



The Benefits of Analytics in the Public Sector

The smart way to cut costs, optimise performance and deliver reform
in the public sector

Table of Contents

Foreword	ii
Executive Summary	1
Introduction	2
Unprecedented challenges facing the public sector	2
A critical time for public sector decision-makers	2
How well equipped is the public sector to meet these challenges?	3
Examples of Best Practice: The benefits of foresight over hindsight	5
Increasing revenues by preventing fraud and error: Taxation	6
Enhancing customer insight and cost effectiveness: Welfare	7
Improving risk management and resource optimisation to save lives: Public Safety	8
Transforming productivity, revenues and public safety: Transport	8
Intelligence-led policing to optimise performance: Justice	9
Data sharing - who shares wins: Local Government	10
Allocating resources fairly and optimising performance to save lives: Health	10
Protect and defend by predicting and preventing: National Security	11
The Road Map to Public Sector Reform	12
About JMP®	15

FOREWORD

The increasing importance of predictive analytics in government

In the Management Science Department of Lancaster University Management School, we have long worked with government and industry in developing analytical tools to support complex decision-making. Most major organisations, whether public or private, have large data repositories containing valuable information about their customers and service users. The private sector has recognised the value of this data and takes its use very seriously, offering better services and products as a result. Though this data is valuable for understanding past performance, it should also be used as the basis for proactive decision making and planning, to provide better public services at lower cost. At Lancaster, we make sure that our students know about new techniques for analysing and using this data, and offer a range of Masters degrees focussed on predictive analytics. Our aim is to produce well-qualified graduates who are welcomed by government and industry.

This SAS® discussion document on government analytics describes how the tools we teach and research at Lancaster help meet the challenges of protecting and improving public services when resources are squeezed. The SAS roadmap it describes highlights some of the key lessons learned about successfully innovating with quantitative analytics. 'Quantify', 'Demonstrate value' and 'Benchmark' are among the factors that we also highlight, whether talking with the private or public sectors. Our work with government departments includes forecasting and simulation, since both are essential tools for sensible planning and policy development. For example, courses at the Ministry of Justice and the Department of Work and Pensions have examined how forecasting and risk modelling can be used to deliver better service. Likewise, work with health care organisations has shown the value in these approaches. We've found a willingness to exploit the latest ideas in predictive analytics to deliver efficiencies. In our experience, SAS offers really useful tools with which to design the changed processes necessary if new public sector targets are to be achieved. This is also the reason we've adopted SAS in our teaching to ensure our students are familiar with appropriate tools for the jobs to which they aspire.

Robert Fildes, Distinguished Professor and Director
Lancaster Centre for Forecasting

Michael Pidd, Head of Department, Management Science
Lancaster University Management School

Tel: 01524 593879
www.lums.lancs.ac.uk/pages/Research/Centres/forecasting



Executive Summary

The UK government is facing the task of urgently reducing a national budget deficit of unprecedented size. As such, its Comprehensive Spending Review (CSR) set ambitious savings targets across the public sector. Government departments must now balance the requirement to save money with the need to provide front line services to a growing, aging and diversifying population.

The CSR stresses that the core challenge faced by public sector leaders is to make the 'right decisions' about where to cut spending and where to invest. However, a recent report by the National Audit Office (NAO) highlights concerns about the public sector's capacity to make the right decisions quickly. The NAO cites the public sector's lack of reliable data and information management tools as the key weaknesses that hamper effective decision-making, and limit the potential for making long-term savings while protecting front line services.

The government recognises the need to completely reform the way the public sector operates, and the central role that improved information management will play. However, government departments still lag behind the private sector when it comes to information management and the sharing of this precious asset. The government must urgently review the ways in which it collects, analyses, exploits and shares information; both internally and with businesses and the public.

Businesses from a range of sectors have embraced business analytics to help them understand their customers and optimise their performance. In particular, organisations are using analytics to take a more proactive approach to forecasting future demand, take the best course of action, reduce risk and improve outcomes. It is precisely this insight that the public sector requires if it is to manage the savings required by the CSR, without sacrificing the fairness or the services that the taxpayer deserves.

Reforming departments can learn from examples of best practice from across the private sector, and some from within the public sector too. In this paper, you will find examples of SAS® Analytics helping organisations to increase revenue, minimise risk, target resources and even save lives. We also provide a road map to help departments as they evolve, drawing on the lessons learned by organisations that are already feeling the benefits of predictive analysis.

Introduction

Unprecedented challenges facing the public sector

The public sector is facing a period of immense strain, as the government attempts to rapidly reduce the UK's huge budget deficit. The recession, and the need to protect the UK's international competitiveness, has limited the coalition's scope to increase tax revenues – making public sector spending cuts a number one priority. Yet demands on public services have never been higher, and will only increase as the population grows, ages and diversifies. Meanwhile climate change, natural disasters and international terrorism further complicate public sector budgetary planning and priorities.

