

## **The Office for National Statistics (ONS) Statistical Modernisation Programme: What went right? What went wrong?**

Stephen Penneck

Director of Methodology, UK Office for National Statistics

Pressures to operate more efficiently, respond more rapidly to changing user demands, exploit data more effectively and improve statistical quality have led a number of statistics offices to seek to modernise their statistical systems in similar ways: adopting a uniform technical environment, using standard tools and processes across statistical systems, with common business processes driven by metadata.

The UK's Office for National Statistics embarked on such a programme of statistical modernisation in 2001. This programme proved very ambitious given the time and resources available, and required the management of a huge amount of change. While it has not achieved all its goals, there have been many achievements. This paper will review the experience of the programme, and set out what was delivered. It will review what went well and what did not, and seek to draw some lessons which will be relevant for the future of statistical modernisation in the UK.

The author hopes this paper will enable conference participants to see parallels and differences with their own experiences, so that those National Statistical Institutes (NSIs) seeking to respond to the pressures outlined above, which remain relevant and pressing today, can discuss common experiences and lessons learnt.

### **1. Introduction**

Eight years ago ONS embarked on a programme of statistical modernisation. This paper sets out what was achieved, what went right and what went wrong.

The case for modernisation was built on the need to substantively upgrade ONS statistical system in an integrated way. Many years of under-investment coupled with an approach that placed ownership of statistical systems in individual business areas had led to a diversity of technology and statistical infrastructure (statistical tools, methods and processes). As a result statistical systems were outdated, expensive to maintain and subject to a high risk of failure. They were difficult to adapt to changing needs, and were reliant on specific staff expertise which was hard to maintain.

ONS had been formed from a merger of three statistical offices (the Central Statistical Office, Office of Population Censuses and Surveys and Employment Department Statistics) in 1996. The 1997 Labour Government had been elected with a mandate to make statistics 'independent', which was to lead to the setting up of National Statistics and the post of National Statistician. In the late 1990's the integration of the three statistical offices and the National Statistics agenda were the priorities of ONS leadership, ahead of statistical modernisation. By 2000, it was clear that greater priority had to be given to modernisation, not only to upgrade statistical systems but to bring together the cultures of three offices into a common way of working. ONS

was in danger of becoming a high cost operation which could not respond quickly to changing user needs.

## **2. Years of hope: 2001 to 2003**

Len Cook, the National Statistician, presented a case to Treasury and gained funding rising to £40m a year from 2004/5. Statistical modernisation would place statistical systems into a robust, shared and enduring environment, supported by an agreed set of common tools and methods. It originally had four components:

(i) Information Management modernisation - an upgraded technical infrastructure

(ii) Statistical infrastructure - new statistical tools integrated into the technical environment

(iii) Re-engineering of 13 statistical areas - national accounts, labour market, population, life events, business register, prices, surveys, regional, ethnicity, industry, health and care.

(iv) An Information Age Access Programme aimed at transforming access to ONS statistics via the web.

The initial target was to place all ONS sources into a common statistical database using common tools and processes by March 2006. A good deal of thinking had taken place prior to additional funding becoming available and a large number of statistical systems competed for resources. Four phases of work were planned and national accounts, labour market and population estimates were agreed as priorities in phase 1 of the programme. These priority projects covered all ONS sites, and were largely driven by the need for flexibility, reducing risk, lowering costs and reducing times for standard work. It is interesting that deliverability or complexity were not significant factors in this prioritisation.

Much of the early work planned the development of standard statistical tools and the conceptual design of the data repository - the Central ONS Repository for Data (CORD). Generic data models were established to cover all data types in the office, and standards for common data structures were set. A lot of this early conceptual work was done collaboratively with other NSIs, particularly Statistics Canada. The vision was to develop CORD as an Oracle input and output database - with several dimensions of use: a time series version, a cross sectional, a longitudinal, and an aggregate, etc. Statistical tools would be enveloped in Java script which would provide a standard web- like interface for business areas. SAS would provide a processing capacity.

