‘Better for Less’
Lean Sigma for the Public Sector

A white paper
by
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Introduction

There is no doubt that we are in an extremely challenging public sector environment, with both central and local government faced with the task of maintaining public services against a back-drop of smaller budgets and lower tax receipts and income. There is increasing demand in some areas, higher social security payments, and the knock-on effects of declines in key sectors such as financial services and construction. The public continue to demand greater service and with less money available, no organisation has the luxury of being wasteful.

Seeking greater efficiencies is of course not a new idea. Progress has certainly been made and there are many examples in the public sector which illustrate this. In addition the gradual use of Lean Thinking (or Systems Thinking as it is sometimes referred to) has helped many organisations achieve improvements and reduce costs. However we’re not convinced that some of the initiatives and savings sought for the public sector will deliver the significant long term and sustained performance that the Treasury needs to help it progress towards a more balanced budget. That’s why we believe it’s time for all public sector organisations to investigate how the application of Lean and Six Sigma thinking could help them in transforming the economics of their service delivery.

Used properly, Lean and Six Sigma can help public sector organisations to maintain high standard of services, despite the cuts. The call has been to do ‘more with less’ — in other words, to be more efficient. But care must be taken to ensure that the focus is not solely on taking the money out — this to a degree is the easy bit. There are, in fact, two ways in which to increase value: one, by reducing waste and thus the cost of a product or service; the other, by increasing value-adding activities. The challenge for public sector organisations is to reduce spend whilst retaining or even improving service delivery. The call therefore is ‘better with less’

This paper aims to demystify the term Lean Sigma, and explain how this approach can deliver better services at lower cost for the public sector. The benefits that can be achieved include:

- Effective management decisions due to heavy reliance on data and facts instead of gut-feelings and hunches. Hence costs associated with fire fighting and misdirected problem-solving efforts with no structured or disciplined methodology could be significantly reduced.
Increased understanding of customer needs and expectations, especially the critical-to-quality (CTQ) service performance characteristics which will have the greatest impact on customer satisfaction and loyalty.

More efficient and reliable processes.

Improved knowledge across the organisation on various tools and techniques for problem-solving, leading to greater job satisfaction for employees.

Reduced number of non-value-added operations through systematic elimination, leading to faster delivery of service, faster lead time, faster cycle time to process critical performance characteristics to customers and stakeholders, etc.

Reduced variability in process performance, service capability, reliability, delivery and performance, leading to more predictable and consistent level of quality and service performance.

Transformation of organisational culture from being reactive to proactive thinking / mind-set.

So for public sector organisations, the benefits are clear: sustainable cost reductions in the delivery of services, while still delivering quality and value to the users of the service.

This paper provides a brief explanation of how Lean principles can and do work in the service sector. It also provides some background to Six Sigma (if you want to bypass this overview go directly to page 9). It also examines how the two combined provides a structured approach to business improvement, areas you need to consider when introducing this approach in your organisation, and how its benefits can be realised in a practical, sustainable and sensible way.

What is Lean Thinking?

Lean Thinking Origins

The ideas behind what is now termed Lean Thinking can be linked to several sources, including management thinkers such as W. Edwards Deming. Of particular note are the ideas originally developed in Toyota’s post Second World War manufacturing operations – known as the Toyota Production System – under the guidance of its chief engineer, Taiichi Ohno.

The term ‘lean’ was popularised in the seminal book ‘The Machine that Changed the World’ (Womack, Jones and Roos, 1990), which clearly illustrated – for the first time – the significant performance gap between the Japanese and western automotive industries. It described the key elements accounting for this superior performance as Lean production – ‘lean’ because Japanese business methods used less of everything – human effort, capital investment, facilities, inventories.
and time - in manufacturing, product development, parts supply and customer relations.

The Key Lean Thinking Principles

In ‘Lean Thinking’ (Womack and Jones, 1996) five Lean principles were put forward as a framework to be used by an organisation to implement Lean Thinking. A key initial premise is to recognise that only a small fraction of the total time and effort when producing a product or delivering a service actually adds value for the end customer. It is therefore critical to clearly define value for a specific product or service from the end customer’s perspective, so that all the non-value activities - or waste - can be targeted for removal step by step.