The UK government has therefore undertaken a Comprehensive Spending Review (CSR), designed to accelerate deficit reduction, drastically reform public services, ensure fairness and promote growth. The strategy involves cutting expenditure in many areas, while investing in priorities to meet growing demand.

None of these issues are new. The private and public sectors have been wrestling with the need to increase efficiency for many years. What is new is the critical need to urgently reduce a government debt of an unprecedented size. To operate in this environment, all organisations must develop the agility to optimise their performance in today's world, but also to anticipate the challenges of tomorrow.

A critical time for public sector decision-makers

The UK government has stressed that the core challenge of the CSR is making the right choices about where to cut spending and where to invest. In a world where demand constantly exceeds resource, decisions must be made that protect essential services and ensure fairness for all taxpayers. But with mounting pressure to act quickly, the risk of making the wrong decisions increases. The key is setting priorities and differentiating between 'bad costs' (activities that are negative or low-value adding) and 'good costs' (activities that are essential or value-adding).

Reform also requires a fundamental reassessment of the role of government and the core and non-core roles of all public sector organisations. Increased localisation, a drive for more efficient delivery channels and 'The Big Society' will see even greater roles for local government – as well as for the private and third sectors – in the delivery of services. For example, Suffolk County Council has already announced that it will outsource all of its activities to the private sector, social enterprises and charities. The council itself will become a group of 'commissioning units', buying services from others.

Meanwhile, public demand for accountability has led the government to commit to greater transparency around its spending and performance, and promise access to existing information that will empower citizens and allow them to influence decisions. For example, it has already given the public access to long-guarded treasury data, and SAS is working to open that information up through publicly available analytical services.

All of the above measures require precise decision-making based on comprehensive, accurate data that can be relied on – not only by the government department in question, but shared across the public sector and with private and third sector partners too. There is an opportunity to reinvent government as just one part of a network that collectively gathers, provides and exploits information for the common good. As such, government leaders must ask themselves some serious questions about how they should collect, analyse and exploit data in this new world. And, crucially, how well are they providing public sector managers with the knowledge and tools necessary to make the ‘right decisions’ and optimise performance?

How well equipped is the public sector to meet these challenges?

With the margin for error in decision-making greatly reduced, the need for reliable management and analysis of information is significantly increased. It is therefore not surprising that, despite the onset of the recession, global uptake of business analytics¹ software across all industries grew by 22 percent in 2008/09. Analysts at Gartner predict that market will grow by ten percent in 2011, to be worth \$10.8 billion, as businesses seek the ‘transparency and insight’ that will ‘enable them to cut costs and improve productivity and agility’ and optimise performance.

Yet the public sector accounted for a relatively small proportion of this increase. And, as the following evidence underlines, it continues to lag behind the private sector in the adoption of information management tools and skills.

In November 2010, a cross party group of MPs on the Public Accounts Committee (PAC) published their review of the 2007 CSR². They found that, despite setting out to achieve relatively modest savings of 3 percent (£35 billion), only £1 of every £7 of savings promised by the government were achieved. Of the £15 billion in savings reported, only 38 percent represented sustainable improvements in value for money – with the remainder being at best uncertain or, at worst, significantly overstated.

Many of the PAC findings were based on a National Audit Office (NAO) report on the progress in delivering savings, and the lessons learnt from cost reduction programmes. The NAO found that the bulk of savings had been delivered through improved procurement and rationalising real estate rather than transforming the way that services are designed and delivered. As a result, the PAC said they were “gravely concerned” about the capacity of the public sector to make the efficiency improvements on the scale required by the CSR 2010. It also stated the fear that government departments will rely solely on cutting front line services.

“Often [government] departments do not have a good grip on the costs of their activities. Without this, [they] cannot make rational choices about what to stop, what to change and what to continue.”

NAO, A short guide to structured cost reduction, 2010

¹ Business analytics, including: data mining, trending, modeling, forecasting, scenario planning and simulation for predictive foresight.

² Public Accounts Committee, 4th Report, Progress with VFM Savings and Lessons for Cost Reduction Programmes, 4 November 2010 www.publications.parliament.uk/pa/cm201011/cmselect/cmpubacc/440/44002.htm

But why does the public sector struggle to implement efficiency programmes and optimise performance? The NAO concluded that the public sector had not fully addressed weaknesses it had highlighted in reviews of previous efficiency programmes, including:

- Lack of suitable baselines for the calculation of savings
- Insufficient data on cost, unit cost and performance
- Difficulties in demonstrating links between savings, performance and improved frontline services
- Insufficient quality control prior to external reporting
- Lack of transparency over arms-length bodies reporting processes to identify what they were doing to save money.

The NAO highlighted that good information is essential to support decisions at all levels – whether strategic or operational – and recommended a step change, and continuous improvement, in cost management capabilities across the public sector.