## **3. The Statistical Modernisation Programme: 2003 to 2006**

A review of governance was undertaken to reflect the substantial increase in modernisation activity and to ensure its focus on integrating the value chain. The organisational structure of the Office's statistical operations was changed from a

subject matter (economic statistics and social statistics) focus to a functional focus (sources and analysis). As a result the new Sources Directorate became a key customer for modernisation work. ONS had been running modernisation as a number of strategic programmes: business transformation, statistical sources development, technical infrastructure development, web development and neighbourhood statistics. It was agreed these needed to be brought together into a new Statistical Modernisation Programme (SMP) set up in July 2003 with the Director of Sources as the Senior Responsible Owner. Its goals were, by March 2006:

- To deliver higher quality and noticeable business benefits through holding the major ONS statistical sources in a common statistical database and through using common processes, tools and practices.
- Produce a 25% increase in statistical outputs compared with 2002-03 with the same relative baseline investment.
- The National Accounts and Labour Market statistics will each be managed through an integrated set of standard statistical processes.
- To provide an automated UK-wide population estimates and projections capability.

SMP had three main components - statistical infrastructure development (statistical tools), labour market re-engineering, and national accounts re-engineering, but in addition had projects to develop CORD, metadata, web dissemination, and twelve other significant projects.

Despite these changes, ambiguities in high level responsibilities remained. A Technology Modernisation Programme (TMP) continued alongside SMP, but there were uncertainties about its status and scope. SMP struggled to deliver its objectives. The strategic projects were complex and proved difficult to complete. They fell behind schedule causing delays to the business projects, such as Labour Market statistics, as that project was having to resolve all the problems of building a strategic CORD tool to meet wider needs.

The office was also having problems finding people to fill some of the new development posts. In many cases staff were transferred from business areas, leaving their old posts hard to fill. Information Management (IM) had embarked on a relationship with a private sector contractor to provide IM support, and this added risk to IM costs. As the work progressed the project directors were learning more about the scale of the challenge and ONS' ability to meet it.

The programme was subject to regular reviews, both internally, and externally by the Office of Government Commerce (OGC). The reviews commented positively on the shared vision of the programme, but the reviews also commented on:

- the complexities of the governance structures;
- concerns as to the ambition of the programme, the complexity of the issues the programme was tackling, and the ambitious nature of the timescales;
- the need for higher level and more experienced programme management skills;
- need to acknowledge the importance and complexity of metadata;

- weaknesses in IM resource estimation and testing procedures;
- need for more business involvement in design;
- relationships between the programme and the business had not been good and that this had hindered progress;
- having the relevant IM resource outside the control of the programme limited the chance of success.

In 2005 there was a shift from attempting to deliver strategic solutions towards the delivery of production quality systems. A new programme management structure was set up and an ONS Integrated Delivery Environment (ONSide) development methodology implemented. These were to have lasting long term benefits although initially they slowed down progress as new procedures were learnt by staff.

By the end of 2005 it was clear that the original March 2006 goals for the programme would not be achieved. This conclusion was not widely acknowledged and with hindsight the lack of recognition of the change in what could be delivered led to continued unrealistic expectations by the business of the programme, which undermined trust in its performance. Although the continuation of funding for the programme had been agreed by ministers for future years in the ONS 2004 budget settlement, improved statistical outputs had also been required, which it had been assumed would be paid for by cash savings delivered by modernisation. With these cash benefits not coming forward, the improvements to statistical outputs took a larger proportion of the investment needed for modernisation, significantly reducing the available funds.

#### **4. Odyssey: 2006 to 2008**

Following a further series of internal reviews and workshops and an externally focused 'zero based' review, the office set up the 'Odyssey' programme in March 2006. This was to run for two years. The naming of the project was significant. It reflected growing realism: that ONS had begun a long journey, and it was not possible to predict the date of arrival. Odyssey brought together work on SMP, TMP and i-dissemination (i-dissemination had succeeded the Information Age Access programme), and introduced stronger programme management. The modernisation vision was confirmed as still imperative for the ONS business. The agreed approach included a range of projects which took forward strategic solutions for social surveys and national accounts. The programme also recognised the difficulty of accurate project costings and built a reasonable level of contingency into the budget. The national accounts project was the project now intended to deliver CORD in its time series version. It was recognised that full modernisation would take much longer than had been thought and that some resource now needed to be focused on immediate business continuity issues. The programme budget was £12m for each of the two years. As the programme was being set up, IM conducted a review of poor delivery issues in the past. It raised the need for:

