon committee of advisors.

(iv) Partnerships with the academic community

The academic community, through its analytic activities, can highlight significant insights derived from statistical data bases. It can also be a partner in building conceptual frameworks; call attention to the need for new information products, review plans for new surveys, serve on advisory committees, review analytic products, and so on. As with all other partnerships, keeping it productive involves some effort. We work with them closely to ensure that we can meet their particular needs for access to statistical data bases, we provide opportunities for some of them to spend sabbatical time with us, we co-author papers with them, participate with them in organizing and supporting scientific conferences, and so on.

Collaboration, over time, can make the academic community very highly knowledgeable about the statistical system. In turn, this enables them to be more effective in calling attention to emerging issues and trends. Some academics become natural contacts for the media on issues dealing with their specialization and it is usually helpful to Statistics Canada when they comment on significant new data or analytic releases.

(v) Media relations

Relevance is determined not only by the potential usefulness of the information produced by a statistical agency, but also by the extent to which the information results in a better understanding of issues. The media have a very influential role to play because it is through their reporting that most people, including many of our elected representatives, acquire statistical information. So frequent and informative media reporting of statistical information is in the public interest. It is also in the particular interest of the statistical office since frequent and objective media references to its products have a positive cumulative impact on the public’s appreciation of the agency.

The single most consequential aspect of media relations is to ensure that each statistical release is accompanied by a highly readable analytic summary of what significant new findings and insights it reached. Other measures involving the media might include: free access to all agency releases; the identification in all releases of a competent spokesperson; being proactive in calling attention to errors or data problems; responding in writing to erroneous or misleading articles; availability of senior staff for media interviews; provision of local area detail in releases where this would likely enhance coverage by regional media.

7.2 The issue of political objectivity and its perception

Public confidence matters because the value of statistics to society directly depends on confidence in their producers. Since few users can actually replicate official statistics, their readiness to use them is ultimately a reflection of their confidence in the professional integrity of statisticians and their ability to carry out their function free of harmful political interference (Fellegi 1991a). The fundamental importance of objectivity has become even more pervasive because of public skepticism about the political process, and the increasing substitution of “objective” statistics for judgement as a means of distributing a diminishing amount of government funds.

I will single out for attention three basic issues and will leave aside such specific and useful techniques as pre-announced release dates for all major series, external review committees, and so on.

(i) Institutional arrangements

I have discussed elsewhere (Fellegi 1996) the general arguments for and against a centralized statistical system. However, there is no doubt that centralization makes it

easier to maintain political independence. First of all, the protection of this independence is a prime responsibility of the head of the agency. The higher his or her standing in the bureaucracy, the more effectively this function can be carried out. This does not primarily derive from power as such, but rather from the fact that public visibility makes an implied threat of resignation of far greater consequence. Since it almost inevitably results in higher standing for the head of the statistical agency, centralization is preferable from the perspective of political objectivity.

Another basic structural issue relates to the formal character of the relationship between the political process and the statistical system. Here, I believe, there is a potentially explicit trade-off between considerations related to relevance versus political objectivity. On the one hand, this paper argued strongly that the status of the chief statistician as a deputy minister (*i.e.*, head of a government department) is of extraordinary importance in maintaining close and productive relationships with other departments – which, in turn, are key determinants of long run relevance. However, a deputy minister reports to a minister. In the Westminster model of government it is the minister who is responsible to Parliament, not the public servant.

A reporting relationship to a minister can certainly lead to political interference. An alternative arrangement that also preserves the advantages of centralization involves the statistical office becoming explicitly an agent of Parliament, such as the national bank and government audit organization are in many countries. Such an arrangement represents the most secure way of isolating the statistical office from political independence, but raises the risk of increased isolation from the machinery of government, and hence of reduced relevance.

In the case of Statistics Canada, the ministers responsible for the agency have always had a senior portfolio which was their primary policy responsibility. They maintain an arm's length relationship to Statistics Canada on all issues of statistical policy and programs: all questions about technical issues and program priorities are either referred to the Chief Statistician or are answered with reference to the Chief Statistician. This tradition is reinforced and kept alive by the senior public service and the Privy Council Office (the department directly supporting the Prime Minister) who have a clear understanding of the public policy importance of having a credible statistical agency.

Everyone is also well aware that by now there is such a strong employee tradition of political independence in Statistics Canada that the media would find out about any improper attempt to interfere.

Given such favourable circumstances, the regular departmental status of a statistical office confers only advantages. But one might well come to different conclusions in other circumstances, particularly if the most senior levels of the career public service could not be counted on for their strong support of the political independence of the statistical system.

(ii) Budget control

Budget control is a basic aspect of non-political independence. If the government could target specific statistical programs through the budget process, this could certainly provide an opportunity to target politically embarrassing statistical programs. And even the possibility of such an event could influence behaviour – on both sides.

Statistics Canada experienced repeated budget cuts during the past 12-15 years. However, the agency was allowed both professional and managerial freedom to implement the reductions. Of course, this meant that we had to be prepared to defend our choices. In fact, our management of the process gained us considerable professional and managerial credibility contributing to our subsequent success in obtaining additional funding for some major new initiatives.

Is there a contradiction between budget control and seeking funds for specific initiatives? Not necessarily. The funding was for new activities that we identified, in partnership with others, as having top priority. Furthermore, once received, the funds became part of our regular budget. While we are obviously honour bound to use it for the advertised new programs, this is neither a formal requirement nor is it in perpetuity.

(iii) The role of substantive analysis

An objective and even-handed flow of analytic output contributes significantly to the image of professionalism and political independence that are so essential for statistical offices. Perhaps more than anything else, this helps to differentiate their public image from that of “the government”.