Womack and Jones’ five principles are:

1. Specify what creates value from the customers perspective
2. Identify all steps across the whole value stream
3. Make those actions that create value flow
4. Only make what is pulled by the customer just-in-time
5. Strive for perfection by continually removing successive layers of waste

Few services are provided by one function alone, so that waste removal has to be pursued throughout the whole ‘value stream’ – the entire set of activities across all the entities involved in jointly delivering the service. New relationships are required to eliminate waste and to effectively manage the value stream as a whole. Instead of managing the workload through successive departments, processes need to flow through all the value adding steps without interruption, using the toolbox of Lean techniques to successively remove the obstacles to flow to meet the demand from the end customer.

Removing wasted time and effort represents the biggest opportunity for performance improvement and enabling a greater focus on creating value.

Lean places greater emphasis on wasteful activity and in line with this, Toyota identified seven deadly wastes related to activity rather than design and implementation: transportation issues, inventory control issues, unnecessary movement of persons or equipment, time management, overproducing concerns, over-processing, and errors. Significant costs may be attached to each of these types of waste. As more and more layers of waste become visible and the process continues every action needs to add value for the end customer.

In this way, Lean Thinking represents a path of sustained performance improvement - and not a one off programme.

As Lean Thinking contends services must think strategically beyond its own boundaries. Because value streams flow across several departments and functions within an organisation, it needs to be organised around its key value streams. This includes enhancing the value delivered by internal service and back office operations … Finance, Human Resources, Legal and Compliance,
Customer Service, Information Technology, Marketing, Facilities Management, etc.

Lean Thinking principles can be applied to any organisation in any sector. Although lean’s origins are largely from an automotive manufacturing environment, the principles and techniques are been transferred to many sectors, often with little adaptation. Despite scepticism by many that techniques and philosophies designed in a manufacturing context apply elsewhere, sectors such as distribution, housing, construction, healthcare, financial services, and other public sector services have all begun to implement Lean ideas in recent years.

Irrespective of the sector you work in, Lean is rooted in two key principles – “continuous improvement” and “respect for people”. The “continuous improvement” principle embodies the tools and methods used to improve productivity and reduce costs. The “respect for people” principle embodies leadership behaviours and business practices that must be consistent with efforts to eliminate waste and create value for end-use customers.

What is Six Sigma?

Six Sigma is a process improvement methodology that has been proven to make step function improvement in any business environment. Six Sigma is driven by quality. It uses facts and data focused on customer value.

It is not a one-time project to fix a problem. It is not a “Flash in the Pan” or a “Flavour of the month” program that will go away. Six Sigma is a structured way to approach your business issues. If Six Sigma is embraced and implemented into your organisation’s culture you can achieve about a 20% margin improvement, 15% capacity improvement and/or a 20% capital reduction. Six Sigma defines customer value as a product or service that is received by a customer at the right:

- Location
- Cost
- Time
- and delivers

All of these as defined by the customer, not you. Many time we see customer value as the “functions” part only — that the product worked or the service did what is was supposed to do. But we forget that Customer value includes the delivery process that is made up of the other three items above — location, cost, and point in time.

The History of Six Sigma

In the 1980s, engineers at Motorola Corporation developed Six Sigma as a business improvement methodology. They discovered the mathematically derived point where the cost of eliminating an error/defect is greater than the cost of living with (and repairing) the defect. That is, there is an acceptable
point of imperfection - and any quality improvement made beyond that point is more expensive than the expected cost savings of fixing the imperfection.

Motorola explained that Six Sigma (which represents 3.4 defects per million) is the optimum level to balance quality and cost. This discovery forced Motorola to assess quality levels by measuring defects in millions rather than thousands, which had been the traditional method. This change enabled a vast improvement in the ability to assess and improve quality levels. Six Sigma enabled Motorola to cost-efficiently perform defect-free more than 90% of the time, resulting in significant savings. Its objective is to find and eliminate causes of defects or mistakes in processes by focusing on outputs. Even a Sigma level of 6 though gives ...  

- 500 surgical operations failed per week
- 1000 letters lost per hour
- Every day 15,000 cheques charged to a wrong account

So every process has the potential for error, and the idea is to look at all the ways in which things can go wrong, especially in the eyes of the customer, and try and eliminate the defects.

