An Assessment of the Impact of Lean Interventions within the UK Police Service

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The police service in England and Wales continues to face intense pressures to manage and reduce budgets while simultaneously maintaining and improving levels of service. In achieving reform, attention has been directed towards the implementation of proven operational improvement frameworks, such as 'lean thinking' taken from the automotive industry. This research draws on contemporary views of 'lean' as a knowledge creation process that is integrated into an absorptive capacity theoretical perspective. The work provides a new perspective on operational improvement within police forces and new insight into how such a reconceptualization may contribute to more successful police transformation.

INTRODUCTION

An effective and legitimate police service represents a fundamental cornerstone of a developed nation. However, such services need to be located within a new age of public sector finances that calls for budgetary responsibility, moving towards greater levels of efficiency and a need to acknowledge the value for money of services (Radnor and Osborne 2013). Such change has been further motivated, accelerated and required by global economic changes in public sector finance, resulting in the UK government's comprehensive spending reviews of 2010 and 2015. This has applied increased external pressures on previously protected public services, requiring tangible changes in service structure in order to deliver significant cost savings. In addition to reductions in central funding, service complexity has also been added by the continuing evolution of the communities being served by the police forces in England and Wales. Rather than the not inconsequential tasks of providing similar services while making significant cost savings, there is also a need to radically reimagine what police forces deliver, what they look like and how they operate (Barton 2013).

Over the last 30 years, private sector manufacturing has seen large-scale transformations, similar to those currently required in public sector. During the 1970s and before, British manufacturing was categorized as difficult to manage and reform, with changes actively resisted by a strong union presence and part public ownership. Products manufactured in Britain were viewed as having poor quality, poor reliability, while at the same time being high cost. It was only when competition was introduced from overseas (specifically Japan), there was a realization that dramatic improvement was needed if British manufacturing was to endure. While successive governments were able to slow the encroachment of competitors through quotas and local manufacturing requirements, overtime, competition increased.

Transplant factories and joint ventures both overcame barriers for local manufacturing, while also illustrating advantages were of non transferrable, company specific advantages (Hamel 1991, Inkpen 1998).

The result of such changes was a realization, not only in the UK, but globally, that fundamental changes needed to take place. At the heart of the transformation was a realization of the key role of quality management practices to systematically develop operational and product development capabilities (Garvin 1988). Based on a range of context specific characteristics, such as limited access to capital and close involvement of worker-based organizations, Japanese firms developed their own unique approach to quality management (Xu 1999, Womack et al. 1990). To explore the extent to which automotive practices were different globally, a large scale benchmarking exercise was undertaken, that identified key practices, that were later defined a 'lean' manufacturing techniques (Womack et al. 1990, Holweg 2007).

Facilities that operated in a 'lean' manner were identified able to produce products with performance characteristics that had been viewed a mutually exclusive, or required trading off against each other. These included high reliability with low cost, customized products with short lead times or quick response with low levels of inventory (Ferdows and De Meyer 1990). These performance characteristics allowed lean facilities to operate much more efficiently with greater productivity, being able to produce more products with fewer workers, with the associated knock-on effects on return on investment (Womack et al. 1990). With increasing levels of pressure to reduce public service budgets (Radnor and Osborne 2013), public service organisations (PSO) have looked enviously upon the transformations of private sector manufacturing, seeing the potential for them to make similar improvements to their own operations. Through the effective implementation of 'lean' techniques to the development 'lean' service organisations (Swank 2003), there was a view that similar improvements could be made to public service. However, difficulties have been experienced within the implementation of 'lean' in the public sector (Radnor et al. 2012, Radnor and Osborne 2013), with a need to focus attention on the complexity and context of public service operations management.

Questions are then rightly raised in terms of whether lean is the right strategy for the public sector environment or question if it was the implementation of the framework that was flawed (Radnor and Osborne 2013). Questions can also be raised in terms of the need to critically reflect on lean techniques and for the public sector to better understand what the implementation process is aiming to achieve. This leads to the presentation of the research question that will begin to be addressed in the work:

RQ: How does the implementation of lean techniques need to be reconceptualized within English and Welsh policing to improve its relevance?