The above failings were acknowledged by the Chancellor in his evidence to the PAC. However, the shortcomings are not restricted to financial data. And the consequences stretch beyond poor financial performance to loss of reputation, public trust and even lives. For example, many investigations into serious data losses in the public sector have highlighted institutional deficiencies in information management. Meanwhile, the Audit Commission has cited high profile cases such as the death of Baby P and the Soham murders as tragedies that might have been avoided if information management had been better.

By contrast, the Audit Commission has also highlighted³ the benefits of improved information management. For example, councils with the highest Comprehensive Performance Assessments are seven times more likely to also score highly for their use of information than those marked at the lowest two levels.

All of this suggests that, if the deficit is to be reduced without harming front line services, the public sector must learn the lessons from past failures in information management – and follow the examples of best practice that exist in both the public and private sectors.

“There was a lack of robust data... unsuitable baselines, lack of transparency over arm's length reporting and savings had not been subject to sufficient quality control.”

Margaret Hodge MP, Chair of PAC,
November 2010

³ Audit Commission, *In the Know*, February 2008 www.audit-commission.gov.uk/SiteCollectionDocuments/AuditCommissionReports/NationalStudies/intheknowreport.pdf

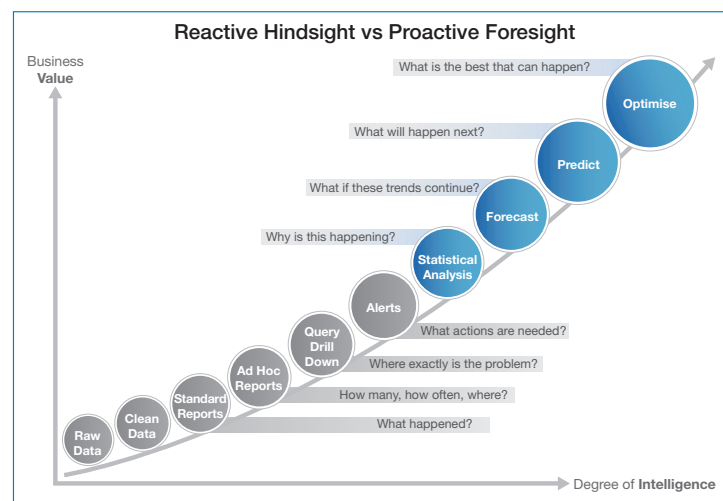
Examples of Best Practice: The Benefits of Foresight over Hindsight

Improved information management has a much bigger role than simply advancing effectiveness of cost-cutting programmes and reporting structures. There are many compelling examples of organisations that have transformed their performance and, in some cases, even owe their existence to the efficient exploitation of information.

In the book *Competing on Analytics*⁴, Thomas Davenport and Jeanne Harris identify a range of companies which turned superior use of information into their main competitive advantage – including industry leaders Amazon, Dell, UPS, Proctor & Gamble, Honda and Tesco. Through building strategies on data-driven insights, these information-savvy firms can better identify the true drivers of financial performance, target their best customers, accelerate product innovation, optimise supply chains, etc. And, these information-based strategies have generated impressive business results.

The authors drew particular attention to the way these information pioneers make use of not only traditional business intelligence software, but also advanced analytics. The distinction is one of hindsight versus foresight. Traditional business intelligence provides better and faster hindsight by improving the quality and integrating historical data. This ability to understand what has happened is vital – particularly in the public sector, where the absence of reliable baselines and benchmarks still hampers performance. But the fact remains that hindsight can only enable organisations to improve their reaction time to what has already happened. And, in this fast changing world, what happened in the past is becoming less reliable as an indicator of what will happen in the future.

In contrast, advanced analytics provides these top-performing organisations with both insight to understand why things have happened, and the foresight to predict what is likely to happen next. This enables them to plan the best course of action, reduce risk and improve outcomes. Put another way, these firms recognised the competitive advantage of being proactive, rather than just reactive.



⁴ Harvard Business School Press, 2007

“...the quality of financial data in Whitehall is pretty shockingly weak at the moment.”

George Osborne, evidence to the Treasury Select Committee, November 2010

Some enlightened public sector organisations have already begun to adopt the best practices of the private sector to improve their information management and exploit this precious asset. The case studies that follow demonstrate the remarkable transformation in performance that has already been achieved as a result. Crucially, they provide pointers for wider reform across the whole public sector.

Increasing revenues by preventing fraud and error: Taxation

The Chancellor has told HM Revenue & Customs (HMRC) to make savings of 15 per cent over the next four years “through the better use of technology, greater efficiency and better IT contracts”. Despite this, he has also signaled an increased investment of £900 million to tackle tax evasion and fraud. Investing such a sizeable figure in the middle of an austerity drive may sound counter-intuitive, but the expected return on investment (ROI) is estimated at an additional £7 billion in tax revenues.

