Discussion

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1. Introduction

The redesign of statistical systems to reflect an agency-wide strategic architecture is one of the most fundamental challenges a statistics agency faces. It is both necessary and difficult.

It is necessary because it will yield the cost savings and quality improvements that funders and users demand. The development of methods, systems and processes to common standards under a unified architecture yields savings in development and maintenance costs, which are timely given ever tightening budget constraints. At the same time common metadata standards, methods and approaches guarantee quality standards at a time when users become more demanding. However, although the agency-wide benefits of this approach are self evident, statistical producers have found this approach hard to deliver.

The strategic redesign of statistical systems poses a number of difficulties and the articles in this issue give some good examples of these and how statistical producers have attempted to overcome them. The articles also underline the importance of statistical leadership, and my discussant note focuses on this aspect.

2. The Strategic Challenge

The extent of the challenge of redesigning systems will vary for each statistical producer, depending on its history of statistical development and the extent to which past development has been at a strategic level. The challenge is particularly daunting for producers that have a diverse infrastructure. Diversification may have arisen for a variety of reasons. One cause, as in the Office for National Statistics (ONS) in the UK, is the move from a largely decentralised statistical system to greater centralisation. The component agencies in decentralised systems tend to follow separate and diverse IT and methodological approaches. As each production area merges into the centre, it takes with it its own particular approaches. Or it may result from the agency maintaining diverse systems in different geographical areas. This is the background set out in the Nealon and Gleaton article, which describes the National Agricultural Statistics Service (NASS) experience (and I shall refer to as the NASS article). Or, as in the article by Seyb, McKenzie and Skerrett from Statistics New Zealand (the SNZ article), diversification may arise from a process culture (also a factor at ONS in the UK, I think), which together with a hierarchical organisation structure led to investment decisions being driven by the need to replace ageing production systems in production silos. At RTI International (the article by

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Thalji et al.) it appears to have arisen from a project approach, designed to meet specific requests from users. In addition, diversification may arise on the technology front as a result of the preference in some agencies two or three decades ago for IT services to be bedded out to specific statistical areas, as described in the article by Struijs et al. (the CBS Netherlands article). This local ownership of IT weakens the strategic drive and often leads to a multiplicity of different solutions and software licencing arrangements.

Whatever the reason for the problem, I think we would all agree that the costs of maintaining such diverse systems escalate. It is useful to see this documented in the SNZ article, and there are also good examples in the NASS article. The CBS article sets out their Enterprise Architecture approach, being the framework needed to successively redesign the statistical processes of an organisation. But bringing systems and methods under a common architecture can be very difficult where the cultural tradition favours diversity. Local statistical solutions for individual business areas, be they national accounts, prices or population statistics, will usually produce optimal solutions for those areas. For example, software that supports a particular editing approach which suits price data may differ from that which suits social surveys. Users, to the extent that they have a view on statistical methods, will support local solutions, as will the statisticians that manage those systems, who may have had a key role in their development. The benefits of locally focused development will be very evident at the local level. Strategic solutions are often suboptimal locally, and their benefits are apparent only for the agency as a whole. In the end, the issue may come to a head if there are simply not the resources to continue with locally led development. However, managers of local statistical systems will have invested much of their time and energy in developing and maintaining those systems, and will have considerable expertise in them, and not necessarily be expert in the strategic solutions being proposed.

3.   The Role of Statistical Leadership

In these circumstances, the need for effective top level statistical leadership is clear. By statistical leadership I mean the ability of the senior professional statisticians in the organisation, working as a team, to meet the strategic challenge, set the direction and take their stakeholders with them. Statistical leaders can do this by propounding the benefits of strategic change to all stakeholders, but especially to funders, to users, and to staff.

Strategic development of statistical systems is expensive and cannot always be funded internally. External funders will principally be concerned about value for money: that is, control of costs and delivering financial benefits. Where an organisation is primarily funded through users, for example, by charging for surveys, judgements need to be made about the extent to which overhead charges can pay for statistical developments. Government agencies which are mainly vote funded by government may need to bid for development funds. The strategic nature of statistical system development generally leads to a statistical programme made up of many projects. These will often include technology projects, projects to determine best methods, projects to redesign business processes and projects to deliver production systems. Indeed technology projects are often prerequisites for statistical transformation, which requires common technology platforms and standards. Thus the NASS article describes a project to consolidate network services across their Field Offices; standardise and integrate survey data and metadata; and generalise survey applications and

databases. The SNZ article covers a modernised IT system, standardised processes and methodology. The RTI article covers a centralised database, case management system, survey instruments and a quality evaluation system. The CBS article notes that the major financial savings will often not be apparent until the programme is complete, although some articles note the possibility of realising some savings along the way.