This research takes a critical perspective towards the implementation of 'lean' and, more generally, operational improvement within the context of police forces in England and Wales. Through a critical deconstruction of 'lean', the aim of a lean initiative is presented as a means of developing awareness of the need to change as well as the actual changes in practice. The process of lean implementation will be interpreted from a knowledge based perspective, and employ the theoretical lens of absorptive capacity. Harvey et al. (2010) identified absorptive capacity as an appropriate perspective for use within the public sector, due to the need for PSO accept information from users and external sources. Consistent with Radnor and Osborne (2013), processes of learning and knowledge accumulation were also identified as important for realizing change in PSO. Absorptive capacity, as defined by Zahra and George (2002), is utilized within the current research to conceptualize how particular firms identify the need to make improvements and accept new approaches to working. Importantly, drawing from Rashman et al. (2009), absorptive capacity will need adaptation for use in the public service domain. Following the presentation of literature on process improvement in the public sector and the development of the conceptual framework, the research methods applied within the work will be presented before findings from the case studies. The findings will be analysed through the lens of absorptive capacity before the presentation of research implications on further police reform, opportunities for further research and conclusions.

IMPROVEMENT FRAMEWORKS AND THEIR IMPACT ON PUBLIC SERVICE ORGANISATIONS

The global success and influence of lean techniques (Womack and Jones 1996, Holweg 2007) has resulted in lean being identified as a potential means for realising improvement within the public sector. Lean is able to realise change through focusing on waste reduction, listening to the customer and continually improving operational processes through reducing unwanted variation. To realise such change, lean has been defined as a range of operational tools and technniques that support changes in organisational processes in order to realise improvement goals. However, work in the public sector has highlighted limitations of applying tools developed within a manufacturing context to a significantly more complex public service environment (Newell et al. 2003, Radnor et al. 2012). This has resulted in lean being considered a "*failed theory for public services*" (Radnor and Osborne 2013), unable to delivery the same results as were possible within a private sector, manufacturing context.

However, while lean is often conceptualised as the removal of waste, reducing unwanted variation and systematic improvement (Womack and Jones 1996), less attention is given to more subtle elements that truly differentiate lean from non-lean practices. Womack et al. (1990) spoke of the impact of lean thinking on the manufacturability of products, that made them inherently 'leaner' to manufacture. Furthermore, Hines et al. (2004) stated that easily learnt, operational improvements tools based elements of lean, while able to provide some significant short-term improvements were unable to provide firms with a sustainable competitive advantage. Furthermore, Berry (2009) spoke of the dangers of the pursue of short term cost savings rather than continuous improvement driven by a true cultural shift. Consequently, it was not the refining and improvement of existing practices, but the ability to make more dramatic changes to organisational systems, or kaikaku (Womack and Jones 1996), that determine whether organizational can *become* lean. This limitation has been identified within the literature on the implementation of lean in police forces where it is not the refinement of existing processes but "*a requirement to fundamentally review how police services are delivered*" (Barton 2013, p.222). Rather than simply undergoing operational refinement, greater attention is needed on strategic improvement, aligned with long term organisational aims, rather than short term cost savings. Contemporary work into lean thinking identifies similar limitations, where too great a focus on cost reduction can limited more extensive change, ultimately limiting the scale of improvement (de Treville and Antonakis 2006).

While the work within the policing sector on operational improvement is limited, Greasley (2004) provides a useful counter point to discussions focused upon lean. By acknowledging the fundamental limitations of existing systems related to the police human resource division, processes was re-engineered from the ground up. Hammer and Champy (1993), in "*re-engineering the corporation*", spoke of the need to fundamentally reimagine organisations in order to deliver services for the modern environment. They spoke of a new way to conceptualise organisational structures, away from the traditional hierarchies that developed during much less dynamic times. Within the New York police context, Sugarman (2010) identified similar issues, where over focus on the improvement of key performance measures limited the extent of changes. By instead focusing on more inclusive, bottom-up learning approaches, Sugarman (2010) presented how more innovative practices could be developed and implemented. Such insights are consistent with Barton and Barton (2011), who emphasised the need to involve the workforce when attempting to implement police reform. While limitation were present with the single case, secondary data evidence of Sugarman's (2010) work, it illustrated organisational learning (OL) as an appropriate theoretical framework for analysing police services.

The following section explores thinking and theory related to process improvement and lean. Following from the identification of lean as an appropriate theory for use in researching police reform, complementary theories will be identified and used to develop a conceptual framework to direct the empirical element of the work.