The genesis of this strategy came in March 2010, when the National Fraud Authority (NFA) published the results of its investigations into fraud in the public sector⁵. The second National Fraud Indicator, published by the NFA in January 2011, indicated that the Public Sector accounts for £21.2 billion out of the UK annual £38.4 billion. Approximately £15 billion of this was made up of tax fraud, i.e. income tax, VAT, National Insurance, council tax, etc, and a further £6.2 billion was fraud across central and local government benefits, legal aid, procurement, staff salaries and allowances, etc. And, with every penny lost to fraud being lost to front line services, one thing was clear: battling this widespread waste had to be a top priority.

The NFA recommended a fresh approach that looked to the private sector for lessons in how to combat fraud. It benchmarked a number of private sector organisations – including SAS customers such as HSBC and other retail banks – which, through using information both reactively and proactively, routinely deliver ROI from their counter fraud projects of between 10:1 and 30:1.

The public sector also offered examples of best practice. The NFA recognised HMRC and the Department of Work & Pensions (DWP) for their adoptions of predictive analytics to fight fraud. For example, HMRC’s Connect system has allowed it to integrate and analyse numerous separate data sources to target personal tax fraud with greater speed and efficiency, while enabling it to process deserving claims faster. In the period up to 2008/09, the implementation costs were around £18.8m, while increased yield was £572m – a remarkable return of 30:1. The pilot system alone increased tax yields by 58 percent and, ultimately, ROI is forecast to be around 1,000 percent over five years. The HMRC has a similar predictive analysis application to detect corporation tax fraud, which is expected to deliver even higher ROI.

The DWP also came in for praise from the NFA, which found that it “already has in place a well-developed data matching service [which] helps it identify over £100 million in overpayments annually”⁶. The DWP system, Centric, uses SAS Analytics

“All public sector organisations... should place greater emphasis on the prevention of fraud, prior to providing a service or making a payment, compared to the resource they place against detection, investigation and prosecution after a fraud has occurred.”

NFA, Smarter Government Fraud Taskforce, March 2010

⁵ A Fresh Approach to Combating Fraud in the Public Sector – National Fraud Authority / Public Sector Taskforce, March 2010

⁶ Ibid

to enable a single customer view across the DWP, HMRC and Local Authorities and highlights inconsistencies between income and benefits received. As a result, the system is also effective in reducing not only fraud, but also error; which is estimated by the DWP to account for double the losses caused by fraud.

Despite these successes, the NFA reported that the public sector, including the DWP and HMRC, continue to lag behind the private sector. It said that more lessons must be learnt from commercial organisations with regards to intelligence-led approaches to data sharing and analytical profiling. For example, data sharing has enabled insurance companies to identify and warn each other about fraudulent activity. If competing companies can share data for the common good, why shouldn't government departments?

The NFA added that the use of advanced analytics is vital in the fight to prevent fraud happening in the first place – therefore reducing the need for expensive investigations and court cases to recoup money after it has been paid out. As a result of the investigation, the HMRC and DWP have produced a joint strategy to fight fraud and error, both existing and that which has yet to happen.

Enhancing customer insight and cost effectiveness: Welfare

Intelligent use of analytics has delivered considerable business benefits to Tesco, which uses its Clubcard data to analyse around 15 million shopping baskets a week. The result is a better understanding of customer behaviours, which informs decisions regarding product lines, store locations and special offers. Since its introduction, Clubcard holders have accounted for around 80 percent of sales, the response rate to targeted offers is over ten times the average for direct mail – and Tesco's sales have increased by 52 percent.

The Pensions Service within DWP is making similar use of SAS advanced analytics to improve insight into the needs of around 15 million pensioners and pre-pensioners. Faced with an aging population and decreasing budgets, the Pensions Service uses its SAS-led 'Customer Insight Engine' to identify short-term demands on resources, and target marketing campaigns designed to encourage pensioners to switch to lower cost channels. The system also predicts long-term demand and helps to inform policy.

The analysis also supports the long-term health and independence of pensioners by encouraging them to claim their full entitlements; thus decreasing the risk of future dependence on state-funded care. By using SAS software to segment their customer base by lifestyle and behaviour, the Pensions Service has reduced costs of marketing campaigns – yet tripled the rate of uptake of key benefits.

In addition, development of Centric – a cross-departmental view of customer data – will not only identify the undeserving to reduce fraud and error, but will ensure fairness by identifying those who are not receiving the benefits they require.

“Private sector examples show how use of...data analytics can prevent fraud occurring. An increased focus on fraud prevention will also reduce burdens on the criminal justice system.”

NFA, Smarter Government Fraud Taskforce, March 2010

Improving risk management and resource optimisation to save lives: Public Safety

The London Fire Brigade (LFB) has adopted a similar approach to integrating external data with its own and using SAS predictive analytics to optimise performance. Internal records of where fires have occurred in the past are now integrated with a range of external data – including census information, land use and lifestyles – to produce ‘future fire risk’ maps of London. The maps inform budget allocation and enable the LFB to target its limited firefighting and preventative resources to the buildings and people most at risk.