Take for example the business of a planning application to a Local Authority. The process begins with your first call to the planning department. Various things can go wrong: you can be placed in a queue and have an unacceptably long wait, you can be passed between departments, or when you receive the document you notice that your details have been recorded incorrectly or that you are being charged a higher amount than you were quoted in the phone call.

Six Sigma also looks at "excessive variation in processes" – for example, the same x-ray on the same machine with the same operator may take 15 minutes one day and 21 minutes the next. Why? How can we reduce this variation?

**Six Sigma Principles**

- Understand the critical to quality requirements (CTQs) of our customers and stakeholders
- Understand our processes ensuring they reflect these CTQs
- Manage by fact:  
  - measurement and management by fact enables more effective decision making
  - by understanding variation we’ll also know when to take action and when not to
- Involve and equip the people in the process
- Undertake improvement activity in a systematic way
Six Sigma Today

While the concept of Six Sigma began in the manufacturing arena decades ago, the idea that organisations can improve quality levels and work "defect-free" is currently being used by public sector organisation of all types and sizes.

Naturally, as Six Sigma permeates into today’s complex, sophisticated government landscape, the methodology is “tweaked” to satisfy unique needs of individual public bodies. But no matter how it is deployed, there is an overall framework that drives Six Sigma toward improving government performance.

Common Six Sigma traits include:

- A process of improving quality by gathering data, understanding and controlling variation, and improving predictability of the organisation’s business processes.
- A formalised Define, Measure, Analyse, Improve, Control (DMAIC) process that is the blueprint for Six Sigma improvements. (The DMAIC process will be described in greater detail later in this paper.)
- A strong emphasis on value. Six Sigma projects focus on high return areas where the greatest benefits can be gained.
- Internal cultural change, beginning with support from leaders and champions.

By defining, measuring, and analysing a business's processes, Six Sigma is able to improve the effectiveness of its operations as well as to design services of a quality that is likely to suit the needs of potential customers. More importantly, not addressing the quality issues can in time result in less efficient processes.

Based on Facts and Data

Six Sigma uses facts and data to understand, reduce and control variation in your business processes, variation that you now compensate for which costs you
money. This is not about analysing reports which you may receive on a weekly or monthly basis. Go and see what is happening out in the workplace and collect real data on how things are done. One local authority Chief Executive would listen to contact centre recordings to understand what was actually taking place.

It is the difference between what you think is happening and what is really happening. There is variation everywhere. To reduce it or eliminate it your first have to understand it. Understanding and addressing variation helps you predict outcomes that you had to compensate for before; outcomes that impact your customer needs. In Six Sigma these facts and data on the variation are collected and analysed to come up with conclusions – which lead to better decisions.

**Lean Sigma – Bringing them Together**

Operating by itself, Lean focuses on using the minimum amount of resources (people, materials, and capital) to produce solutions and deliver them on time to customers. Lean implementation can involve extremely thorough data collection and analysis that take years before any change occurs. This approach often yields desired results, but takes too long to get there.

Meanwhile, Six Sigma, operating independently, aims to improve quality by enhancing knowledge generating processes. In many cases, this leads to slow, deliberate, change-intolerant practices. To combat these challenges, organisations have found that by merging the Lean methodology with the Six Sigma methodology, a synergy is achieved that provides results much greater than if each of the approaches was implemented individually.

When Lean is added to Six Sigma, slow processes are challenged and replaced with more streamlined workflows. Additionally, the data gathered during Lean implementation helps identify the highest impact Six Sigma opportunities. When Six Sigma is added to Lean, a much-needed structure is provided that makes it easier to consistently and predictably achieve optimum
flow. The two methodologies work so well together, that a new, integrated, Lean Sigma approach, with its own unique characteristics, has been defined and incorporated by several leading organisations.

Lean Sigma therefore is the application of Lean techniques to increase speed and reduce waste, while employing Six Sigma processes to improve quality and focus on the Voice of the Customer. Lean Sigma means doing things right the first time, only doing the things that generate value, and doing it all quickly and efficiently. When meshed together as Lean Sigma, each of these ideals serves to increase delivery speed while decreasing variation in performance.

As a result, Lean Sigma allows managers to effectively address issues of speed, quality, and cost.