Each project is complex and generally there is a high degree of interrelationship between them, making the estimation of the overall costs uncertain. In addition, financial benefits will often not be fully apparent until production systems are delivered, often much later than the early infrastructure development projects. At the beginning of the programme business cases will be produced, highly uncertain given the nature of these developments, but essential to secure the funding needed. Unless funders are made aware of the complexity of the developments planned and the attendant pitfalls, there is a high risk that failure to deliver the benefits in the business case will adversely affect the reputation of the agency. The SNZ article stresses the expectations that public sector agencies have on them to deliver cost-effective statistical systems.

Leaders will also need to ensure that users fully understand the strategic benefits. Locally managed systems will often deliver rapid responses to changing user requirements. Users may be concerned that a strategic solution will be less responsive. They may also be concerned that a significant change of approach will lead to discontinuities. Users will need to be persuaded of the broader benefits of the new approach and that the existing approach may not be sustainable in the long run.

The agency's staff is the key stakeholder group. The new development approach will require a high level of detailed understanding by all staff. It is likely to require a large number of projects, all to operate within a common architectural framework. Project managers and business area managers will need to understand the new approach and be able to see the implications for their work and how the approach can best be used. Staff in the agency will often be alert to the benefits of change. It is interesting that in the NASS article staff were asked where savings in the future might come from, and they identified the more effective use of staff, seen in the wasteful duplication of functions in the agency.

Agencies often use statements of principles to articulate the new approach. The NASS article uses a set of four criteria: centralisation, integration, standardisation and flexibility to provide direction to its transformation. SNZ defined a set of nine "guiding principles". CBS founded their enterprise model on a set of key principles. RTI identified standardisation, integration, and data access. Such statements of principle are powerful ways of communicating the strategic approach to staff. The degree of commonality in these sets of principles in different organisations is striking.

With each of these stakeholder groups – funders, users and staff – it is for the leadership in the agency to articulate the vision, and set out the benefits in ways that can be readily understood. A relentless focus on communications is essential, together with setting up good governance and evaluation approaches. The NASS article pays tribute to the NASS Administrator's support and the role of the senior executive team. There will always be differences of view amongst senior executives, especially where a development programme has led to some re-ordering of priorities. Staff will be looking for the wholehearted commitment of the senior team to the changes that are about to be made, and a divided team will have a considerable impact on how well the programme can be

delivered. SNZ recognise the need for a culture and change leadership programme to develop strong leaders and develop a performance culture. The CBS article also notes that insufficient communications in the early stages led to misunderstandings.

4.   The Complexity of Statistical Development: The Need for Methodologists and Technologists to Work Together

The need to upgrade and develop technical architecture and the need to improve statistical methods often go hand in hand, and technologists and methodologists need to work closely together to ensure success. Both NASS and SNZ describe a move away from traditional transactions processing, with its emphasis on speed and repeatability of process, towards analytical processing, providing more flexible and powerful analysis. Technology innovations such as thin client architecture, virtualisation of servers and the development of Agile development approaches, as described in the NASS article, lend themselves both to the easier consolidation of statistical systems and the active engagement of statisticians in their development.

Although we have come to view a generalisation of the statistical process as set out in UNECE (2009) as the norm, that high level view covers a degree of complexity, leading to what SNZ describe as the "design and build" bottleneck. At each stage of the model there are options and variations, often tied up with particular software choices. In addition, the detailed coding required in software solutions, even for proprietary software, can be complex and require a high degree of statistical understanding. Close collaboration is required between the designers (traditionally the statistical methodologists) and the system builders (traditionally information technologists). A third player in the development triangle is the business owner of the system being developed, often a statistician, but possibly from a related analytical discipline, such as an economist or social researcher, or maybe an expert process manager. The SNZ article describes this group as "subject matter specialists". As the NASS article makes clear, one of the most frequent causes of failure is a failure to meet business requirements, caused by a lack of understanding between the three parties concerned. Both NASS and SNZ have employed the agile approach to help build collaboration by requiring constant communication between the parties. In fact SNZ have gone further. By developing a highly flexible statistical infrastructure and a generic set of tools, they have empowered their subject matter specialists enabling them to develop systems themselves, and providing a quick and low-cost development approach.

