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## Lean and Six Sigma in policing: austerity, driver or distraction?

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### **Lean and Six Sigma in Policing: Austerity, driver or distraction?**

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## Continuous Improvement in Policing – Austerity: driver or distraction?

### Abstract

**Purpose:** This paper seeks to broaden some of the recent discussion which focuses on austerity being the driver for introducing continuous improvement methodologies, such as lean, into policing. While the impact of austerity is recognised quality management approaches should be systems for long term integration into working practices, and improving quality of services to the public.

**Methodology/Approach:** Academic and practitioner literature is reviewed to summarise the drivers for change and the progress of lean and Six Sigma in the UK Public Sector and in policing.

**Findings:** The paper concludes that there are significant gaps in the literature and while there are undoubted challenges, there are overlaps between the strategic direction of policing and the approaches of Lean Six Sigma. Some of the challenges and opportunities are then discussed.

**Research Limitations/Implications:** There are a small but growing number of papers which evidence the applicability of Lean Six Sigma in policing. This paper explores the challenges around identifying who customers are and the intangible nature of some services in policing.

**Practical Implications:** The paper emphasises the risks to service delivery if factors such as budget constraints are considered in isolation. The paper provides examples of opportunities which may exist in policing as well as introducing ongoing work in policing in Scotland.

**Social Implications:** Policing by consent remains a key philosophy and can be related to the 'voice of the customer' as a key component in delivering service improvement to ensure policing remains relevant to communities.

**Originality/Value:** This paper is among the first to explore the issues of how improvement methodologies fit into the strategic direction and challenges of policing services.

**Key Words:** Lean Six Sigma, Policing, Public Services, Voice of the Customer, Continuous Improvement.

**Paper Type:** Viewpoint

## Introduction

Public Services in the United Kingdom have been required to review the ways in which they deliver services against the backdrop of the global financial crisis during 2007/08 and consequential reducing budgets (HM Treasury, 2010). This trigger has seen activity to implement reform in the Civil Service (HM Government, 2012) and reduce the number of Public Bodies (Cabinet Office, 2010) among other efficiencies.

There is an emerging discussion around the challenge of policing in austerity and a recognition that for continuous improvement methodologies to be successful, there is a need for cultural and organisational change (Smith, 2016) and that there is a varied willingness to embrace such change. In England and Wales, the focus for embracing continuous improvement has been through 'Lean' (Barton and Matthews, 2015; Barton, 2016) whereas in Scotland initial work in this area has been through a Lean Six Sigma approach (Antony, Rodgers and Cudney, 2017). This paper considers the application of Lean alone and discusses the characteristics and advantages of both Lean, Six Sigma and the integrated Lean Six Sigma.

However, this paper emphasises that the financial challenge alone has not dictated the need to change the way in which public services are delivered and accessed. Drivers also include equality of access and tackling unfairness and inefficiency (HM Government, 2011). In Scotland, a holistic approach to reviewing public Services was taken, and while the financial challenge was referenced, the key principles which emerged included reform to 'empower individuals and Communities receiving public services by involving them in the design and delivery of the services they use', to integrate service provision and to 'become more efficient by reducing duplication and sharing services wherever possible' (Christie, 2011). This key principle of involving the customer or user in the design of services is taken forward in this paper to consider the benefits which can be derived from the use of Lean Six Sigma and the 'voice of the customer' as tools for improving the quality of public services in general and policing.

This article initially considers the wider impact of public service reform and the emphasis on joined up public services, which of course includes all emergency services. An overview of the use of Lean Six Sigma in the wider public service is drawn from the literature and presented to allow for critical comparison of the approach taken by other areas of the public sector with that of the police service. The authors argue that activities in healthcare or local government have potential impact on the emergency services and vice versa and so 'end to end' process improvement linked to a strategic approach should be preferred to 'silo' views of service delivery focussed on single agency cost reduction.

## Introduction to Lean and Six Sigma

Lean is commonly referenced as 'Lean Manufacturing', 'Lean Production' or 'Lean Thinking' and has its roots in the Toyota Production System (Antony et al, 2016). Lean methodologies are centred around the removal of waste from processes and the focus on what adds value to the customer or person receiving a service from the organisation. Waste has been defined as "anything other than the minimum amount of equipment, materials, parts, space and time which are absolutely essential to add

value to the product” (Russell and Taylor, 2000). Lean is associated with a proven range of tools and techniques to remove non-value steps or activities (Antony, 2011)

Six Sigma can be viewed as a process variation reduction strategy which results in defect and cost reduction and thereby increased customer satisfaction and enhanced bottom-line impact for the organisation. Six Sigma utilises basic and advanced statistical tools (depending upon the complexity of the problem at hand) and is used for tackling more complex problems with unknown solutions using a structured and disciplined problem-solving methodology called DMAIC (define-measure-analyse-improve-control.” (Antony, 2011). Six Sigma has its roots in Motorola in 1987, but gained prominence through its implementation in General Electric in 1995 under the strategic and visionary leadership of Jack Welch (Schroeder et al, 2008).

