

Standardisation of the End-to-End Statistical System and Business Processes

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ABSTRACT.

Standardisation of business processes to enhance productivity and statistical coherency is a core element of Statistics New Zealand's transformation plan: Statistics 2020 Te Kāpehu Whetū (Stats 2020). To achieve this we have launched a multi-dimensional programme of change, including:

- strengthening standards / design governance
- adoption of a generic Business Process Model
- cluster-based business processes and IT platforms across the end-to-end statistical process
- ensuring that our People Strategy meets the future work-force needs.

The Stats 2020 programme includes a Delivery transformation plan which is expected to bring about:

- Standardised systems and business processes.
- A 21st century Collections function that achieves more-cost-effective ways to gather data and manage respondent burden.
- Access to new methods, tools, products and services to enable much more coherent service to our customers.
- Greater agility to be able to better respond to customer needs, for example open IT architecture, flexible processes, modern systems

As many National Statistical Offices face similar challenges we engage with colleagues from overseas on a regular basis. Historically this has been limited only to experience-sharing or reuse of (existing) tools / platforms without much possibility to influence the future development. A more pro-active collaborative approach with the aim to deliver tangible outputs has been initiated in the Statistical Network alliance which is working towards the concept of "The Industrialisation of Statistics".

This paper will draw on our experiences of Statistics 2020 Te Kāpehu Whetū and the Statistical Network alliance.

1. INTRODUCTION – Why Statistics 2020 Te Kāpehu Whetū was needed.

In late 2010, Statistics NZ successfully made a business case to the NZ Government to invest in 10 year programme of work, Statistics 2020 - Te Kāpehu Whetū (Stats 2020). The purpose of this programme is to create a more efficient and sustainable way of working by addressing the key issues as identified in the business case which included

1. The existing severe risk to the ongoing supply and reliability of some of New Zealand's most important economic and social statistics due to
 - Ageing IT systems and statistical methodologies, with about 70% fully depreciated. Many of the economic statistics systems were developed in the mid-1990s, with the Household Labour Force Survey methods dating back to 1985.
 - Systems specific to an output with common processes and functions duplicated over the 250 separate statistical production systems. Making the systems complex to change and maintain resulting in outputs being slow to respond to changing customers' needs.

- The updating of statistical standards and methodologies being severely constrained within the limited resources available and the inflexible silo systems.
 - The recruitment and retainment of skilled staff necessary to produce the current portfolio of statistics proved difficult.
2. The ongoing supply of statistics was at risk due to a perception of declining value for money. This arose from issues including:
- The vast majority of social statistics being subject to time-limited and output specific funding. As a result, social and population statistics were custom built for each specific domain, slow to deliver and difficult to integrate data to get a coherent picture of social issues.
 - The wider statistical system, the Official Statistics System (the OSS), lacked adequate coordination, coherence, and prioritisation; There were inefficiencies through poor prioritisation, duplication, and the under-utilisation and limited re-use of the statistical information held across government. The lack of a comprehensive picture of the performance of the system limited Statistics NZ's ability to provide quality advice to ministers on value-for-money, and compromises decision making on future investment in the OSS
 - Expectations of key stakeholder exceeding what Statistics NZ could deliver. These expectations ranged across a number of areas and related to such factors as: enhanced quality and relevance; improved timeliness; the need for more new statistics to fill key gaps; easier access to, and manipulation of, data available (including data sets); and reducing the cost on businesses and households of producing statistics (including internet collection).