THEORETICAL DEVELOPMENT

While changes based on trial and error may result in gradual improvements, without understanding how deliberate changes lead to the desired outcomes, it may be difficult to sustain and repeat improvements (Fiol and Lyles 1985). At an individual level, unless those affected understand why they are changing practices, they may be unwilling to change, resist external support and even act to undermine improvement activities (Ackroyd and Thompson 1999). From this knowledge-based perspective, rather than attempting to transfer lean tools and techniques directly from a manufacturing environment, lean techniques can be viewed as means of developing understanding about organisational issues. Such a perspective allows those affected by organisational change to develop an awareness of the need to change, reducing the likelihood that implemented practices will be rejected. Consequently, following Radnor and Osborne (2013, p.271) lean "*is about building a more fundamental understanding of the underlying principles of Lean through their application*".

The accumulation of knowledge has been identified as the key compenent of competitive advantage in a modern environment (Grant 1996). Previous research in operations improvement initiatives has illustrated how knowledge represents a key output of improvement projects (Anand et al. 2010). This perspective accounts for the changes in practices that realise immediately from process changes, but also how the knowledge created in projects can motivate and benefit subsequent improvement activities. This may include the development of perspectives at an individual level that accept the use of revised procedures or help individuals identify further improvement opportunities. Hines et al. (2004) applied a knoweldge creation perspective specifically within the context of lean, conceptualising lean as an OL process. Drawing from Fiol and Lyle (1985, p.803), they presented lean as "*a process of improving action through better knowledge and understanding*". This perspective supported Hines et al. (2004) in illustrating how the creation of new knowledge enables lean to provide firms with a sustainable competitive advantage.

Although knowledge creation activities during operational improvement activities is important for developing a competitive advantage within a lean initiative, attention is also needed on the "front end" of problem solving (Marzec and Tan 2011). Before operational improvement activities can be carried out, critical knowledge acquisition activities need to take place that have a potentially critical impact on later activities. Within the police context, there is a degree of homogeneity due to similar training programmes, institutions and doctrin. Forces also have access to similar information about the need for improvement based on national data and imposed budget cuts. In addition to access to similar information about the need to improve, forces have also had access to similar resource to make changes (Quest 2011). These resources may focus upon building cultures of continuous improvement, that has been identified as the essense of process improvement (Flanagan 2008). However, withstanding these similarities, police forces have drawn from performance data and support in differing ways. As a result, a conceptual model for exploring the implementation of lean activities within police forces needs to account for the mechanisms that initiate improvement activities, as well as the organisational change activities themselves.

Viewing operational improvement activities as an OL process, where knowledge is acquired that results in changes to organisational systems, insight can be gleaned on why external performance measurement data does not always initiate improvement. While there may be an awareness of a need to change, Fiol and Lyle (1985) illustrated that it may require the onset of a organisational crisis sufficient to initiate the 'unlearning' process. Within the automotive industry, this required the unlearning of established production and new product development mechanisms that had become outdated. However, while an awareness of a need to change is necessary, the information needs to be interpreted and disseminated throughout the organisation in order to affect subsequent behaviour and realise change (Huber 1991). Alternatively, unless key individuals within organisations accept the need to support organisational changes processes, firms may be able to resist realising change through OL (Lawrence et al. 2005).

To better understand the process of integrating new knowledge, we draw from March (1991), who conceptualised the process of accepting new information as the introduction of new organisational