Collaboration between professionals builds over time and as the transformation progresses through a number of projects there is a degree of organisational and individual learning. Using external IT providers or outsourced staff can be a barrier to this, although it may be necessary if sufficient skills – either specific skills or the quantity of skills – are not available in-house. In most countries, contractors will rarely have experience of developing statistical systems, as such systems are not widely used outside statistical agencies. Consultants tend to underestimate the complexity of these systems, and if they are only contracted for a single project, do not have the opportunity to learn. A longer term strategic relationship is needed, but can be difficult to sustain, given the agencies' need for contestability and the contractors' uncertainty about the value of long-term skills investment. The employment of contractors for statistical development is difficult to

envisage in the "analyst builds" approach of SNZ. RTI looked at a variety of commercial off-the-shelf packages for its data collection project, but decided to develop in-house to maximise its design control.

How can we manage such complexity? Good project management techniques are essential, together with programme management to ensure interdependencies between projects are understood and managed. SNZ has developed an approach to complexity by breaking down the transformation into a number of phases, and setting targets for each phase. Furthermore, they have used a prototyping approach with their scenario store: this essentially mirrors the live production environment. Statistical leaders also need to think about the organisational implications of enterprise-wide strategic developments. The CBS article describes the need to set up new units to undertake new corporate functions (e.g., their Data Service Centre), while in the UK, the ONS has brought together methodologists and IT experts into a Strategy and Standards Directorate, providing an innovative focus for the Office, and ensuring that their developments are aligned with the corporate strategy and standards.

5. The Need for Strong Governance

The NASS article is right to point to the need for strong governance as part of the answer to complexity. It can help to ensure that the strategic benefits are realised, and that business requirements are met. As noted earlier, all articles have a set of guiding principles which describes their visions.

The NASS article identifies the role of a Senior Project Manager, which in the ONS we called an Executive Sponsor, or Senior Responsible Owner: a board level executive who takes on the role of ensuring strategic alignment and that the agency level business benefits are delivered. SNZ have set up Portfolio Committees. RTI had a team of senior executives as a steering committee.

The NASS article also describes an Enterprise Architecture Council (in ONS known as the Design Authority) that has the role of approving technical standards and of ensuring that projects meet them. SNZ have a similar Standards Review Board. Without some such Authority it is very easy for the results of such developments to be an updated technology with little change to business process or methods, so that the overall business benefits are not delivered. The CBS have created an Enterprise Architecture Board to interpret their strategic goals and make decisions on how to operationalise them.

SNZ recognise that their development model, using analysts as builders, requires a high degree of control to prevent the problems of the past resurfacing. Hence they build limitations and controls into what the analysts can do.

6. The Need for Organisational Learning

A number of agencies have now been working on strategic redesign for some years. The CBS has been following its current enterprise architecture approach for about seven years. SNZ has had more than one attempt at standardising its statistical production. The ONS has also been on this path for a while now (see Penneck 2009), using different approaches. There are some similarities here, with the agencies moving from a large-scale infrastructure development approach to smaller-scale rapid developments.

The RTI has a well-developed approach to evaluating the success of its developments, which relates performance to success criteria based on its original principles. RTI also plans to monitor development costs in the new strategic environment compared with ad hoc developments. The other articles say less on how they will evaluate their programmes, although they are clear about the need to measure benefits.

Most of the articles set out the points they have learned along the way, and bringing them together will be a valuable aid for all agencies engaged on this work. The work described in these articles is necessarily long term, and the membership of project teams and the holders of key posts will change over time. The leaders of an organisation will want to ensure that the lessons derived – the positive as well as the negative – are learned by the whole of the organisation and not only by a few individuals who may move on (or worse, only by external consultants). Organisational learning is the key to organisational improvement, and can only be successful if the lessons are widely disseminated within that organisation.

Is there scope for greater international collaboration? The answer must be "Yes". Reading RTI's development of a case management system reminded me of ONS' similar attempt some years ago. Certainly statistical producers should be encouraged to write up and publish their experiences in this area: there is a great deal of common ground and potential for international learning.

7. Conclusion

In this short note I have attempted to draw on some of the experiences set out in some of the articles in this issue, together with my own experience in ONS, to underline the importance of statistical leadership for an organisation which is embarking on strategic redesign of its statistical systems. By exercising statistical leadership, the senior statisticians in the organisation can respond to the strategic challenges of a change typified by:

- a legacy of diverse systems, methods and processes.
- benefits most evident at a corporate level.
- a high degree of complexity.
- a need for good governance.
- a need for organisational learning.

8. References

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