### **Lean and Six Sigma in the Public Sector**

The benefit or otherwise of the application of Lean and Six Sigma in the Public Sector is still being debated. There are several studies which have summarised the use of the methodologies across the past 20 years. A systematic literature review of the use of lean in healthcare (D’Adreamatteo et al, 2015) explored 243 papers, 57 of which were from the UK. The review showed that there had been a steady build of the number of papers published in this area, between 2003 to 2013.

The findings of D’Adreamatteo et al included challenges around a single identified definition of what lean is and what it is not to assist analysis of the implementation of methodologies along with recognising an under examination of the benefits and drawbacks of blended approaches such as Lean Six Sigma. It is noted that those authors have commented that;

“the UK Government has primarily chosen Lean as a means to reform its public sector” (p1206).

This reference is attributed to Radnor and Osborne (Radnor & Osborne, 2013) who assert that the application of lean in the UK public sector has focussed on the use of tools without an understanding of underlying logic and theories of service management. This ‘tool’ based approach is shown through individual projects and deployments in small areas of the public sector with examples including Revenue and Customs (Carter et al, 2011), Health (Hicks et al, 2015), Education (Thirkell and Ashman, 2014) and in many cases has been driven by a need to reduce budget expenditure rather than deliver best value to customers and the public.

The authors argument in this paper is that evidence of deployment of continuous improvement in the public sector has been disconnected and possibly lacking in strategic vision and intention and this is evidenced through emerging thinking around greater integration of methodologies into business models rather than simply the deployment of individual tools alone (Radnor et al, 2012), (Antony, 2014).

This article will move to focus on policing but would also reference that the challenge is wider than lean and should be discussed in the context of improvement methodologies more generally and that the research on the dominance of lean in the public sector is skewed by the decisions to focus on lean in the health sector.

Radnor & Osborne reference that 51% of sourced publications relate to Lean and 35% are from healthcare.

Still within healthcare, a further systematic literature review explored the use of both lean and six sigma in surgery (Mason et al, 2015) and in this review, the authors found that there was a role for both Lean and Six Sigma methodologies and that interventions needed to be considered on an individual basis. The analytical challenge was found to be the wide range of interventions to which methodologies were applied but little evidence of interconnectedness of approach meant that even within a single field of endeavour within health, lean and six sigma had been deployed in diverse ways.

The discussion on the use of both Lean and Six Sigma in the UK public sector is additionally explored in Education (Antony et al, 2012; Antony, 2014). However, it is agreed that most publications on improvement methodologies in the UK Public Sector are Lean focused as asserted by Radnor and Osborne. In an exploration of the use of Lean within the Tornado programme of the Royal Air Force (Bateman et al, 2014), the authors conclude that the key concept which can be extrapolated to the wider public sector is what they term 'demand readiness', where the customer need may not yet be expressed but the service requires to position itself to deliver the service when required. This goes beyond the normal definition of a pull system in the lean context.

### **Lean vs Six Sigma**

So far, this article has summarised the use of Lean in the public sector and, in particular, the dominance on lean in the health sector but has also introduced the fact that the blended approach of lean and Six Sigma has been used in healthcare and in education.

It is argued that the selection of only a single methodology can limit the nature and type of improvements which can be undertaken and, in turn, limits the tools available for improving services. Given that the small body of research published in this area shows examples of Lean applied in England and Wales (Barton, 2013) and Lean Six Sigma applied in Scotland (Antony et al. 2017) a brief overview of the distinction between the two methodologies is provided in this section. A collection of views from leading academics and practitioners additionally explored the relationships between lean and six sigma and what each mean and can bring to continuous improvement programmes (Antony, 2011).

The discussion of whether lean and six sigma are complementary has been ongoing for more than 10 years. In initially describing Six Sigma (Arnheiter and Maleyef, 2005), its roots in Total Quality Management (TQM) and the Six Sigma metrics explored by Motorola are referenced and a key point in this is the concept that quality is everybody's business as well as the TQM focus on customer satisfaction in management decision making. It is contended that these concepts have a resonance in public sector service delivery.

