

**Implementing operations strategy through lean processes
within health care**

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Implementing Operations Strategy through Lean Processes within Health Care - the example of NHS in the UK

Structured Abstract:

Purpose

This paper explores the degree to which senior-level personnel within the NHS are fully clear as to what Lean really is and if they knew the range of operations criteria that could be applied in Healthcare.

Design/methodology/approach

We adopted semi-structured interviews for data collection with senior-level strategic personnel in order to track strategy development and implementation in the NHS, starting with NHS England, through the clinical commissioning groups (CCGs) to hospitals.

Findings

Operations/capability benefits were not fully developed. 'Best practice' was not being disseminated across the NHS, for either patient experience or organisational effectiveness. Despite Lean's attraction for Healthcare at a micro level, significant operational and cultural hurdles must be overcome for the full strategic benefits of Lean to be realised.

Research limitations/implications (if applicable)

Our sample provides an initial snapshot. A larger number of hospitals and/or longitudinal research are needed to deepen understanding of embedding strategic change to improve overall performance.

Practical implications (if applicable)

Tackling cultural performance and operational issues at a macro level could help Healthcare providers reconcile the perceived conflicting goals of improving patient care (ie service delivery) whilst simultaneously reducing costs.

Originality/value

This research builds on and extends the work of Toussaint and Berry (2013), Seddon and O'Donovan (2010) and Carlborg and Kowalkowski (2013). We highlight how some of the apparent contradictions in the requirements of the various stakeholders create operational and strategic tensions. We highlight the complex nature of design and delivery of a multi-interface service within the complexity of a very large provider of healthcare.

Keywords: Service operations, Healthcare, Lean, Public services, Performance, Strategic capability

Article Classification: Research Paper

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INTRODUCTION

Healthcare is perhaps the most personal and important service people experience, yet ironically, it is not a service that people necessarily seek (Berry and Bendapudi, 2007). ‘Patient experience’ transcends a purely medical and organisational perspective, although the focus in healthcare is typically on the technical aspect of service provision (Makarem and Al-Amin, 2014). Providing healthcare services, in an environment where patients are increasingly experience-aware and where ever-tighter financial constraints are evident, presents interesting challenges both for service design and performance management (Zomerdijk and Voss, 2010, Dey et al., 2013, Tax et al., 2013). This highlights the important role of operations strategy because this becomes the means by which a range of operations management initiatives can be defined and implemented (Hill and Hill, 2011) within organisations, including healthcare providers.

‘Lean’ is one of these operations management initiatives that has received significant attention from both practitioners and scholars within service environments (Panchak, 2003, de Souza, 2009, Mazzocato et al., 2010, Burgess and Radnor, 2012, Vegting et al., 2012, Toussaint and Berry, 2013, Bhat and Jnanesh, 2014). The application of Lean processes is alluring for senior-level managers within the NHS because of the promise of combining cost reductions while simultaneously offering outstanding standards of health service to patients. Papadopoulos et al. (2011) noted that Lean, as a label for interventions in the National Health Service (NHS), is widespread but the interpretation of Lean is varied. de Souza (2009) noted agreement about the potential of lean healthcare, but that its evaluation remained a challenge.

Many hospitals have embarked upon ‘Lean projects’ to improve performance, and, similarly to Papadopoulos (ibid), researchers have noted varied success levels and identify that this might be due to the focus on the “tools of Lean”, rather than the application of the holistic philosophy of Lean (Burgess, 2012, Matthias and Buckle, 2015).

This research explores the degree to which senior-level personnel within the NHS understand and practice two key aspects of Operations Management:

- a) Operations Strategy and its application within the NHS
- b) Lean and the range of operations criteria that could be applied in Healthcare.

The reason why these two areas were chosen is because of the links between them within the NHS. The term “operations strategy” is now used as an umbrella term to deal with long-term change projects within the NHS; additionally, embracing Lean practices has been seen as a key driver for change within the NHS. This triggered the desire to explore how senior level staff within the NHS understood these two terms and how they were implemented in practice. This paper follows on from extensive primary research with senior-level managers within the NHS in the UK, specifically England, and this paper builds upon other published outputs in IJOPM regarding Lean and service provision (Moyano-Fuentes and Sacristán-Díaz, 2012, Malmbrandt and Åhlström, 2013, Bamford et al., 2015, Samuel et al., 2015, Waring and Alexander, 2015).