Put simply, using SAS Analytics literally avoids the need for expensive and high risk ‘fire fighting’ across the public sector.

But in the private sector for example, for Waitrose, optimising performance means ensuring stock availability and customer service, while holding the minimum stock possible and reducing waste. Recognising that the use of internal, historical sales data alone was limiting its scope to predict stock requirements moving forward, Waitrose has added external data to the mix, including: weather forecasts, upcoming sporting events and TV schedules. By applying SAS predictive analysis, the supermarket has been able to reduce its stockholding and waste, by 8 percent and 4 percent respectively, and decrease order amendments by 40 percent.

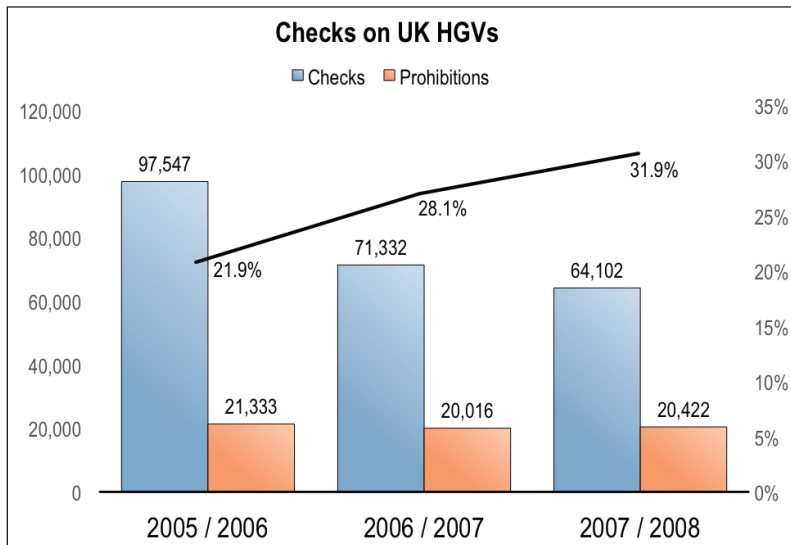
Transforming productivity, revenues and public safety: Transport

The Vehicle & Operator Services Agency (VOSA) has transformed its performance since investing in SAS predictive analytics to reduce costs and risk, increase revenues and improve customer service. The agency initially looked into using analytics in response to criticism from the Department for Transport (DfT) on their performance reporting. However, VOSA quickly realised that this smarter way of working had the potential not just to improve the reporting of its performance, but to transform that performance itself.

Enforcement checks on vehicle operators are a huge expense for VOSA, and for the operators themselves. But by integrating and analysing its databases, the agency was able to assess vehicle operators according to the risk of non-compliance with road-worthiness and taxation rules – and target its enforcement resources accordingly. Within 12 months, the number of enforcement checks was reduced by 15 percent, while the number of prohibitions increased by 32 percent. Revenue collection improved and customer satisfaction was up by 22 percent. The Transport Select Committee praised VOSA as a model for best practice, highlighting the intelligent use of information as the secret of its success. And, perhaps most importantly, in 2008/09 VOSA's intelligent enforcement approach contributed to a 7 percent drop in annual traffic accident casualties – the highest annual reduction since the Second World War.

“We are the first brigade to use such sophisticated analytics...SAS software enables us to prioritise and understand risk [and] base our decisions on real facts, rather than second guessing. As a result, we are preventing fires and saving lives.”

Andy Mobbs, Risk Information Manager, LFB



Other unexpected uses of VOSA's data have also emerged, including improved analysis of traffic black spots, better quality and consistency of demand forecasting for MOT testing and enhanced location analysis for checking stations. Plus, publishing vehicle operator risk scores on the VOSA website has created a culture of 'self-policing' and prevention among many vehicle operators and manufacturers – which are now using the data to manage the performance of their own businesses.

By using SAS advanced analytics, VOSA has achieved a paradigm shift in its approach – from reactive to proactive – and generating huge financial and social benefits in the process.

Intelligence-led policing to optimise performance: Justice

Poor quality data meant that Gloucestershire Police wasted a lot of time trying to access information they already knew. But, working with SAS, the force was able to hit operational efficiency targets, reduce crime and improve public confidence.

Gloucestershire Police are using SAS business intelligence software as an enterprise decision support system for the whole organisation. The system provides valuable insights for intelligent decision-making, as well as detailed information on performance and public perceptions. Statistical returns are sent directly to the Home Office through SAS, delivering further efficiency gains by having one system and a single version of events.

In practical terms, better data quality means being able to put a police officer at the right address to apprehend a criminal. Gloucestershire has reduced overall crime in the last two years, with notable success in violence and robbery, and has achieved excellent detection rates. It also indicated that public confidence is improving – a finding backed by the British Crime Survey that showed an increase from 45.8 per cent to 51.5 per cent in the number of local residents who are confident their police and council were dealing with anti-social behaviour and crime.