In considering Lean Management, Arnheiter and Maleyef consider the roots in the Toyota Production System and the concept of 'Just in Time' production methods as well as the shift from 'batch and queue' manufacturing and the reduction of waste in

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3 processes. Again, the concept of public services being available when needed and  
4 the reduction of waste as seen in many modern bureaucratic processes in the public  
5 sector have a resonance. The authors conclude that a lean six sigma organisation  
6 would capitalise on the strengths of both approaches.

7  
8 This conclusion is echoed by other explorations on the integration of lean and Six  
9 Sigma (Su et al,2006) (Salah et al, 2010) and (Cherrafi et al. 2016). There is  
10 additional recognition that lean and six sigma understanding is moving forward but  
11 are most effectively deployed holistically (Snee, 2010).

### 14 **Voice of the Customer – Public involvement in the design of services**

15  
16 The introduction to this article referenced some of the drivers for change and  
17 improvements in the public sector in Scotland in particular. These included the  
18 political direction towards greater public involvement in public sector service design  
19 (Christie, 2011). One of the criticisms levelled recently at the application of lean  
20 within the UK public sector is the focus on internal improvements (Radnor and  
21 Johnston, 2013) and whether customer service is considered as part of the redesign  
22 of process and or services. It can be suggested that focus on one without the other is  
23 not only questionable from the organisational perspective but also contrary to  
24 strategic direction in the UK public Sector.

25  
26 In Scotland, the Commission on the Future Delivery of Public Services (Christie,  
27 2011) found that there was a need for reform and that public-sector services were  
28 still based on a principle of providing service to people rather than with or for them.  
29 The Christie Commission also stated that there was a need to work more closely  
30 with individuals and communities to understand their circumstances, needs and  
31 aspirations. Even more recently the Scottish Government enacted the Community  
32 Empowerment (Scotland) Act, 2015 (Scottish Government, 2015) reinforces the  
33 recommendations of the Christie Commission by providing a legal right for  
34 community bodies to participate in designing and developing local outcome activities.

35  
36 This all serves to reinforce the importance of the Voice of the Customer and while  
37 this may have originated as a market research technique and been a key input in  
38 Quality Function Deployment as developed by Mitsubishi and later adopted by  
39 Toyota in the 1970's (Griffin and Hauser, 1993) it's relevance continues to this day.  
40 Collecting the voice of the customer has a whole chapter dedicated to it in The Lean  
41 Six Sigma Pocket Toolbook (George et al.,2005) with the purposes of gathering the  
42 voice of the customer including "to set priorities and goals consistent with customer  
43 needs" (p55) very much mirroring the public-sector direction of travel and the key  
44 point made by Radnor and Johnston.

45  
46 The challenge in gathering the voice of the customer is of course recognised as it is  
47 not always easy to identify who the customers are (Alford, 2002) and the views of the  
48 citizens who pay for and have expectations from the service may well be different  
49 from the clients who actually directly use the services and this brings us back to the  
50 need to consider perceptions of the service as well as actual customer satisfaction.

51  
52 The UK Public sector are not alone and the paradoxes between delivering customer  
53 satisfaction in the public and private sector are also recognised, where equality of  
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3 access to services, the intangibility of some services and again, identifying who the  
4 customers are all recognised challenges (Fountain, 2001).

5  
6 The foregoing summarises the evidence that the application of lean and six sigma in  
7 the public sector has not always given the importance to the voice of the customer in  
8 the redesign of services and this is not only an already existing important aspect of  
9 an integrated lean and six sigma model but there is further key evidence that this is  
10 not only expected but regulated for in the future of public service delivery.

### 11 **A Focus on Policing**

12  
13 The whole of UK policing has been affected by the broader public-sector reform  
14 agenda and like other agencies and departments have explored the use of  
15 improvement methodologies and quality management. Like other areas of the public  
16 sector this has particularly been influenced by lean manufacturing (Barton, 2013).

17  
18 Within a Policing context, Sir Ronnie Flanagan was commissioned by the Home  
19 Secretary to review policing in England and Wales in 2007. Included in the terms of  
20 reference were a desire to reduce bureaucracy, promote better business processes  
21 and levers and incentives for greater efficiency and productivity (Flanagan, 2008).  
22 The final report included recommendations that Police Force mergers should be  
23 facilitated where there was a sound business case and a focus on 'high potential'  
24 areas for improved productivity. This last recommendation was linked to the  
25 Operation Quest Programme, which underwent a proof of concept in 2006 with the  
26 objective of testing whether business re-engineering techniques could be applied to  
27 frontline operational policing (Home Office, 2007).