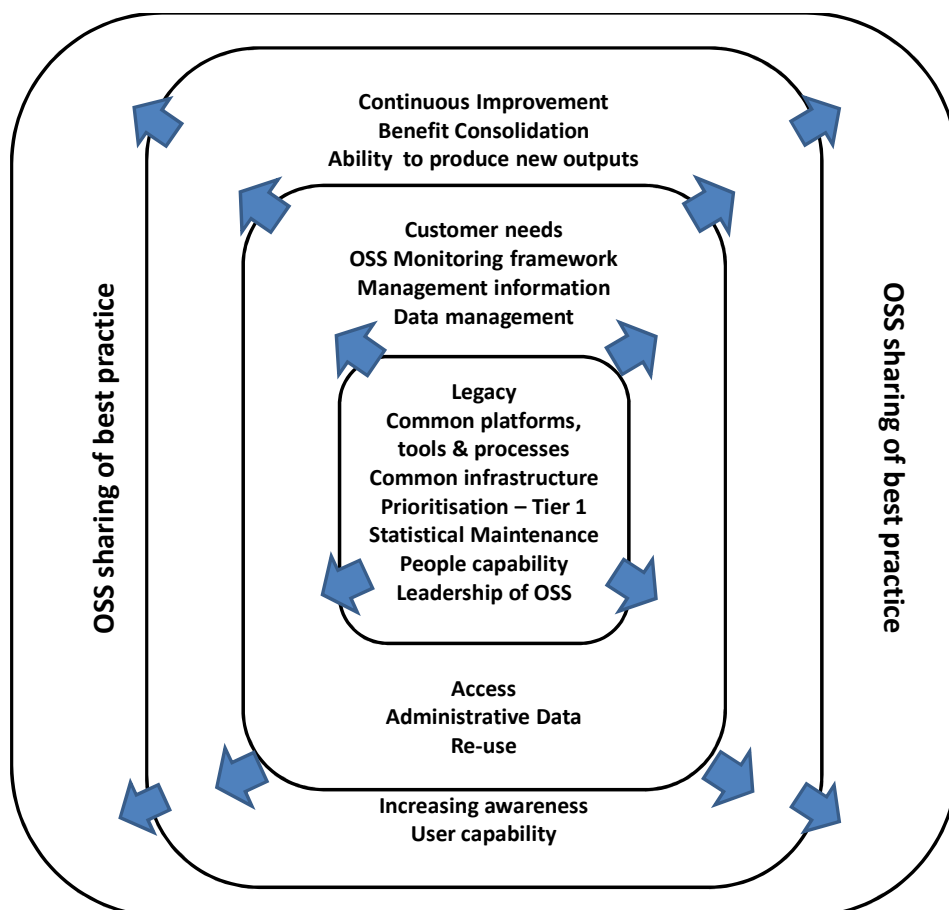
Additional funding of \$138 million over a 10 year period was obtained for operating costs (equivalent to around \$14 million per year), with an additional \$12.7 million for capital expenditure.

2. STATISTICS 2020 - TE KÂPEHU WHETÛ - The Approach

Stats 2020 has been planned over the 10-year period. Initial emphasis is on addressing the areas of greatest risk and potential efficiency gains. This would then extend out to focus on increasing the value of the earlier developments to enable improved use of statistics, and finally ensure that there is momentum for ongoing improvement and potential to extend best practice across the OSS.

The following diagram illustrates the initial focus for the programme and how this extends out and increases value.

Figure 1: Stats 2020: changing focus



The first phase which is currently underway is to address legacy issues by the migration to standard platforms based on functional needs. This reduces the risk of system failure while allowing the adoption of standard methods, processes and tools for common functions. Improved statistical maintenance is also part of this stage to ensure that the relevance and coherence of the organisational portfolio of statistics is maintained. Developing and recruiting the staff needed to effectively progress the change and maintain the production of quality outputs is a priority in this phase.

Along with its Official Statistical System (OSS) partners, Statistics NZ has been developing a list of the statistics needed to support Government in its agenda – this list is known as Tier 1. The completion and implementation of the current Tier 1 review will provide clear prioritisation of statistics across the OSS, including those produced by Statistics New Zealand and used to inform both ministers and producers. The development of this framework will enable more informed decisions on the priority and identification of areas needing development or transformation to ensure the continued value for money

When the standard platforms are integrated to provide an end to end model, Stats 2020 will then extend out to include initiatives which will build on, and increase, the value of these early developments. Standardisation will facilitate the re-use of data, enabling data to be integrated across domains. This, combined with more analysis and interpretation, will enable new insights and enhance knowledge. The development of a data management strategy will make information easier to find access and organise. Access will be further facilitated by exploiting tools that enable users to search, interrogate, and manipulate data for themselves such as visualisation and geospatial tools. Barriers to access through existing policies, practices, or legislation will also be minimised, creating a culture of access.