“At European level, VOSA's enforcement work is seen as a model of best practice... information and intelligence is a key component of an enforcement policy which is based in significant measure on the targeting of the most likely offenders.”

Transport Select Committee

Another large UK police force has been able to improve performance thanks to an extensive data quality programme that lasted for 12 months. Better still, it has been able to measure that success. For example, when one offender was arrested for a daytime burglary, records instantly showed that he had separately been stopped at 3am the previous morning in the vicinity of a reported mugging. Thanks to this accurate and timely data, the offender was placed in a line-up and identified by the victim as the mugger – all within 24 hours⁷.

Data sharing – who shares wins: Local Government

The Croydon Drug & Alcohol Action Team (DAAT) are using a similar insight-driven approach to tackle addictions that can often lead to poverty, ill health and/or crime. It uses SAS advanced analytics to clean, integrate and analyse data from a wide variety of local sources, such as Social Services, the NHS, Police, Probation Service and the Third Sector.

Collating and reporting on the data would once have left little time to actually make use of the information to improve performance. However, integration and reporting tasks can now be performed in a few hours, rather than many days. The data is then analysed and the insight used by all stakeholders to optimise performance for early intervention. For example, Ministry of Justice analysis shows that over 70 percent of prisoners admitted using drugs in the 12 months before they went to prison, and 22 percent drank alcohol every day in the four weeks prior to conviction. The advance use of this knowledge is a fantastic example of how improved data sharing and analysis is vital to achieving a more joined up, preventative and cost effective regime. As with VOSA and the police, Croydon DAAT is also beginning to create comprehensive profiles of vulnerable individuals and use these to improve prioritisation and risk management.

Allocating resources fairly and optimising performance to save lives: Health

Despite the government's commitment to ring fence health budgets, the reality is that a growing, ageing and diversifying population means pressure on the limited resources of the National Health Service (NHS) will only grow. To achieve the necessary efficiencies, without compromising front line services or fairness, will require a radical transformation in the way the NHS operates. This overhaul is already underway with NHS Blood and Transplant (NHSBT), one of the first public sector organisations to understand the importance of an evidence-based strategy, supported by SAS advanced analytics.

The challenge faced by NHSBT is optimising its performance to meet growing demand, and to do so both equitably and transparently. For this department, the consequences of making the wrong decisions can be fatal and, with demand outstripping supply for donated organs by over 230 percent, the margins for error are extremely limited. Accurately matching donors to recipients, and maximising the

“...it improves the effectiveness of interventions [and] allows us to be more proactive. We can point to considerable time savings and improved resource allocation.”

Ray Rajagopalan, Data Manager,
Croydon DAAT

⁷ NPIA IMPACT Forces Bulletin Jan/Feb 2009

chances of success, involves assessing probabilities and risk across multiple variables, including blood group and tissue type compatibility, size, waiting time and clinical need. The complexity and speed of the decision-making required continues to increase rapidly as science and new practices develop. For example, a single liver can be split to allow more than one recipient to benefit. In such a complex and high-risk environment, the capability to perform rapid analysis and optimise decisions is a matter of life or death. In addition, the NHSBT must at all times ensure and demonstrate fairness of access in terms of both geography and demographics, so all patients have the same chance of treatment and quality of life.

Using SAS advanced analytics, the NHSBT's raw data is properly validated and corrected, and is then subject to complex analysis to understand the multiple factors that influence survival rates, waiting times and donor consent. Detailed comparisons of performance between Transplant Units – taking into account the variation in their patient mix – can also be used to understand and correct fall-offs in performance at an early stage. Also, the insight is used to predict demand and plan, to ensure the right theatre capacity and surgeons are available in the right place, at the right time, to optimise the number of transplants.

“SAS is fundamental to our work in optimising the use of very limited resources [to] increase the chances of survival and improve quality of life.”

Dave Collett, Director of Statistics and Audit, NHSBT

Protect and defend by predicting and preventing: National Security

The national security agencies manage a diverse and fast-changing set of risks and challenges. Terrorism, climate change, inequalities in natural resources, cybercrime and reduced control of critical national infrastructure are just some of the challenges the agencies must overcome to ensure the safety and prosperity of their countries.

Meeting these challenges, while juggling budget cuts, will require a more joined-up, preventative approach across defence, the police, intelligence, border agencies and the private sector – both within the UK and internationally. To succeed, a step change is needed in the way these organisations manage, share and exploit their information.

Although this shift towards more intelligent use of information has been heralded in high-level strategy documents for some time, the implementation has so far been patchy – as recent publicity concerning poor planning, overspend on procurement and failures within the MOD have highlighted. In fact, the NAO⁸ has used the MOD as a prime example of the dangers of short term, tactical cost-cutting measures that simply defer, and ultimately increase, overall spend while negatively impacting operations.