**The Lean Sigma-based DMAIC approach**

With this methodology, a team defines a problem and works through to implementing a solution linked to its underlying causes, establishing practices to ensure the solution sticks.

**Define**

The Define phase of the DMAIC process is often skipped or short-changed, but is vital to the overall success of any Lean Sigma project. This is the phase where the current state, problem statement, and desired future state are determined and documented via the Project Charter.

**Measure**

The Measure phase is where the business gathers quantitative and qualitative data to get a clear view of the current state. This serves as a baseline to evaluate potential solutions and typically involves interviews with process owners, process mapping of the key business processes, and gathering data relating to current performance (time, volume, frequency, impact, etc.). Information that gives a clear view of the current state is found in numerous locations – and all of it is valuable and should be captured.

**Analyse**

In the Analyse phase, the business studies the information gathered in the Measure phase, pinpoints bottlenecks, and identifies improvement opportunities where non-value-add tasks can be removed. A business case is conducted, which takes into account not only hard costs but also intangible benefits that can be gained, such as productivity and satisfaction, to determine if the improvement is cost-effective and worthwhile.

**Improve**

The Improve phase is when recommended solutions are implemented. A project plan is developed and put into action, beginning with a pilot programme and culminating in full-scale deployment. Where appropriate, new technology is
implemented, workflows are streamlined, and unnecessary processes are eliminated. Key factors of success during this phase are acceptance by end users and change without any degradation of current productivity levels.

Control

The Control phase is where the business ensures the solution consistently delivers.

And tell the story ...

So why do it?

Lean Sigma’s goal is growth, not just reducing costs. Its aim is effectiveness, not just efficiency. In this way, a Lean Sigma approach drives organisations not just to do things better but to do better things. In the past, companies used Lean Sigma primarily for operational improvement – refining existing processes to reduce costs, improve performance and provide better customer value.

However, dramatic upheavals in the competitive marketplace are prompting business change on a more significant scale. Organisations must innovate, not just improve.

Despite its heritage, Lean Sigma is well suited for this step change in target and scope. Because of its core tenets – analysis based on facts and direct customer input – Lean Sigma is equipped to facilitate a much broader transformation, helping an organisation rethink its entire business and create a more innovative climate.

Public Sector

How can Lean Sigma help service providers to cut costs and still deliver a better a level of service?

One of the reasons it has only been recently applied is that, unlike manufacturing, it is very hard to see a physical product in services and follow it through its key processing from raw material to finished product. In the service
world the service product is hidden within many interconnected departments. This is why it can take weeks to complete a simple service because of invisible hand-offs, bottlenecks and non-ownership of the process as it crosses inter-department fiefdoms all with their own measurements for performance.

Many managers lack statistical knowledge and the ability to apply statistics to problem solving. If you look at management development programmes, how many devote time within their programmes to practical and applied statistical methods. So the challenge is to motivate the managers to understand and apply statistical methods. It is a fundamental framework for managers to use these techniques for problem solving in organisations.

There is a real gap. One of the problems is short-term thinking by senior managers. We need to change the mind-set which thinks just for short-term results and which lacks a clear vision or strategic direction. We need to move away from creating fire-fighting managers who only tackle problems that arise on a daily basis without determining the root cause, so the problems come back again and again. There is a big need for a change in culture. We need brave leaders setting direction and looking at how we transform businesses.

Lean Sigma brings powerful methods for quickly combating recessionary pressures, and its application in the service sector and office environment unlocks significant opportunities to reduce costs, remove waste and improve the overall customer experience. It provides a compelling option for consideration, not least because it helps organisations across the public and private sector to achieve cost reductions without sacrificing service quality.

Improvement activity must be tailored to circumstances if benefits are to be sustained and in reality, different approaches are often brought together to deliver the right result. ‘Lean Sigma’ recognises that the improvement strengths of Lean can be harnessed with the financial benefits and analytical discipline of Six Sigma to create benefits on a far greater scale.

It is a systematic method to improve an organisation’s capability to meet customer demands, and identifies ways to deliver improved customer service at lower cost – in other words: “achieving much better with less”.