There will be an increase in the use of admin data in this second phase, with the aim of the changing the balance in data source. This will reduce the need for direct survey collection and reduce

respondent burden. Increased focus will also be on gaining a shared organisation-wide view of customer needs and using this to inform products and services. Steps are being taken during the 1st phase to strengthen Statistics NZ's own management information so it can more easily monitor and manage its own performance in subsequent phases. Initiatives to strengthen leadership of the OSS will be pursued. Particular emphasis will be placed on ensuring that there is more collaboration across OSS to agree common objectives and look for opportunities for rationalisation.

The third phase will focus on ensuring that there is momentum for ongoing improvement and the potential to extend best practice across the OSS. Emphasis will move to increasing the awareness of official statistics more broadly and ensuring that users have the skills and ability to understand and use statistics. A culture of continuous improvement will be embedded in Statistics NZ. There will also be a strong emphasis on ensuring that the potential created during the earlier phases of Stats 2020 is realised and delivers benefits for government, users, and respondents.

Underlying the whole programme will be a constant focus on benefit realisation and improving value-for-money.

3. IMPORTANCE OF LEARNING LESSONS.

3.1 Historical

Prior to Stats 2020, Statistics NZ had made various attempts at similar initiatives, usually through core funding or linked to time-critical events such as Y2K. The key lessons learnt from these experiences included:

1. Ensure that the resources, skills and time requirements contains flexibility to adapt and is based on a robust business case in which costs, benefits and a range of options were explored, and objectives are well identified.
2. Clear accountability and ownership lines need to be established and enforced.
3. Make sure that the organisation, and technology are at a maturity level that matches the programme's aspirations.
4. Never underestimate the magnitude of capability and culture change required (the amount of time and resources required for people to adapt was consistently underestimated). It is critical to identify responsibility for the change management and capability shift.
5. Programmes of this magnitude need to apply suitable project management & governance.

These lessons were been incorporated into the implementation plan for Stats 2020 and our experience of the last two years has highlight the importance of addressing these lessons as well as introducing some new ones.

4. CURRENT EXPERIENCE

Key lessons learnt over the life of Stats 2020 to date are:

4.1 How we develop the Enterprise Architecture.

Statistics NZ, like other NSOs, have a heavy reliance on information management & information technology. We have realised that in order to standardise our processes etc. we must also standardise our information management practices and supporting information technology. In order to achieve this Statistics NZ promotes a 'shared services' enterprise architecture model: systems are designed and built by connecting standard business capability, where the process elements are mostly implemented as common services. The services are reusable software which may be developed in-house, sourced from other NSOs or from private companies. Business logic is extracted from applications and formalised as configuration rules which chain together processes and services into meaningful business workflows. Data and metadata are defined and managed using standards-based formats aligned with the generic statistical information model reference framework which is currently being developed. Processes and services are implemented in a standard way to collect performance and quality metrics to allow continuous improvement.

Over the years we have had many debates about the potential to develop one (big) IT solution to process all our collections. While technically feasible to develop one system or architecture, we have found that 'de-normalising' the data to such an extent that it is able to cope with all the different data structures NSOs reside over, or implement methodologies required becomes untenable for the end-user.

So as a consequence, Stats2020 development is based on a range of standard platforms rather than one (big) IT solution.

Currently, five platforms cover all aspects of statistical production: data collection, economic outputs processing, social and household outputs processing, National Accounts processing and data dissemination are being developed. The platforms are at various stages of development: ranging from the first generation collection platform to the Micro-economic platform which will have eight regular outputs by the end of 2013. Good progress has been made on a standard data dissemination platform which includes a web browser that provides access to data stored on the dissemination platform, and an SDMX gateway that provides a machine-to-machine data exchange service. A key area for development in the near future is expanding the collection platform to include electronic collection, and moving away from expensive paper-based collection of information. In the future, it is likely there will be a Population statistics platform that would include processing of the Population Census and population estimates. No limit has been set on the number of platforms that will ultimately be developed, but it is expected to be numbered in the tens and far fewer than the hundreds of survey processing systems in the organisation just a few years ago.