members that were either slow and fast learners. If an organisation regularly introduced new members, who did not necessarily accept established approaches to working (slow learners), they were able to adapt organisational processes to account for their ways of working. However, if the majority of new members were fast learning or there was not a regular introduction of new members, an organisation would become unwilling or unable to adapt to account for the introduction on new members (or new information). This was stated as resulting in firms that were unable to adapt to account for changes in the environment or make use of opportunities for improvement. March (1991) stated that such firms tended towards persuing changes that resulted in immediate benefits (refining existing processes), rather than improvements that required more fundamental changes. Critically, with police introducing new organisational members at lower levels, while there is the introduction of new ideas, new members have insufficient power to realise organisational change.
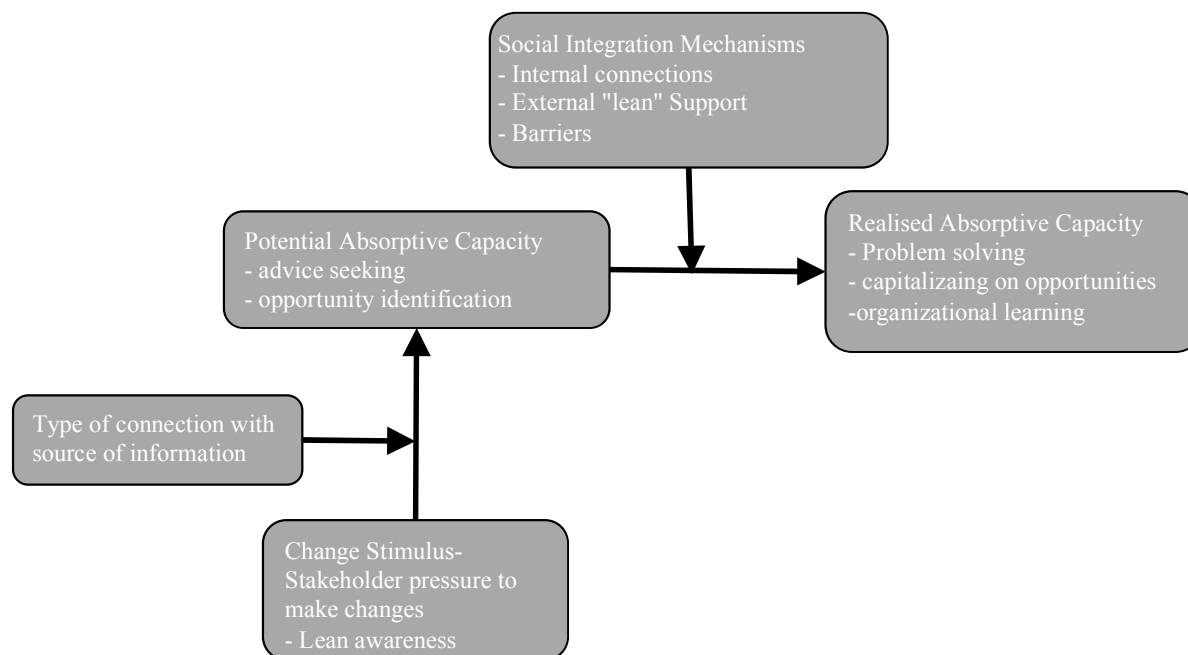
Within the context of Policing, such phenomena can be interpreted as an organisation focusing internally, looking to make adaptations to existing processes. With training taking primarily a practice based, social learning approach (Seely-Brown and Duguid 1991), emphasis is given to the maintenance of established operational practices, processes, institutions and doctrin. By focusing attention on community based approaches to learning, the values and beliefs present within police forces become embedded and difficult to change. Rashman et al. (2009) illustrated that OL theories needed to account for such characteristics of PSO. By developing and institutionalising organisational codes of practice, the Police are potentially less likely or able to accept new knowledge originating from external sources. Cohen and Levinthal (1990, p.133) presented this as rejecting knowledge that was "*not-invented-here*" resulting from a lack of related knowledge. Cohen and Levinthal (1990) define the ability of accepting knowledge that originated outside an organisation as absorptive capacity, with firms with low levels unable to innovate and create new knowledge based on external stimulous. Poor absorptive capacity can also result in the rejection of new knowledge, due to a lack of related knowledge meaning the potential value or importance of the new knowledge is not appreciated.

This leads to the identification of two key learning processes that determine how organisations, and specifically police forces, engage in learning, organisational improvement and potentially reform. Firstly, how police forces identify the need to change and which sources of information they accept and use to initate subsequent changes. Secondly, how they implement change to account for the information they acquired. This second process not only relies on the knowledge within the organisation to motivate and make changes, but also the ability to accept externally originating knowledge or resources to support change activities. This process may take the form of accepting external support necessary for facilitating and enabling change. Zahra and George (2002) conceptualised this as a two stage model of absorptive capacity. The first part of the process was defined as potential absorptive capacity, where it was necessary to have access to and realise the value in that knowledge or information. The second part was how the acquired knowledge was integrated into the organisation in order to realise benefits from the acquired knowledge, termed realised absorptive capacity. Zahra and George (2002) presented social integration mechanisms as determining the how much potential was translated to realised absorptive capacity, affected by barriers that resisted change.