It comes at a time when there is extensive and heated debate within the British Parliament concerning the future of the NHS – specifically its cost and service quality performance. This paper examines some of the key issues facing the NHS with its attempted adoption of operations strategy and improvement practices as it simultaneously grapples with two key strategic objectives: i) improving service delivery and customer satisfaction, and ii) reducing costs. The paper then develops aspects of the process and content of operations strategy in

engendering a performance culture, often necessary when implementing Lean processes for sustainable results.

At its inception in 1948 NHS funding was around 2% of GDP, rising to 3.6% in 1950, and remaining largely between 4% and 4.9% until 1998 (Mitchell, 2011). The sharp increase happened this century, peaking in 2009 at 9.4% with healthcare expenditure growing faster than GDP (Lewis and Cooper, 2015). This is being reversed, and in 2013 stood at 8.8% of GDP, creating the perception of stringent financial constraints, which is exacerbated by an operational feature unique to healthcare – technological advances tend to drive up unit costs rather than decreasing them. Combined, these factors create a difficult operational climate.

The NHS has been reorganised many times, with the core aim of enhancing the quality of care for patients. Like all organisations, one of the ongoing challenges is to make the best possible use of limited resources. Within the NHS the biggest challenge has become providing high quality healthcare with excellent service for patients and other stakeholders as the government continues to cut the overall share of GDP attributed to healthcare expenditure.

The UK government has introduced a number of policies in an attempt to improve efficiency, and provide transparency and accountability for its funding. These are shown in Table 1.

Table 1: Key NHS Initiatives

Policy Initiated	Year	Purpose
“Working for Patients”	(1989)	First attempt to standardise clinical audit as part of professional healthcare
“Principles for Best Practice in Clinical Audit”	(2002)	To improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change

The Darzi Report	(2008)	Ambitious visions for the future of health and healthcare to enable the local NHS to achieve improved health and high quality care for all.
Health and Social Care Act	(2012)	Puts clinicians at the centre of commissioning, frees up providers to innovate, empowers patients and gives a new focus to public health. Sets up a new NHS commissioning board called NHS England to oversee the NHS from the DoH
The Nicholson Challenge	(2010)	Introduced the QIPP (Quality Improvement Productivity and Prevention) challenge to the NHS to improve quality whilst making efficiency savings. Sir David Nicholson (leader of the National Health Service in England, 2006-2012) set the challenge of saving £15-20 billion through efficiency savings from 2011 to 2014. The challenge was to make these savings through better ways of working, whilst keeping quality as its organising principle.
The Francis Report	(2013)	Makes 290 recommendations, including: openness, transparency and candour throughout the healthcare system (including a statutory duty of candour), fundamental standards for healthcare providers, improved support for compassionate caring and committed care, and stronger healthcare leadership.

The Francis report recommendations, focusing on patient safety and quality of care, could be interpreted as a consequence of the years of emphasis on cost reduction and efficiency increases. It is perhaps unsurprising, therefore, that the UK NHS has been intermittently attracted to a range of managerial and business initiatives, most notably the promises of Lean with its associated reduction of waste in all forms, including financial overspending, and its emphasis on quality processes.

The paper is arranged as follows. The Introduction has provided some background and context regarding the nature of the NHS and the unique demands that it faces. The next section is a literature review that explores operations strategy, service operations, and Lean. This is followed by an explanation of the research approach adopted, after which the

findings are presented. A discussion section and a set of conclusions and suggestions for future research complete the paper.

LITERATURE REVIEW

Operations Strategy

The NHS use of the term ‘operations strategy’ has been noted above. Operations strategy developed from the term, ‘manufacturing strategy’ and was established as a core topic in Operations Management by major contributions from US academics, led by Skinner (1969, 1974), along with Hayes and Wheelwright (1984). This was developed in the UK by academics such as Hill (1985), Voss (1996) and Brown (1996). Over time the term, operations strategy, has been adopted to reflect the increasingly service-dominant nature of most economies, thus shifting focus from manufacture of goods to the provision of services to the customer (Voss et al., 2008, Spring and Araujo, 2009).