By putting Lean Sigma principles into practice, we believe public sector organisations can offer high-performing services that typically achieve:

- A clear focus on the issues that matter most to customers and other stakeholders
- An understanding of customer demand and how this can vary
- Greater responsiveness and flexibility to meet customer needs
- More effective service delivery, at reduced cost
- Whole systems’ improvement through more capable end-to-end processes
Sustainable changes in culture, improved communication and morale

Higher levels of customer satisfaction

Improved productivity and efficiency

Case Studies

In the US there are a number of public sector examples which demonstrate how Lean Sigma has been applied with positive outcomes. These include:

- Naval Air Systems Command – eliminating unnecessary reporting in the government agency – leading to a saving of $360,000.
- City of Fort Wayne – cost savings and improved city services – over 50 Lean Sigma projects which saved $10m.
- Oregon Department of Environmental – quality, reduced time and cost to test environmental samples – the number of steps in overall testing process was reduced by 42%, waiting periods were reduced by 38%, and decision points by 53%.
- Idaho Department of Environmental Quality, Improved Air Quality Permitting Process - application error rate dropped from more than 90% to less than 10%, the number of steps in the process was reduced from 221 to only 55 (a 75% decrease), and the time to process applications and issue permits was reduced to less than 50 days - an 83% reduction.

In the UK examples include:

Local Government – Adult Social Care. Results included:

- Overall lead time reduced from 99 to 34 days.
- Total processing time reduced to 450 minutes.
- The time customers spend waiting reduced from 14 to 2 days.
- 49% reduction in cost and a 56% reduction in time taken for processing a single assessment.
Health – Productive ward. Results and benefits included:

- Better management of patient expectations - patient satisfaction improved.
- Better management of the nurses expectations - nurse satisfaction improved.
- Improved direct care time in excess of 10%.
- Reduced staff absenteeism.
- At a glance patient status.

Health – Endoscopy 18 Week Rule. Results included

- Total of 14 – 16 working days taken out of the process.
- Improved flow.
- Improved inter-departmental communication.
- Rolled out to other departments – resulting in time savings in four further departments.

In Addition ...

A Scottish local authority has begun a Lean Sigma programme to enable a culture with improved performance, efficiency, customer service and more empowered staff. It has trained and dedicated 20 Lean Sigma staff with a goal of improving the top 50 processes across the council identified as using the most resources and having the largest customer impact. A second aspect of the approach is:

- Establishing end-to-end process management.
- Appointing process owners with responsibility for end-to-end management and governance.
- All the teams from across the council working on a process are represented and work to the same end-to-end performance indicators and improvement plan.

At the same time, the teams working on the process are being trained on a Lean system to empower them to manage their own performance and improvements. It believes that the three stage approach it has put in place will support its goal of creating a staff led culture of continuous improvement focusing on the customer and delivering not only better for less but also more for less.
And Finally ...

Lean methodology concentrates on creating more value with less work. The Six Sigma system strives to identify and eliminate errors/defects. Thus, Lean Sigma provides a method to accelerate a company’s decision-making processes, while both reducing inefficiencies as well as increasing quality.

Both Lean and Six Sigma have the same goal of continuous improvement but it is reached by asking different questions. In reality, a pragmatic approach needs to be taken, picking the best bits of each approach to use for the problem that needs to be solved.

Lean Sigma is the way the public sector can follow private sector service delivery organisations in steadily improving the services they deliver without any additional resources. Given this change in mind set, and the similarity of much of the work being done, there is no intrinsic reason why productivity growth should be any different in the public sector than it is in the private sector. Indeed, the opportunities are probably greater in the public sector over the next few years.

Lean Sigma does not require expert statisticians. It does not mean that you need highly qualified Lean Sigma experts – it is, at the end of the day, what is right for your organisation. It is not a cure all for every nook and cranny of an organisation. There may be a need for some expertise – be it statisticians or other experts. But for the relatively straightforward projects that most service environments are looking at, what is needed is for everyone in the organisation to understand Lean Sigma. You should not see Lean Sigma as the purview of experts, but as a philosophy which embraces the organisation.

So, that’s Lean Sigma – the elimination of unpleasant surprises
To Find Out More
Contact us on info@tealconsulting.co.uk for more information on how we help our clients achieve ‘better for less’. You can also download further publications and case studies from the Knowledge Bank area of our website www.tealconsulting.co.uk.

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