In their review of OL and knowledge in PSO, Rashman et al. (2009) highlighted the limited work carried out on PSO. However, with Harvey et al. (2010) presented absorptive capacity as an appropriate theory for use in piblic sector research, by acknowledging the need to accept knowledge and develop new approached to operating informed by the external environment. Hodgkingson et al. (2012) also demonstrated how accesss to market information could support performance improvement in PSO. They also illustrated how the greater complexity of PSO could reduce the impact of absorptive capacity, providing weight to Rashman et al. (2009), who called for the development of new OL theories for PSO. Similar insights were provided by Newell et al. (2003), who identified the barriers associated with the highly professionalised context, where task based knowledged inhibited interactions across functional boundaries. Consequently, the knowledge created during improvement activities that enabled interactions between functions played a key role in implementing new "best practices".

Sun and Anderson (2010) provides further insight to Zahra and George's (2002) revised conceptualisation of absorptive capacity by integrating it with Crossan et al. (1999) influential OL framework. The structure of absorptive capacity was defined in terms of individuals accepting knowledge and gradually integrating it within the organisation through group level activities, until organisational policies were changed. Further work unpacking OL processes provides insights on the drivers and barriers of change identified as barriers to converting potential into realised absorptive capacity. Lawrence et al. (2005) acknowledged the key role of power and politics in enabling and driving change. With the impact of established practices within the police force and the hierarchical structure, appreciation of the role of power and politics in realising organisational change appears critical and an area requiring further research (Rashman et al. 2009). In summary, these discussions provide an overarching theoretical framework through which to view processes of organisational improvement, change and learning within the context of policing. The conceptual framework, based upon Zahra and George's (2002) revised conceptualisation of absorptive capacity and informed by OL is presented in Figure 1.

Figure 1: Conceptual Model of Police Force Organisational Improvement.

RESEARCH METHODS

To investigate how police force improvement activities have been pursued within a range of individual police forces, in July 2011, funding was secured to finance a pilot study of 5 forces within England and Wales. The intention was to collect data on how police forces actually engaged in operational change activities, away from the reported rhetoric surrounding the nature, variety and scope of Lean initiatives (Waring and Bishop 2010). Initially 14 Chief Officers and Borough Commanders (London) were contacted and 5 agreed to participate in the study. Table 1 provides an outline of the forces involved in the research.

Table 1: Case Database

Police Force	Type	Location
Welsh	Constabulary	Wales
Metro	Metropolitan Police Borough	London
South	Small constabulary	South England
Central	Mid-sized constabulary	Central England
Swest	Small constabulary	South-West England

Interviews focused upon discussing recent improvement activities, with emphasis given to the different stages of the improvement, from the initiating point, parties involved, tools applied and benefit realized from the initiative. While drawing from literature to structure the analysis of collected data, the framework provided discipline for theory construction (Weick 1989) and the linking of identified concepts with established frameworks (Walsh and Bartunek 2011). This approach both gave attention to assessment of the framework identified from literature, helping the development of new context specific theory. The strength of this approach was to explore complex social phenomenon, while helping frame and organize the data (Barton and Valero-Silva 2013). The broad selection criteria, while limiting the ability to confirm insight across cases, allowed the conceptual framework to be explored across a broad selection of operational contexts. The result was the development of potentially more robust theories, with greater external validity (Yin 2009).

The conceptual framework (figure 1) provided a structure that was broadly consistent with the phases of improvement activities that were discussed in the interviews. This included what initiated the improvement activity, the nature of the connections, the aims of the improvement initiative, tools used and outcomes realized from the initiative. Summaries of the case data are presented in Table 2. The data was analyzed both in terms of how individual cases related to the different elements of the conceptual frameworks and how approaches taken by the different cases varied across the different phases (Yin 2009). Although the main topics of the interviews were focused upon the practices of operational improvement, absorptive capacity provided theoretical underpinning to the analysis process. The following section presents findings from the cross-case analysis.