- good working practice using ONSide, with a closer adherence to project management techniques, and use of timeboxing etc
- new estimating guidelines and formal inclusion of contingency
- ONS to move towards being more self sufficient in IM skills

- stronger ethos of change control
- regular 3 monthly functional releases of deliveries
- keep the business requirements focused on the minimum necessary

When the two year Odyssey programme closed in 2008 it had successfully delivered 10 out of the planned 16 projects. A lot of learning had by now taken place. The projects that delivered were all those that started afresh under Odyssey, where we had learnt the lessons from SMP and properly established business needs and design principles from the outset, and appropriately managed delivery. The projects that had been inherited from previous programmes retained all the entrenched problems of lack of clarity of business needs and of design direction, and these proved too entrenched to resolve within the time scales. It is also true that the newer projects were smaller and not so leading edge - something else we were beginning to learn.

Larger more strategic projects continued to be more difficult. While national accounts began to be more successful, eventually delivering the CORD Time Series database functionality, the Labour Force Survey project (the remains of the labour market re-engineering project) continued to have difficulties. In most cases the strategic projects continued to suffer from a lack of understanding of business requirements - although Odyssey made good progress in building these skills; and a lack of specification of non-functional requirements. With externally agreed timetables for delivery the programme would not have time to address these major weaknesses. There continued to be skill deficiencies - technical delivery and estimation, testing, programme and project management and business analysis.

## **5. What had modernisation achieved?**

Over the seven years to 2008, ONS made limited progress in developing generic statistical systems but has had success in applying strategic tools to specific systems, and had learned a lot about how to do this kind of work. The early work on data structures, standards and metadata fed through into the later projects. The new architecture used an oracle database (CORD) with Java to provide a web interface with statistical tools. SAS is currently used as the preferred statistical processing tool. The statistical systems that were modernised over this period included:

- the national accounts core system
- life events interface and civil partnerships systems
- annual survey of hours and earnings
- new monthly indicators of earnings
- population estimates (part)
- foreign direct investment
- integrated business register and employment survey pilot (BRES) - full survey going live this year
- telephone data entry system for business data
- secure electronic capture system for business data
- upgraded scanning system for business survey questionnaires
- improved matching system for the business register
- functionality to assist the reweighting of the Labour Force Survey and redesigned core questions for the Integrated Household Survey

moving retail price index system to an upgraded server

The office now has an agreed set of corporate statistical tools including ACTR, Banff, Canceis, SAS, and X12-ARIMA. They have recently again been reviewed and reconfirmed as office tools. There is a unified quality reporting system and some progress has been made on unified metadata. Our technical and business capability has improved - with a significant reduction in the use of contract staff. We have developed a wide range of clear standards and working practices including IT development and business analysis. The office has developed a more robust programme management culture, with greater acceptance of independent transparent upward reporting, and better risk analysis.

## **6. So what went well?**

Clearly, as this paper shows, a lot has not gone well with ONS statistical modernisation. We are far from having achieved all that we set out to do. Nonetheless, there are some clear successes:

### ***6.1. The vision***

The need for this work has been compelling as has been the vision. The programme has been subjected to endless reviews but none has questioned the need to do this work and the ultimate vision we are striving for. However, the success of the vision also to some extent has defeated it. Staff who had felt the need for updated systems for so long became very enthusiastic about the vision and the short timescale for delivery. When this became impossible to deliver the vision in this timescale they became rapidly disillusioned and it then became very difficult to engage people in modernisation work. Also, the breadth of the vision clouded the approach to priorities. Some view modernisation as being about cost reduction, others about data exploitation for analysis or reduction of statistical risks, or technology upgrade. Modernisation had the potential to deliver all these benefits, but lack of clarity on their ranking at times made prioritisation difficult.