There are numerous examples of national security organisations around the world that are using SAS Analytics to transform their performance and save lives:

- A European border agency collects and analyses information on all people who travel to or from their country by air, rail or sea. The agency is therefore better equipped to spot potential security risks and intervene, sometimes before the risk even reaches the country.

⁸ *Progress with VFM Savings and Lessons for Cost Reduction Programmes, National Audit Office 19 July 2010* www.nao.org.uk/publications/1011/vfm_savings_compendium.aspx

- A defence organisation uses predictive analysis to generate scenarios and predict future logistics and supply chain requirements at a macro and brigade level. This means it can ensure the right supplies – including fuel, equipment and food – are in the right place at the right time, and at the right cost, to meet the needs of its existing and potential operations.
- A US national agency integrates and analyses a range of data to identify the operational, financial and social networks involved in the deployment of improvised explosive devices (IEDs). In Iraq, this work has resulted in the significant reduction in the number of IED incidents, deaths and injuries.
- A US military operation uses predictive analysis to identify unusual patterns of activity to detect and prevent cyber attacks on mission critical systems.
- A European Commission project integrates, analyses and shares forensics and ballistics information from across all member states to provide a joined-up approach to fighting international terrorism and crime.

Each of the above initiatives represents the foundations of a more agile and efficient national security.

“Preventative action saves money, lives and political relationships.”

IPPR, National Security in the 21st Century, 2009

The Road Map to Public Sector Reform

The above examples give a flavour of how SAS Analytics can underpin a smarter, more preventative approach to reforming public services and optimising performance, even in the face of budget cuts. Each organisation is at a different stage of its journey. But all are united by their adoption of better information management practices to improve efficiency and protect frontline services.

Drawing on its extensive experience of both good and bad practice, the NAO has compiled a guide to structured cost reduction⁹; central to its argument is that a lack of information and poor planning is the key cause of waste in the public sector. This, it says, is the root of short-term, indiscriminate cost cutting that can lead to higher overall spending – or just move the costs elsewhere – and leave organisations exposed and unprepared for the future. The report urges the public sector to adopt a longer-term, data driven strategy instead. It highlights that this approach is vital to ensure that government departments have the information to perform optimally today and in the future, and to embed continuous improvement and efficiency into ‘business as usual’ – not just as a response to budget constraints.

The NAO acknowledges that the execution of such strategies will involve investing in technologies that improve the capability to understand and compare costs, and to conduct comprehensive risk assessments. It also recommends the use of analytical frameworks to understand cost and value-drivers, and proactively influence future demand. Finally, the report stresses the importance of adopting this approach ‘system-wide’, rather than in departmental silos.

⁹ NAO, *A Short Guide to Structured Cost Reduction 2010* www.nao.org.uk/publications/1011/structured_cost_reduction.aspx

But how can the public sector afford these essential investments and ensure department-wide buy-in? It would be impractical to attempt to provide a detailed guide to best practice here. However, the examples given in the previous chapter do share some common lessons – and contain some clues to the critical success factors.

Quantify: The vital first step is to gain senior level commitment to exploring the opportunities and benefits available – as well as the risks involved with retaining the status quo. A catalyst for this is often a call to action, such as the budget crisis, combined with the recruitment of senior managers or non-executives with experience of the private sector, or the benefits of improved information management. For example, leadership commitment was achieved in the area of fraud simply because the NFA had been able to clearly quantify the size of the prize.

Demonstrate: Buy-in is often achieved through senior executive workshops, which help to bring the benefits of analytics to life. VOSA made their breakthrough when SAS delivered a proof of concept ‘data challenge’ in which they integrated and analysed real data to provide the board with some surprising insights – within just one week. SAS has also supported HMRC in the creation of a Data Lab, with the aim of spreading best practice and promoting greater use of predictive analytics across HMRC and the wider government. It can often help to identify the information and applications that will provide the biggest win in the short-term, as part of a longer-term approach.

Benchmark: Workshops should involve learning from best practice in other industries. SAS helped the NFA to benchmark with numerous customers from across banking, insurance and the public sector. Similarly, SAS runs a range of forums and events to encourage this practice as standard.

Cultural shift: The leadership teams that have done the most to optimise performance in the shortest time often share two or three common ‘light bulb’ moments:

- **Go the extra mile:** Business intelligence was originally adopted to comply with mandatory reporting and legal requirements, but it has come a long way since then. The first step to reform is often making a virtue out of necessity; realising the enormous potential of management information to transform the very performance that is being reported on.
- **Prevention is better than the cure:** The next stage is recognising the importance of foresight, and its strategic advantage over hindsight. The adoption of SAS’ proactive ‘predict and prevent’ approach has already been critical to optimising the performance of limited resources: transforming productivity, increasing revenues and improving public safety.

