SOME EXPERIENCES IN TRAINING STATISTICIANS IN OFFICIAL STATISTICAL OFFICES

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The paper looks at the scale of change statistical offices now experience, and what is expected of their statistical methodologists. The paper discusses the ways in which the preparation by universities needs to supplemented by training on the job, in house education, planned work experience, and how far personal and group experiences contribute. The experiences of the United Kingdom Office for National Statistics, and of Statistics New Zealand are drawn on, with examples from several other countries.

INTRODUCTION

In an official statistical office, statistical thinking and practice pervades almost all the work of the office, including that of specialists in fields such as information technology, training, general management and communications. The training of statisticians usually embraces methodologists, statistical analysts, survey management and survey operations staff, but this paper concentrates on the sustainable development of a statistical methodology and analysis force. In the United Kingdom, the whole of government benefits in having a sustainable force of professional statisticians has long been recognised, through the establishment in the 1960s of the Government Statistical Service, the head of which has also had the standing of a Permanent secretary in the civil service. A similar situation exists in France, where training has been institutionalised through INSAE. In New Zealand, Australia and Canada, a strong methodology group within the national statistics institute has sustained professional leadership within the institute itself, and external influences are not driven by institutionalised practices as in the UK and France. The UK has recently recognised the limitations of the decentralisation of methodology, and established a strong central methodology group of some 130 professional statisticians. On the other hand, in New Zealand and Australia, there is a keenness to broaden the community of those in official statistical work, including those in other agencies.

THE CONTEXT OF CURRENT CHANGES AND CONCERNS

The role of statisticians within government is itself changing. Improving the analytical basis of policy makes a difference. The statistician's role is much more than measurement, as they consider the limits to measurability, the relevance of simplifications that enable measurement processes, assess judgements, whilst themselves usually being captured by the society of the times. Analysis for assessing public policy is hard, and policy responses are not linear, not symmetrical. We live in a world that is increasingly richer in diversity, and influencing variables are more than ever difficult to understand. For example, in expenditure and income studies, we show a huge diversity of outcomes for similar situations .

Increasingly, government statisticians work with the tension between relevance from close proximity to issues, bringing strong affinity with current policy, and the importance of being objective. In managing this, there are several things that need continual attention. Evidence for accountability different from evidence for improvement, which is usually basis for need to balance distinct roles of official statistics from policy analysis. Transparency can be assured in several ways, such as peer review, alternative research communities, separate research from policy. The need for statisticians not only to bring professional methods to play, but also to explain them, is one that applies to scientists generally. Consequently the arguments I will present are not only just for statisticians, but for all who advance knowledge through scientific methods, whether in developing or applying them. Sustainability of confidence in policy as well as stability of future policy change necessitates commitment to collecting information that could inform prospective policy options, even where not part of current political leadership.

The paper identifies some of the more significant influences on the scale of change that statisticians who work in official statistical offices now experience, and how we support them in what is expected from them now. These include:

- How to best manage the balance between statistical activities focused on survey design and management, and on the analysis of survey and administrative sources for policy and other uses.
- How to most effectively provide users of complex surveys such as longitudinal surveys and time use surveys, with the analytical capacity these sources need.
- Given that not all countries have yet to have a political consensus about the role, shape and direction of the official statistical system, how to respond to statistics being more likely to be challenged in political forums, and the media.
- We have seen a rise in the place of quantitative information in public life, partly influenced by a shift in the way governments promise to achieve success, through results rather than spending.
- As the balance of work has shifted from survey design to data extraction from administrative sources that have no statistical design, develop new skills.
- Provide new statistical designs for the many critical statistical measures and analyses that now depend on the quality of integration of sources and the coherence of information for the credibility of results and policy effectiveness.
- As the potential from information management moves ahead faster than we can often keep up, limit the extent to which this hinders the quality and scope of solutions that statisticians can provide within short time periods.
- Draw on the considerable benefit to the statistical work in all countries that arises from international collaboration, and is facilitated by cheap travel, low cost international communications, and pervasiveness of English.
- Be able to deliver responses in near real time to expending expectations for the delivery of unchallengeable results.
- Provide statistical analyses to inform the global policy shift in social policy which has generated demand for great detail about small populations.
- The demand for detailed information about small populations brings tension in statistical work needed for the administration of policy, compared to policy development and evaluation.
- Performance targets set by politicians bring statistical results closely alongside political aspirations and tensions, in public affairs.
- Quality measures are a critical part of statistical results, despite a legacy from the 1980s in some countries of an unwillingness to pay for this information.
- In the face of globalisation and technological and population change, information typically used for critical survey frames is less likely to represent the population throughout the life of the survey design.
- Statistical literacy of the community and media may not be advancing fast enough for the rise in quantification.

SUSTAINING THE METHODOLOGICAL DEVELOPMENT OF THE OFFICIAL STATISTICAL SYSTEM

The paper discusses the ways in which development of statisticians is part of a system beginning with the preparation by universities, which needs to supplement by training on the job, in house education, planned work experience, and how far personal and group experiences contribute.