### ***6.2. Organisational restructure***

The move from a subject matter focus (economic statistics and social statistics) to a functional (sources and analysis) split has worked well and although it continues to evolve it has not been seriously challenged in subsequent restructurings. The Sources Directorate has lost some key functions - policy and quality, design - as resources have been cut; and the analysis Directorates have changed regularly to reflect changing priorities, but there have been felt to have been important benefits from brigading social and business surveys together

### ***6.3. Team commitment***

Commitment of the teams working directly on modernisation was very strong and contributed to the successes

### ***6.4. Statistical and IT infrastructure***

The logical data model, the standards for common data structures, the statistical tools, and the metadata thinking and design have proved to be robust for all future projects. The new approaches to IT development, once they began, were strong and resilient.

### ***6.5. Learning from our experience***

In the latter part of the period we had learned some hard lessons about the need for strict programme and project management, design principles and business area engagement, and projects managed in this way delivered well.

## **7. And what did not go well?**

### ***7.1. Leadership***

Leadership commitment was not always clear. Initially there was a very broad approach with time spent starting a lot of projects which were not continued. A lot of time was spent on governance models and reviews but the latter were often not acted on and in the early period accountability was not clear. Those running the programme sometimes felt isolated and unsupported by senior management as problems with the programme began to develop.

### ***7.2. Achievability***

Clearly the original task was not achievable in the timescale set, yet these timescales were high profile and drove priorities: they had been agreed with Treasury in return for financing. Statistical systems are extremely complex. Outside contractors has little to offer here. Despite this there was little understanding of how this might affect the programme.

### ***7.3. Capability***

ONS lacked most of the core skills in the depth needed - project and programme management, business analysis, IT architecture, development and testing, reflecting a lack of investment in such skill development over many years. Buying in the skills soaked up a great deal of the available finance, and we were slow to grow our own. We also took a while to develop some of the techniques and processes needed, though once done these were invaluable.

### ***7.4. Business areas***

Business areas were not sufficiently engaged, especially as progress was not as rapid as promised. The prototyping development methodology led to a poor use of resources given some businesses had not thought through their requirements nor the business process redesign needed. Non-functional requirements such as speed of processing and storage capacity were not given priority.

### ***7.5 Culture***

Part of the aim of modernisation was to create a ‘new way of doing things’. This cultural imperative was not fully developed so that it could drive the design of the new generic business process, hindering business process redesign. In fact, over time a cultural divide emerged between the business, which saw little being delivered by modernisation and the programme, which saw it self beleaguered and its achievements under valued.

## **8. Our way forward**

Following the end of Odyssey, modernisation work has continued, although in a more limited way. National accounts re-engineering is proceeding, and being managed from the business area. The challenges of developing the CORD time series system have been largely met, including the non-functional requirements, and a more realistic assessment of business requirements is allowing the work to convert national accounts to the new system to proceed. The ONS has reflected on the future direction of modernisation, which is now being taken forward in the following way:

The ONS Design Authority (chaired by the Director of Methodology) is developing explicit design principles, covering methods, tools, processes and systems, using many of the approaches learned through the last eight years.

The new IT strategy (‘Red to Green’) maps our systems onto our strategic approach and prioritises the development of our most vulnerable statistical systems.

Together the Design Authority and IT strategy provide clear direction for modernisation.

Future development of statistical systems will be led by business areas who will need to make a business case for investment, and then take responsibility for delivering project outcomes. When seeking approval for their investment they will need to secure approval for their plans from the ONS Design Authority.

Business areas will use CORD, plus the tools, plus SAS as the technical infrastructure, leverage benefits from the developments achieved to date (eg national accounts, BRES, IPS) and extend modernisation into areas (such as workforce jobs and productivity) where these can best be applied.

Projects will be in bite size chunks ensuring deliverability.

In this way we can ensure that ONS projects continue to advance towards our strategic goals.

Office for National Statistics, Government Buildings, Cardiff Road, Newport, Gwent, NP10 8XG, [stephen.penneck@ons.gsi.gov.uk](mailto:stephen.penneck@ons.gsi.gov.uk)