- **Birds of a feather stick together:** Organisations spend a lot of time differentiating their products and services to gain a competitive advantage. All too often this mindset trickles over into software procurement decisions and leads to organisations investing in expensive, bespoke solutions – often referred to as the ‘cost of being special’. But the realisation that the organisation is not unique, and that many others in the private and public sectors have been wrestling with the same fundamental problems, is key. This frees decision makers up to adopt best practice ‘commercial off-the-shelf’ analytics solutions and processes, which often result in much lower implementation costs and faster ROI.

Coordinate and share: Many SAS customers are realising the benefits of linking with other organisations within the same ecosystem to share experience and explore ‘system-wide’ benefits. For example, HMRC and DWP have agreed a joint counter fraud strategy and are establishing a shared ‘risk and intelligence unit’. Meanwhile, others have enriched internal data with external data to provide a more holistic view and even greater predictive capacity.

Audit: Successful reform starts with understanding what information your organisation has, where it is, who holds it, what condition it is in and assessing what issues and gaps there are. The SAS white paper *Valuing Information as an Asset*¹⁰ is a great place to begin; it outlines how to create an information asset register and includes research into the rationale and business benefits of Business Analytics Competency Centres (BACCs).

Build trust: Information must be cleaned and integrated to demonstrate its value and build confidence throughout an organisation. A large UK police force adopted a quick win approach to demonstrate the operational benefits of improved data quality. In less than a year, they had transformed from having one borough in 32 being rated as excellent and 14 rated as poor, to none being rated as poor and 14 as excellent.

Consolidate: Better business intelligence allows organisations to consolidate information management staff and tools – thereby reducing duplication and exposing gaps in resources. For example, VOSA’s new advanced analytics software saved the agency enough money on information gathering that it practically paid for itself. The key here is adopting a long-term ‘solve and evolve’ model, rather than a ‘rip and replace’ approach, i.e. exploiting existing business intelligence software investments. Tools can then be gradually rationalised towards a fully integrated and agile predictive analytics system.

Partner: To reduce initial costs and overcome skills shortage, public sector agencies should seek best-in-class private sector partners. This could involve shared services or an as-needed Software as a Service (SaaS) relationship. Or they could follow the example of HMRC and DWP, which have looked at risk/reward partnerships, based on increased revenues generated by reducing tax evasion and benefit fraud.

Create centres of excellence: Once businesses have accepted the pivotal importance of improved information management, many also agree the need for a new governance and organisational model; this leads them to set up a dedicated

¹⁰ *Valuing Information as an Asset, SAS whitepaper*

Information Management Centre of Excellence or BACC. These are business-oriented rather than IT oriented organisations, which aim to agree the information evolution road map, drive its execution and assist the wider organisation to understand and exploit the information as an asset. Given the shortage of skills, tools and funds in the public sector, it is recommended that smaller to medium sized organisations pool resources and share these centres of excellence.

This list could be regarded as an evolutionary path to performance optimisation and increased efficiency. As the case studies have demonstrated, it is a journey worth making and one on which there are many experienced practitioners to guide the way. It is also a journey that, increasingly, public sector organisations will have no choice but to make if they are to deliver the front line services taxpayers deserve and expect.

About JMP®

The JMP® Division is a business unit of SAS, the largest privately held software company with annual revenues exceeding \$2 billion, a track record of more than 30 years, and a worldwide presence.

JMP®, JMP® Pro, JMP® Clinical, and JMP® Genomics are software products that allow scientists, engineers, and business users to easily get value from their data through “Statistical Discovery”. JMP has been under development for 20 years, and is used globally.

Statistical Discovery starts with data, and consists of both exploring and modeling patterns of variation to gain new, useful, insights that have practical value for operations whatever the context. Someone who understands the meaning of their data can use JMP as a toolbox to provide these new insights for themselves without reliance on an IT function. In this pattern of use, distinguishing features of JMP are a high level of interactivity and a wide repertoire of modeling capabilities from the simple to the sophisticated.

JMP can be also be used to quickly build complete applications that require some aspect of Statistical Discovery, providing more controlled or directed functionality more suited to a specific use. JMP can also work seamlessly with SAS, and in version 9 with R too.

www.jmp.com

Other white papers from SAS UK’s Public Sector team include:

- *Designing KPIs for Improved Public Sector Performance* - How to turn data into actionable information for better decision making
- *Knowledge is Power* – How to win the battle against Public Sector fraud and error
- *Valuing Information as an Asset.*

“To meet this challenge, departments must look beyond immediate, short-term efficiencies... the longer-term return on investment should be considered to allow departments to be bolder in their approach.”

NAO, *A short guide to structured cost reduction*, 2010Century, 2009



SAS UNITED KINGDOM WITTINGTON HOUSE HENLEY ROAD MEDMENHAM MARLOW BUCKS SL7 2EB
+44 1628 486933 www.sas.com/uk www.jmp.com

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies. Copyright ©2011, SAS Institute Inc. All rights reserved. 1639UK1111