28  
29  
30 Operation Quest went through 5 phases between 2006 and 2009 involving a variety  
31 of Forces within England and Wales. The Home Office further emphasised the  
32 importance of the importance of efficiency and productivity in all functions of a police  
33 force but with reference to improvements in corporate services in their Efficiency and  
34 Productivity Strategy for the Police Service (Home Office, 2008).

35  
36 The Home Office additionally appointed an advocate for Reducing Bureaucracy in  
37 Policing. She reported an appetite to cut out waste and duplication but commented  
38 on the danger of being overwhelmed by the enormity of the task (Berry, 2010) while  
39 solutions are identified as empowering individuals and rationalising process, there is  
40 a focus on better managing risk to combat the 'industries built around capturing  
41 information "just in case..."

42  
43 Policing in England and Wales has been impacted by the global financial crisis in  
44 budgetary terms but there is a focus on efficiency and productivity to improve  
45 services driven by the Home Office. In Scotland, the Cabinet Secretary for Justice  
46 commissioned an independent review of policing in Scotland in 2009. This report  
47 surfaced a greater need for collaborative working between the Scottish Police Forces  
48 as well as developing capability, capacity and standards for working across the  
49 whole country (Tomkins, 2009). This work, again set in the context of the HM  
50 Treasury Spending Review 2010, led to the Scottish Policing Board implementing a  
51 programme of work to develop a sustainable policing model for Scotland (Scottish  
52 Policing Board, 2010). This work culminated in the Police Reform Programme and  
53 the ultimate merger of the 8 geographic Police Forces and 2 national Agencies into  
54 Police Scotland on 1<sup>st</sup> April 2013 (Scottish Government, 2012). The legislation also  
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specifically articulated that the Chief Constable must 'seek to secure continuous improvement in the policing of Scotland'.

It can therefore be seen that public-sector reform has in some cases been kick-started by a financial imperative and indeed value for money should be a factor in the provision of public services but a pattern of activity to reduce bureaucracy, deliver greater efficiency and productivity and greater public and individual involvement in the design of services can be evidenced.

### **The Drive towards Continuous Improvement in Policing**

Crime figures in England and Wales reduced year on year since 2002 (Office of National Statistics, 2014). In Scotland, recorded crime is at its lowest level since 1974 (Scottish Government, 2014). However, this has not meant that the challenge to policing is lessened. It is argued that the police workload has increased significantly over the past 25 years (Flanagan, 2008) and in England and Wales in addition to demand pressures there have also been reductions in the numbers of officers (College of Policing, 2015). It is argued that the demand has reached such a point that it is now recognised that the police cannot meet every conceivable demand placed on them by the public (HMIC, 2017). This increasing complexity is reflected in Scotland (Tomkins, 2009) where changing threats from international terrorism, increased public expectations, new scientific advances in forensic and investigative techniques and expectations of additional support to other public agencies in areas such as pandemics or severe weather.

Two common factors emerge as a focus for change, firstly increasing bureaucracy in the day to day role of Police Officers (Berry, 2009; Home Office, 2010) and secondly, risk aversion as a common causation factor for increased bureaucracy, which has led to inefficient processes designed to 'cover backs' rather than add value (Home Office 2010). Again, this is mirrored in Scotland (Tomkins, 2009).

Having identified the need and the associated challenge the question has been asked around the applicability of business improvement methodologies (including Lean, Six Sigma, Business Process re-engineering and Kaizen) in public services (Radnor et al 2006). Evaluation of individual lean deployments and broader literature indicated the applicability of lean but identified that it was best supported by an organisation which had less hierarchical management structures and which allowed empowerment and engagement of their workforce. To give additional context to the assertion that Lean is applicable to the public sector, the case studies undertaken related to healthcare, local government and a military site.

The applicability of Six Sigma in the public sector is additionally asserted as being able to enhance customer satisfaction and reduce costs (Dedhia, 2005). These are specific references to Lean and Six Sigma but there are a whole range of initiatives in the public Sector which have been called Lean but have been very narrow in application and have focused on rapid improvement events which are then referenced as the implementation of lean without building capacity. It is argued that in some cases this has led to impact being described as; "not even low hanging fruit but apples on the ground" (Radnor, 2008).