CROSS CASE ANALYSIS

Across the case forces, there was considerable diversity in the motivators and drivers of lean initiatives. While all forces were operating within the same broader context of budgetary restraint that required cost savings, imposed cost cutting was the motivation for only one of the cases. Consequently, the aims of the activities were varied, from developing understanding of operational processes to maintaining staff morale during cuts. Rather that explicit cost saving, greater emphasis was given to making changes to processes in preparation for cost savings that would be imposed in the future. As a result, the lean initiatives reported in this work can be viewed as pilot studies, allowing the police forces to build understanding of the relevance of lean to their particular context.

To account for the lack of knowledge of operational improvement approaches, one force's initiative champion engaged in training (Swest), while two forces worked with an external change programme (QUEST)(South and Central). In addition to providing knowledge, involvement of external parties also provided additional resources and experience for implementing organisational change. However, within the activities involving the external consultancies, while changes were made to practices and a range of tools were employed, insufficient attention was given to creating and embedding new knowledge and practices into existing processes. This meant that without newly created knowledge becoming embedded, once support was removed, there was insufficient knowledge to sustain changes or promote further changes.

Table 2: Case Database summary

Police Force	Driver	Nature	Aims	Tools	Direct Outcomes	Indirect outcomes
Welsh	Following critical external audit by CPS, sponsored by Local Criminal Justice Board	Lean review of criminal justice services	Develop understanding of the process from arrest to summary trials	Brainstorming, 5 why, Value stream mapping, cause effect diagnosis	Process changes, cost savings, daily team briefings	good evidence of cultural change leading to a multi-agency approach
Metro	Imposed cost cutting, Borough commander not wedded to idea of lean.	Strategic objectives measured against performance indicators	Maintain staff morale during cuts	Visual management	No evidence of any adoption of lean methods	-
South	Chief constable	Externally supported performance improvement programme (QUEST)	Deliver benefits, support senior officers with investment decisions and build continuous improvement	Training for senior management, visual management, process mapping	Reduce process times of arrests,	Doubts about sustainability of initiative, following removal of low hanging fruit
Central	Annual Policing Plan	Adopted Home Office QUEST (lean) programme for productivity and performance improvement	Ensure people see staff, budgets and all other resources being used wisely to deliver value for money	(Cross functional workshops, value stream mapping, cause effect, 5 why) from QUEST	Chief constable viewed initiative as a success	Chief constable to review way services are structured, planned savings to be redirected
Swest	Funding secured to pursue productivity and performance improvements	Champions trained in lean management with secured funding	Initiate lean activities to improve productivity and performance	Small teams, value stream mapping? Job rotation (team disbanded)	Small savings	Lean initiative disbanded

In comparison to the forces that involved external parties, the force that had trained an initiative champion in lean experienced different problems (Swest). Without sufficient power to coordinate internal resources, the initiative champion was only able to focus on small scale changes, being unable to implement wider scale change. In comparison to Swest, the initiative in Central involved the Chief Constable. While the initiative itself has been unable to realise significant improvements, the Chief Constable realised the potential of operational improvement activities. Following on from the Quest intervention, the Chief Constable integrated findings into a review of services within the annual policing plan.

The two forces that drew less extensively from external sources took quite different approaches to engaging in improvement activities. Metro attempted to pursue broad aims of cost cutting based on strategic measures while also attempting to maintain staff morale. This broad project definition made it difficult not only to define what the project was aiming to achieve, but also validate whether the improvement activities had been successful. By attempting to achieve a lot, but not carefully defining the

process or drawing from external support, very limited benefits were realised, with no follow up activities.

In comparison, the Welsh force focused their improvements on a particular operational process, following the receipt of a critical external audit from the crime prosecution service. Due to the report directing attention to the force as a whole, there was greater managerial commitment to resolving issues, and illustrate that identified problems had been resolved. Based on a review of existing processes, they engaged multiple functions identified by the audit and involved them in multi agency improvement workshops. While not engaging in formal training, multi agency workshops were supported by lean experts from the Crown Prosecution Service. This process helped participants use a range of tools to develop understanding of the process. This process supported the creation of new knowledge that drew from multiple perspectives, allowing the development of new processes that accounted for the requirements of the customer, helping reduce non-value adding activities. With a project of limited scope, the welsh force was able to explore the problem in depth, involve a range of operational staff, allowing them to realise tangible (process changes and cost savings) and intangible (cultural change) benefits, that were embedded and sustained through daily meetings and visual management.