While there has been good progress in this area, the benefits of such work will only be apparent when we have an end to end solution. Statistics NZ will complete our first E2E test in the next month and this is expected to guide priorities for investment for the next 2 years and test whether the expected benefits are likely to be achieved with the current standardisation approach

4.2 Migration versus Transformation

Moving from silo based systems has been harder and more costly than expected. One of the key areas of discussion has been the need to make trade-offs between migrating as is or, to avoid risk of system failure opposed to taking the opportunity to redevelop systems to meet new needs or to implement process improvement. Clear understanding of the value of the work being undertaken, how it relates to the overall picture and constant review of priorities is required to manage this tension. The original Stats 2020 schedule of this work has already significantly changed with some areas such as Geospatial infrastructure now going straight to a "To Be" model.

4.3 Collaboration and Partnering.

For a number of years, Statistics NZ has held regular bilateral and trilateral meetings with other national statistical offices (NSOs). The organisation has particularly close ties with the Australian Bureau of Statistics because of our geographical closeness. In addition, as we travel to other parts of the world to attend conferences etc. we often visit other NSOs so to develop relationships and identify areas of potential collaboration (subsequently via email etc.).

A particular collaboration that we are part of presently is the Statistical Network. Formed in 2010 with an aim to cooperating in the industrialisation of production of official statistics, the Statistical Network comprises an informal CSTAT group from NSOs in Australia, Canada, New Zealand, Norway, Sweden and the UK. More recently (April 2012) formal membership to the Network has been extended to Statistics Italy. Within these NSOs there is agreement about the need to work together in a climate of limited funding, aging infrastructure, and increased user demand. Two types of collaboration were identified as worth pursuing: longer term efforts that would result in the largest gains but would require adopting enabling information management and architecture management standards, including standards to facilitate the exchange of data, and shorter term efforts that would help build trust between NSO's. As a result of some work on the longer-term challenges the

Generalised Statistical Information Model (GSIM) has been developed; and in the short-term work has progressed in confidentiality, and editing and imputation.

For a number of years we have acquired tools (eg. x-12-arma) from other agencies, and also contributed to the international environment with our classification management system and Business Frame. It needs to be pointed out that it has been, and still remains the case that acquiring the tools is often the easy bit with most of the effort going into the workflow to integrate other agency tools. As part of Stats 2020 we have established a project to manage our toolbox; with the mandate to re-use, buy and finally (as an absolute last resort) build.

4.4 Understanding value and being adaptive

The need to maintain a top down oversight of the whole programme, interdependencies and how work contributes to overall benefits has been a key learning. Over the last 2 years, there has been considerable change such as the delay of the 2011 Census to 2013 due to the Christchurch earthquake, introduction of cross government initiative as well as unexpected opportunities to transform some key data areas such as prices ahead of the original schedule. This has meant that our overall programme needs to remain flexible and adapt to change.

Work on reviewing outputs against standard processes and Tier 1 expectations has also raised more fundamental questions about the current portfolio of outputs resulting in changing priorities and questions of the value of planned work. For example, the economic statistics have identified that there is an opportunity with standardisation to move to a more relevant set of indicators within the 10 year window. Originally this work was not in scope of the Stats 2020 programme. Similarly, our population statistics area has the opportunity with the delay of the 2011 Census to reviewing the future options for Censuses and production of population measures

4.5 Governance of standardisation.

As outlined above, standardisation is one of the key concepts underpinning the Stats 2020 programme of change - by standardisation we mean standardisation across concepts, processes, methods, infrastructure and systems. We recognise that we need a comprehensive understanding of our current level of standardisation, the level of standardisation we are aiming to achieve, or how we will achieve it (a Standardisation Roadmap). Statistics NZ is developing a fuller understanding of the degree to which standardisation has been applied and should be applied across the organisation in order to track and measure progress towards improved standardisation. In order to do this we are developing a standardisation matrix to house a comprehensive stock- take of standardised concepts, methods, processes, and infrastructure, and how they operate within Statistics New Zealand. The matrix will allow for easy identification of the following:

1. The current level of standardisation within the current environment.
2. Instances of, and reasoning for deviation from standard concepts, methods, processes, and infrastructure.
3. Instances of planned shift to standard concepts, methods, processes, and infrastructure.
4. Gaps and opportunities for standardisation.