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3 Within the Police Service itself, a limited range of examples exist where lean  
4 methodologies or derivatives have been applied. A systematic review of the use of  
5 lean and Six Sigma in the public sector (Rodgers & Antony, in press) only identified 3  
6 articles in this area focussed on UK policing. Many of these examples are not  
7 published in academic journals and are linked to Operation Quest. Operation Quest  
8 was a joint programme between the Home Office and KPMG and was implemented  
9 in 15 of the 43 Forces and in the National Crime Agency (KPMG, 2010). Quest is  
10 described as an 'organisation wide approach to cost reduction and performance  
11 improvement...' (KPMG, 2010). The approach is described as a methodology and an  
12 approach to continuous improvement with the epithet Lean being retrospectively  
13 applied (Flanagan, 2008). Examples of the work undertaken by Forces as part of  
14 Operation Quest include;

- 15
- 16 ○ Norfolk Constabulary focused on three areas, Contact and Dispatch,  
17 Volume Crime and Intelligence
- 18 ○ Devon & Cornwall looked at incident and Crime Management
- 19 ○ West Yorkshire Police looked at Criminal Justice
- 20 ○ Wilshire Constabulary looked at defendant management and custody
- 21

22  
23 5 case studies were undertaken to better understand what was happening in terms  
24 of police forces adopting lean methodologies (Barton, 2011). Four of the case  
25 studies were Police Forces in England and Wales with the 5<sup>th</sup> being a London  
26 Borough. Of the studies 3 relate to activity within Operation Quest, with a fourth  
27 identifying the need for activity but resulting in the commander being unable to  
28 secure the resource to move to implementation and finally a case study delivered a  
29 'lean review' around inter-agency co-operation as a means of improving the criminal  
30 justice process. Barton additionally goes on to comment that the reality is that police  
31 forces have tended to use specific tools and techniques and have not adopted the  
32 full-scale methodologies of Lean Thinking (Barton, 2013).

33  
34 Barton's recognition that the full-scale implementation of Lean has not been  
35 demonstrated is important as successful implementation of Lean requires (amongst  
36 other factors) that lean is not a one-off process re-design, event or project but about  
37 continual improvement (Radnor, 2012) and again this would bring discussion back to  
38 strategic alignment organisational ethos and wider implications for the public sector.  
39 Such issues are considered at an organisational level (Antony, 2015).

### 40 41 42 43 **Lean Six Sigma in Policing**

44 Having identified the context, drivers and needs of the police service, the fact  
45 remains that there are very few published studies on the application of lean and/or  
46 Six Sigma in policing. The West Virginia State Police Forensic Laboratory used Lean  
47 principles to develop its forensic information management system (Ahluwalia and  
48 Srinivasan, 2004) with the outcomes of improving communication and flow of  
49 evidence from the scene of a crime right through the examination process to  
50 presentation at court.

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53 Public dissatisfaction over the length of time it took the police to attend calls in  
54 Taiwan led to the deployment of Six Sigma methodology (Chen et al, 2008). The  
55 project looked at the overall call handling and deployment process from end to end

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3 using the Define-Measure-Analyse-Improve-Control Methodology. This was intended  
4 to improve performance and therefore public satisfaction.

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6 Alder et al (2012) explored lean management for road traffic law enforcement in  
7 Israel. The volume of tickets issued was having a negative impact on the overall  
8 ability of the criminal justice system to process and administer the tickets, however  
9 given the underlying purpose of traffic enforcement of reduction of collisions, the  
10 priorities for issuing tickets were also not aligned to offences related to the known  
11 causes of collisions. The deployment of lean in this case rationalised the optimum  
12 number of tickets issued and ensured that the production flow through the criminal  
13 justice system was managed rather than having the enforcement and administration  
14 functions operating separately. The project also resulted in a steep increase in  
15 'quality' tickets (those for offences associated with known accident causes) by more  
16 than 70% replacing the issue of non-quality tickets.  
17

18 In Scotland, the police service partnered with Heriot-Watt University as part of a  
19 structure three tier continuous improvement programme to identify, train and support  
20 staff to deliver service improvements from within the workplace. Over the course of  
21 the first year almost 100 staff have been trained to white, yellow or green belt levels  
22 with 8 projects having been completed at the time of writing with a total cashable  
23 and/or efficiency savings realised of over £800k. This has been achieved from an  
24 initial investment of £80k and means that currently a 10:1 return on investment has  
25 been achieved, albeit this will continue to rise as additional projects are completed  
26 and their benefits are confirmed. The projects already delivered have included  
27 areas such as typing services, project meeting structures, annual leave allocation,  
28 sick pay process, protection of vulnerable group (PVG) application process and  
29 health and wellbeing. More detailed examples of these projects have been published  
30 separately to this article (Antony et al, 2017).  
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### 34 **Further Research and Opportunities**