While the acquisition of information from external sources could direct improvement activities, and external support (to a degree) supported organisational change, the processes of implementing change can be given further attention by the conceptual framework. While the initiatives as a whole were defined as focusing upon 'lean', each aimed to change and improve operational processes. The implementation activities can thus be conceptualised as the process of translating information and the need for organisational change into realised change at a force level. From this perspective the roles of the different lean tools applied within each initiative can be reinterpreted, in terms of how they translated aims for improvement into changes in practice. Consistent with the theoretical framework, this support the perspective of lean tools not being the form of knowledge being acquired in lean initiatives, instead as a means to create new knowledge and enable change.

The 'lean', problem solving tools, such as cause-effect diagrams or 5- why analysis, provided a means of underearthing embedded assumptions of operational issues, providing a foundation for developing new approaches to operating. Through group-level problem solving activities, individuals could begin developing shared understanding and accepting new approaches to operating. Tools such as value stream mapping then supported staff to learn about the capabilities and practices of other functions parties, helping develop awareness of how their work impacted end users.

Finally, the use of visual management, the most widely applied practice across the case forces provided a means of embedding new operational practices overtime, validating change practices and communicating changes to external parties. With considerable attention being given to performance measurement in police forces and a requirement to report performance data, the acceptance of visual management is logical. Unfortunately, within many of the cases, insufficient attention was given to the creation of new knowledge, meaning visual management primarily embedded existing practice, rather than newly developer, 'leaner' practices. Consequently, lean effectively further institutionalised existing practices, adding new non-value adding activities, while incurring costs associated with measurement.

In summary, each of the initiatives involved in the research to take the form of pilot activities, oriented around developing understanding of 'lean' tools and techniques. Such an approach allowed each force to explore the relevance of lean to their operations, potentially helping senior management decide how further improvement activities could be pursued in order to realise cost savings. Unfortunately, in some cases, the pilot nature was not explicit, meaning attention was not given to the learning that took place within initiatives, instead focusing on the tangible results that were realised. This meant that specific roles and deliverables were not always defined within activities, making it difficult to assess the success of particular initiatives. Without such information, if was difficult for firms to determine whether lean was an appropriate approach, or whether it was the approach taken that failed to provide satisfactory results. The initiatives were then judged in isolation, with the completion of only one initiative formally leading to follow up improvement activities (Central).

DISCUSSION

The findings provide a broad picture of the practices and parties engaged in improvement initiatives and the potentially critical impact of how improvements are initiated. The source and focus given to improvement activities by how they were initiated appeared to provide achievable goals that could be reflected on, upon completion of activities. Within broader operations literature, this has been identified as important for supporting firm in making process improvements. Furthermore, training and building commitment for goals, combined with challenging improvement goals can promote motivation to achieve goals, resulting in the improved performance of improvement activities (Linderman et al. 2003). The research illustrates the impact of the nature of what initiated improvement, with problems providing motivation to achieve improvements and a means of assessing whether improvements were successful. Consequently, the research shows that attention is needed on carefully choosing and defining improvement goals to provide those engaged with improvements a means of driving improvement and gauging the success of activities.

The 'pilot' nature of the activities included within this work reflect when the research was conducted and the need for further research as the comprehensive spending review moves into its second stage and cost saving pressures increase. Drawing from Fiol and Lyle (1985), until imposed cost savings result in an organizational crisis, police forces maybe be unwilling to engage in full scale organizational reform. Consequently, the isolated nature of improvement activities reported in the research are unable to provide evidence of organizational change taking place. Consequently, even within the more successful cases, rather than organizational; operational and process level learning are the primary changes that took place. Rashman et al. (2009) spoke of this as a key aspect of OL in PSO, with all organisations operating within similar political context, suggesting that as external pressures increase, the need for reform will increase across all PSO.

By viewing the activities reported in this work as pilots, the findings provide a multi case foundation for a framework to inform the structuring of subsequent improvement initiatives. With the second phase of the comprehensive spending review, there will be a requirement for more significant, tangible cost savings, reflecting Barton's (2013, p.222) call to *fundamentally review* policing practices. This identifies the need for greater emphasis on the transformational improvement frameworks, rather than those approaches that may focus on the "low hanging fruit (and windfalls!)" that can be realize by simply removing inefficiencies from existing processes (Radnor and Osborne 2013, p. 275). Reflecting on the work of Greasley (2004), police forces may need to comprehensively re-engineer organizational processes. By focusing on making radical, "kaikaku" (Womack and Jones 1996) forms of improvements, significant cost savings could be realized, while developing services that are more appropriate for the current environment.