In order to govern standardisation, we have decided to modify an existing structure (Standards Governance Board) to become the Standardisation Governance Board (SGB). The fundamental change was to shift the Standards Governance Board from its previous role of management and approval of operational standards to that of strategic guidance and championing of standardisation. This was also coupled with the heightened expectation of our methodological & classification areas to champion standardisation, creating stronger governance of standardisation across the organisation and supporting effective cost quality trade-offs.

We recognise we need a culture where standardisation is the norm, where staff know how and when to standardise, and the appropriate occasion for an exception. Where decisions that affect the quality of individual statistical outputs are made with due consideration of how they will affect the efficiency of production and maintenance of quality across statistical outputs. Governance arrangements for

standardisation need to strike the right balance between allowing local initiatives to resolve local problems and the need for standards to be applied consistently across the organisation. A centralised approach will deliver greater benefits for standardisation across business areas. Therefore some centralisation of authority over end to end statistical production is required to champion, oversee and maintain standardisation.

It is important to be clear on the relationship between IT infrastructure and standardisation. Statistical standardisation drives the end to end business model that is realised through IT infrastructure and systems. SGB exists to govern the former and IT have a different mechanism to provide advice on the latter.

Overseeing compliance with standardisation will be a formal step in the approval of business plans and project plans, and a requirement incorporated in the standard templates. This has led to an explicit formal step for new or redeveloped statistical production proposals to be reviewed for alignment with endorsed statistical policies including standards, classifications, guidelines and practices required to support standardisation. It is expected that this step will be overseen by project steering committees with any substantive deviation forwarded for consideration by SGB. Overarching support for standardisation through steering committees will be enabled by methodological & classification representation at these meetings.

4.6 The Power of Prototyping and its role in benefit estimation

The conceptual benefits of prototyping are compelling. We are finding that these are all the more compelling when the wider the scope of the change. This is both from the point of view of making systems work and from the point of view of estimating the cost savings that can arise from implementing systems. Trying to ascertain the benefits of an infrastructure investment like metadata, when all the systems that the metadata system will interface with are changing is very difficult. This approach runs a significant risk of counting the same area of improvement multiple times. There really is no simpler, more reliable way of getting an order of magnitude of the benefits than to simulate them in a prototype environment

4.7 Disciplines in Managing Developments

In previous years there had been concern that Statistics New Zealand had not been sufficiently focused on the disciplines of project management. Recent years have seen the parallel implementation of the discipline associated with the Prince2 methodologies and the flexibility inherent in the Agile development methodology. It takes some skill to manage these processes together but our experience has certainly been that by exploiting the process clarity of Prince2 and the communication and adaptive learning disciplines of the agile methods, very significant improvements in project delivery can be achieved.

4.8 People Strategy.

As mentioned before we recognise a need to invest in our people and so have developed a People Strategy to support Stats 2020 - it will be our people that drive the transformation, aided by strong thought and people leadership and advocacy. The People Strategy touches the whole organisation, and underpins all four strategic priorities to achieve wider organisational change (for example; customer focus, standardisation, data reuse, OSS leadership).

The People Strategy focusses on creating a more engaged workforce and building on our expertise to manage, analyse, interpret and tell the story of statistical information to enable the organisation to succeed. As it rolls out across the organisation it is apparent that the skill is to identify where it needs to provide need cross organisation disciplines and processes that must be followed and where it needs to create tools for individual managers to pick up and use according to their own judgement of what they need and when they need. Performance Management systems are clearly in the first category, while some of the change management frameworks are in the second category. We can see we are going to have to be prepared to try new ideas and be prepared to learn as we go.

5. CONCLUDING REMARKS

This type of change is multi-dimensional. The challenges of aligning technical, project management, process change and people change are considerable. There are numerous frameworks and theories available in each area. There are increasing moves to professionalise disciplines such as project management. The challenge is to maintain an overview of the totality of frameworks and strategies in place and focus on what the key value is in the changes being implemented.

The main point is that we need to commit ourselves to setting up structures that can be adapted as we get more confident that we understand what works. There is a lot of structure and tools on offer but, as always the challenge is to exercise judgement about the right tools for the job.