- The paper notes the decline of place of central teaching of statistics in universities (Southampton, Auckland as exceptions)
- The growing need to strengthen the capacity of statisticians to bridge the gaps/ differences across professions (UK approach - integrating analysis, ESRC, cross government professional capacity building)

- The need to understand the different bases for evaluating evidence in statistics, and other fields of decision making, particularly the courts and medicine.
- Limits to measurability in face of the unknown statistical properties of a growing share of statistical sources based on administrative records (see what works notes).
- The essential need to understand the legal context of access to component statistical and research sources.
- Does the increased specialisation of statisticians in particular fields lead to a slowing of the advancement of statistics as a science? Do we need a capacity to explain in common language?

A structured approach to training is necessary; to ensure the sustainability of statistical leadership, in the face of a broadening skill need which far exceeds the capacity of any single individual to bring excellence in all components. Even the largest statistical offices can not lead innovation in all fields, so international collaboration is critical for all agencies. The challenges we face are severe, and demand strong and insightful leadership. Statistical offices alone cannot provide sustainable solutions; this needs a strengthening of commitment to statistics from the beginning of the education of children. Experiences are grouped into five key types.

Support for Personal Endeavour and Initiative

- Professional advisor role, outside management structure
- In house methodology publications (Statistics Canada, UK ONS)
- Importance of communication, and having an informed challenging media and informed users (special attribute of UK with its strong press and large non-government statistical sector)
- Fear and cost of failure, and forms of exposure can generate a culture of risk, fear, event if not balanced by confidence and competence

Structured Approach to Developing a Sustainable Statistical System

- Importance of sustaining a critical mass of experts in key fields, of sample survey design, time series, quality management, confidentiality protection, index numbers, operations research.
- UK centralisation of methodology since 2000
  Hence, the move to a more centralistic approach of a single business unit may mean that we will forego few of the gains made, with newer management understanding that we now have be more effective in a centralistic rational approach.
- Retirement of the very large cohorts of statisticians recruited in the 1960s and 1970s
- Technology shifts affect all aspects of work, and bring about huge shifts in comparative advantage of sound statistical thinking if exploited
- Speed breadth of change now normal

Stimulating Leadership Behaviour

- Need to raise bar of professional leadership by managers
- Top management commitment to strong methodology
- External boards have become more usual, UK set up external methodology board as long established in Statistics Canada and ABS, in order to help shape our current strategic thinking in the management of the statistical methodology unit, and in the executive of Statistics New Zealand about where we go.
- Flexible recruitment and appointment processes

Recognition that Learning is an Ongoing Social Process

- International conferences valuable learning UK used Berlin ISI, Stats NZ used Sydney ISI
- Exchanges with ABS and regular visits

- Internal exchanges and co-location for large projects

Giving Emphasis to Collaboration

- Establishment of partnerships with Universities and official statistical offices, to develop statisticians (ABS has scholarships in 4 universities, and cadetships for honours years, USBC has University of Georgetown partnership, ONS and Southampton
- Cross country comparison and benchmarking of survey methods
- Almost all endeavours are now dependent on new forms of information and evidence DNA testing, courts, isotope tests, drugs.
- New partnerships (Southampton links at ONS, ABS chair at Wollongong, NZ Institute of Mathematics and its Applications, Old ISOR experiences)

MEASURING SUCCESS

We need to know how we will recognise when we are having some success. Most visibly, the use of statistics in public life will improve, but this is an intangible long term outcome, and we will want to see signs of improvement in the things that are more immediately and obviously influenced by statistical leadership. These will include:

- The speed and breadth of engagement of official statisticians in not only issues of measurement, but the limits to measurement, and the implications for policy options of measurement errors.
- The extent to which statisticians themselves are involved in the public analysis of statistical results.
- The sustained effective application of up to date tools, and science
- The lower costs for government and the community, from changing policies and operations.
- A strong capacity to collaborate/contribute, such as a shared experience of other statistical systems, and comparable areas of knowledge elsewhere.
- The clear development of leaders of the next generation of statisticians and statistical thinking.
- Responsiveness of the teaching of statistics in schools and the status of statistics.
- Extent to which user needs for statistical integration are met as a consequence of survey design as well as post survey analysis and adjustment.
- The extent to which new information sources become used to the full extent that is possible given the nature of the administrative processes that determined the form of the information.
- Leadership in understanding policy questions, creating an insightful focus for the advancement of the national statistical knowledge base, and providing the capacity to integrate information at level relevant to the nature of policy questions (Micro data vs. aggregates).
- Continued advancement of access and presentation tools, leadership of better data visualisation, and its place in understanding.
- Provide Leadership in managing policy risk, through an understanding of contemporary trends in population, economy and society, and responsiveness to where statistics might have helped a better result.

CONCLUSION

Finding ways of responding some real difficulties in sustaining a strong professional statistical force in official statistical offices has led to some convergence of thinking, and some innovative approaches, many of which involve cross country collaboration, and greater within country sharing of good practice. This paper has sought to provide an overview of the forces which have led to these pressures, and distil common elements in the responses to them.