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36 While there is much to suggest the applicability of lean and six sigma across the  
37 breadth of policing services there is a need to demonstrate this through the delivery  
38 and subsequent publication of case studies which evidence benefits and challenges  
39 of using an integrated continuous improvement methodology, within this context  
40 there are also clear cautionary tales in implementing such a programme. These  
41 include; ensuring the involvement of the staff who deliver actual services in  
42 improving those services and of course considering the impact of such projects on  
43 those staff. An additional theme is ensuring that the voice of the customer is  
44 identified and included in service improvement and of course ensuring the end to  
45 end improvement of services across the sector and including partners who deliver  
46 aspects of the service.  
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49 To further examine this area there needs to be a greater understanding of  
50 continuous improvement methodologies in policing and discussion of tools,  
51 techniques, successes and challenges so that lessons can be learned from other  
52 public and private sector experiences. Given the ethos of collaborative working  
53 within the public services opportunities exist for shared projects, joint learning and  
54 supporting networks for practitioners across agencies. In addition to this joint  
55 practitioner and academic work has been demonstrated to provide positive outcomes  
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3 and shared learning. This is evidenced in Scotland through the broader work of the  
4 Scottish Institute for Policing Research.

5  
6 It seems clear that the drive towards reducing bureaucracy, streamlining services  
7 and greater public involvement in the design of those services is continuing and the  
8 police service must culturally evolve to meet this and find supporting methodologies,  
9 tools and techniques to deliver relevant improvements. It is further contended that  
10 there is additional work required and being developed to normalise a culture of  
11 customer advocacy and employee empowerment to drive forward the embedding of  
12 both the concept of end to end improvements within policing and the public sector in  
13 general.  
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## 18 **Summary**

19  
20 There is a desire to tackle inefficiencies and bureaucracy within the Police Service,  
21 but these are often evidenced and exemplified as individual, interventions or projects.  
22 There is a lack of references which evidence the move from successful improvement  
23 activities into sustainable programmes and there is a danger of focusing on short  
24 term gains (Bateman, 2005). The literature references Public Services and  
25 implementation examples identify collaborative working practices. There are  
26 references to the potential to enhance public satisfaction (Dedhia, 2005, Flanagan,  
27 2008) but there is little evidence of engagement with the public in the full customer  
28 sense of the end users of public services and how they can be involved in the design  
29 and improvement of their services with a focus tending to be on accountability  
30 through democratically elected processes (Flanagan, 2008, Home Office, 2010).  
31

32  
33 The focus is not shown to be on the culture, rather delivery of the changes with a by-  
34 product being potential benefit from a longer-term change, and there is a need to do  
35 both (Berry, 2010). The question of assessment of organisational readiness for  
36 continuous improvement is also raised (Radnor, 2010) (Antony, 2014) and it is  
37 suggested that this includes 'developing a culture focused on improvement, an  
38 understanding of the customer, and the 'value' within the organisation.  
39

40 This merits greater discussion within the police service and broader partnerships  
41 who deliver criminal justice services as from one direction, the quest to provide  
42 efficient, cost effective services continue but from the other direction the rightful  
43 demand for the public to be more involved in the design and delivery of those  
44 services also grows.  
45

46 This paper demonstrates the ongoing discussion of the applicability of lean and six  
47 sigma in the public sector in general and the police service in particular and goes on  
48 to discuss some of the challenges and lessons learned, particularly in embedding  
49 service improvement methodologies into organisational culture. One of the key  
50 arguments presented is that the focus on austerity, while understandable, pushes  
51 towards short term savings which are often unsustainable and fail to take account of  
52 value to the public and the voice of the customer and the customer involvement in  
53 the design of public services. These strategic drivers will support more sustainable  
54 change and ensure that efficiencies and savings are not internally solely focussed. It  
55 is the view of the authors that openness to the introduction of Six Sigma as well as  
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lean and the adoption of methodologies as a wider organisational system will provide improved sustainability and focus benefits strategically in the correct areas. Additionally, the development of a framework around the problem complexity and the development of a maturity model to support implementing and embedding organisation wide culture of improvement will additionally assist efficiency and effectiveness of policing services.

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