Although business process re-engineering has received some negative press, resulting from the need to enforce changes and discard existing approaches to operating (O'Mahoney 2007), this is inconsistent with the original work (Hammer and Champy 1993). By emphasizing the need to move away from tightly defined tasks, the original work gives attention to handing back autonomy to front line staff, in line with the fundamental principles of policing. The evidence from the current research begins to suggest that lean techniques may provide a useful first step, on a longer road of transformation to a potentially less hierarchical, more flexible form. Initial lean activities may provide the understanding to develop potential absorptive capacity, help build awareness of all levels of staff of the need to change and promote acceptance of new approaches to working. Increased knowledge of lean techniques may also support those affected by radical changes to make incremental improvements to new processes once implemented. Through implementing processes, such a visual management, new approaches to working could be supported in becoming embedded into organizational culture. This was stated by Flanagan (2008) as the essence of successful process improvement activities necessary for promoting continued improvement.

CONCLUSION

For police forces moving toward the implementation of further change activities, the identified framework of absorptive capacity provides theoretical underpinning to informing further improvement activities. With 4 more years of experience of organizational change, police forces may be better positioned to critically reflect on the services they provide and the effectiveness or role of particular operational improvement techniques. With awareness of the need to make changes, forces may have increased their level of potential absorptive capacity, promoting the initiation of further, operational level improvement projects. Forces may also be more willing to acknowledge limitations in their own ability to undergo transformation alone, while appreciating the potential role of external parties to contribute services and support to the re-engineering process.

Within the framework of absorptive capacity, Lawrence et al. (2005) helps locate the key role of management within the case, particularly within the hierarchically structure policing context. The research illustrates that unless improvement activities gain the commitment, support and necessary resources from senior management, it may be difficult realize and sustain benefits from improvement activities. However, rather than management enforcing change, that can increase costs (Lawrence et al. 2005), the resources provide those affected with the opportunity to accept the need to change and develop new ways of working. Consistent with this, Rashman et al. (2009) spoke of the need for management to create a learning environment necessary for accepting change, increasing absorptive capacity. This provides evidence of the need to extend the presented conceptual framework to account for the role of management. While limited work has attempted to integrate the role of leadership within the absorptive capacity framework, Sun and Anderson (2012) suggest that both top and middle management level play key roles in developing absorptive capacity.

The case data also illustrates that the important of engaging in multi-agency activities, to create new knowledge about operational processes, that promote improvements that benefits all parties involved. This finding is consistent with Newell et al.'s (2003) on best practice within the NHS, where multi agency activities not only promoted the development of new approaches, but also enabled the development of cross functional knowledge that facilitated use. Similar concepts have also been highlighted in work exploring innovation that involved engineers and medical professional. Interestingly, Yoda (2015) also highlights the importance of leadership at a project level, necessary for developing the level of cross functional absorptive capacity necessary for different professional to work together. The knowledge created from such multi agency teams can then result in new processes that meet the needs of the end users and stakeholders, while reducing waste and increasing ease of use, further promoting their acceptance by those affected. Finally, the research illustrated the importance of measuring the impact of improvement activities. While the cases gave emphasis to visual management techniques to help embed practices, measurement also provided a means to demonstrate the results of improvement activities, important for building support for subsequent improvement activities.

Building on the current research, further research needs to explore how improvement interventions have been embedded and developed. This will help develop a better understanding of how different forces have chosen to pursue organizational reform. Following on from the small scale, isolated improvement activities reported in this work, further research that looks at larger scale reform activities will facilitate the further validation of the proposed conceptual framework. The ability to include the dimension of time into future research will also allow the evolution of improvement approaches employed within police forces to be observed. Rather than assessing whether lean is an appropriate theory for use within police reform, it may be possible to develop new, police specific improvement frameworks and interpret how these are different to lean in order to account for the specific requirements of the policing context. Overall, such research will allow the development of understanding of what 21st century police consists of and whether it can truly be defined as "lean policing".

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