Analytic output by Statistics Canada takes a variety of forms, the most visible being what we call our “flagship publications”. These provide monthly or quarterly high profile reviews of the economy, of labour market and income analyses, of the analysis of trends in both health and education, and so on. In addition to publishing a wide range of analytic reports, we have an explicit policy that all our statistical releases must be accompanied by a summary of highlights calling attention to significant economic and social developments.

Both objectivity and relevance are important. Objectivity involves exploring all sides of an issue, avoiding policy advocacy, stating assumptions, highlighting major findings whether or not these reflect well on the government. Relevance relates to the choice of topics: they should deal with issues of clear importance – even though some of them might be controversial. Like our other publications, analytic studies must feature readable highlights and they are very widely quoted by the media.

While a regular and visible flow of analytic output can make a very positive contribution to our image, such a program must be particularly well managed. The output must be subject to peer review so as to verify the scientific validity of the analytic approach. But it must also be subject

to what we call an “institutional review”, to ensure that the analysis is neutral, that it explores issues in an even-handed manner, and that it does not transgress the fine line separating analysis from advocacy.

7.3 International collaboration

The last element of the external strategy that I want to touch upon is the need to participate in international work. I believe that the international arena is not an optional luxury. It takes at least the following three forms.

(i) The traditional international functions

Under this category falls the work well recognized by our profession for over 150 years:

efforts to harmonize concepts and classifications, mutual professional stimulation, and learning from each other. In respect of harmonization, while always important, the need has already increased dramatically and will continue to do so. The requirement arises from a number of sources: transnational corporations, international negotiators, international organizations who set fees and distribute benefits, researchers for whom international comparisons serve as natural benchmarks, and the general public which already has unprecedented ease of access to national data on the Internet.

(ii) Pooling intellectual efforts

While the category above encompassed collaboration, it related either to traditional professional interactions, or to work that could only be carried out by and under the aegis of international organizations (such as the development of international classifications and standards). In recent years, stimulated by the persistent conceptual complexity of certain problems (such as the measuring the outputs of the service industries sector), we formed a variety of informal but structured working groups which meet with some regularity and where the national “membership fee” is the contribution of conceptual/developmental work carried out between meetings. Many of these fora turned out to be productive.

(iii) Transnational dimensions

There is a third category of international work whose dimensions are still fuzzy, but the need for which is clearly discernible. It relates to the looming problem of tracking the economic contributions and transactions of transnational enterprises. No national statistical office can take a proper account of their functioning since they truly operate in a borderless mode. Consider a manufacturer in Canada which, as part of a transnational car enterprise, produces brakes and exports them world wide for use by the same enterprise. This Canadian manufacturer would report export earnings, value added, profits, inventory, capital stock, and so on, all according to the book keeping conventions of the enterprise.

In turn, these may well change over time in response to their assessment of the benefits they can derive from differences in national tax laws.

Furthermore, however complicated the problem of tracking might be in respect of goods, it is substantially more so with respect to services, many of which can cross international borders electronically, and go undetected. It is evident that any progress regarding this issue of increasing importance can only be made through the collaboration of national statistical offices in ways and through fora that are yet to be articulated.

8. Conclusion

As the millennium is drawing to a close, it is quite fashionable to try to peer into the future: identify emerging trends and provide erudite analyses of their consequences. My experience with similar exercises triggered by other excuses has not been favourable: in retrospect the most important trends turn out to have been different from those that were anticipated. High profile examples of misdiagnoses abound. One of my favourites is the famous statement made by Lincoln Steffens, the American journalist, when he returned from a visit to the Soviet Union in 1919: “I have seen the future; it works...”

Even when we correctly anticipate, our constraints in responding to them are typically quite different from what we might have expected. As a result, I chose to base my analysis on the scenario identified by a group of senior Canadian policy analysts, and so avoided putting forward my own favourites as to what the key policy challenges of the foreseeable future might be.

I could have tried to create my own futuristic scenarios, *e.g.*, about the impacts of involving computer-communications and their impacts on society and the statistical office; I could have speculated about the withering away of nation states – or indeed the opposite (both perspectives were espoused in a recent 75th anniversary issue of *Foreign Affairs*, by no lesser authorities than Arthur Schlesinger, Peter Drucker, and Anne-Marie Slaughter (*Foreign Affairs* 1997)); I could have tried to discern trends about whether the recent retrenchment of the role of governments is a secular event or only the currently discernible movement of a giant pendulum. I chose to avoid all of that. I fundamentally believe that it is not only possible but essential to pursue a robust strategy that does not depend intimately on our futurology, and I tried to outline the internal and the external elements of such a strategy.

The main feature of the internal capacity is the development and maintenance, even in the face of budget cuts, of a strong professional and operational capacity capable of adapting to its environment. I outlined what I already perceive as major adaptations needed in a number of specific domains of major relevance to public policy. Most of these involve both conceptual and data issues, and I argue that these two issues must be addressed in parallel, in an

iterative manner, typically by starting with some conceptual frameworks and then fleshing out and refining them through new data systems.

The key aspects of the external strategy are there to ensure that we have excellent receptors to pick up and filter the signals from our environment; that we place extremely high priority on the various approaches that we need to pursue in order to stay relevant (which means, among other considerations, trying to go beyond our traditional role of monitoring by striving to illuminate issues, including the role of “policy levers”); that we serve our society well – all major groups, and in a manner that is suited to their needs, not our convenience; and last but not least, by doing all that is necessary to preserve and strengthen our non-political and professional independence.

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