The purpose of an operations strategy is to provide the broader conceptualisation of ‘value’ and service delivery, create organisational knowledge and enable planning to reconcile market requirements and resources (Slack, 2015). Previously, Brown et al. (2013) had also suggested that operations strategy is:

- Concerned with meeting existing market needs and exploiting opportunities for potential market segments
- About making the best use of resources, and leveraging these resources either alone or with partners
- The ultimate responsibility of senior-level managers within the firm - while recognising the importance of a range of stakeholders in the process be they within or external to the firm
- About devising and implementing processes that will enable the enterprise to compete and, ideally, to create competitive advantage

- Concerned with developing capabilities within the firm's Operations that are superior to other competitors and which other competitors either cannot copy or will find it extremely difficult to copy

All but the last point has direct relevance for the NHS, which needs to make best possible use of public resources to deliver a public service. Further insights into the importance of operations are provided by offering an indicative list of the type of areas that the operations strategy can contain, of which a number, if not all, are particularly pertinent to today's healthcare environment (Brown et al., 2013):

- Management of value
- Sustainability
- Ethical Issues
- Capacity management
- Location decisions - the range and locations of facilities
- Process management
- Managing technology
- Formation of strategic buyer-supplier relationships as part of the organisation's 'extended enterprise'
- Innovation - new product or service introduction
- Human resources management

Healthcare, as already noted (Berry and Bendapudi, 2007, Makarem and Al-Amin, 2014) is a service experience for all patients. Despite its relevance to healthcare operations, there is little research on Operations Strategy in healthcare (Rifai and Pecenka, 1990, Butler et al., 1996, Li et al., 2002, Silvestro and Silvestro, 2003). This paper seeks to address that.

The Emergence of Lean

The term, Lean, was coined by Krafcik (1988) when analysing the Toyota Production System (TPS) which encourages the full development and integration of technology, policies and human resources with minimum amounts of waste in all forms. It was brought to widespread attention by Womack et al. (1991) in their book, *The Machine That Changed the World*. The claims of the authors of the book were both bold and clear:

"....the adoption of Lean production, as it inevitably spreads beyond the auto industry, will change everything in almost every industry - choices for consumers, the nature of work, the fortune of companies, and, ultimately, the fate of nations" (Womack *ibid*:p12)

As the application of Lean expanded into other sectors, Lean production evolved into the concept of Lean thinking, as Womack and Jones described (2003). The over-riding ethos in Lean Thinking remained focused on the elimination of non-value-adding activity (labelled 'waste'), with optimum flow of materials and information throughout the value chain, increased customer service and higher quality.

Much of the above is familiar to those concerned with service delivery, be it quality or recovery (Bamford and Griffin, 2008, Patricio et al., 2008, Smith et al., 2010, Malmbrandt and Åhlström, 2013). It is important to note that there was no mention of reduction in costs in the original text, *The Machine That Changed the World*, nor in their subsequent books (2003, 2005) which moved the focus from manufacturing to service. Rather, the implication was that by improving a range of capabilities, including layout, quality, inventory management, space reduction and process design, the changed practices that are the outcome of Lean thinking would then lead to subsequent financial improvements. This echoes the thinking outlined by Ferdows and De Meyer (1990) in their theory of Operations Strategy development presented as the Sandcone Model. They state that excellence is built on a common set of fundamental principles about the best way to manage effort and resources. They outline a specific sequence which helps organisations achieve substance and not just form in performance improvement. Cost improvements are an ultimate consequence of resources and management efforts invested in the improvement of firstly quality, followed by dependability and speed, with all three being objectives fundamental to continuous improvement and to the philosophy of Lean.

However, even from the outset, there have been criticisms of Lean to counteract the enthusiasm. For example, Brown (1996) noted, even within manufacturing environments, weaknesses existed, including:

1. **The contribution of the manufacturing/operations function to business strategy:** The explicit role of the manufacturing function is, largely, ignored in terms of its contribution (at any stage) to corporate planning in Lean.

2. **The importance of seniority of manufacturing/operations personnel:** Womack et al. (1991) homed in on the operational specifics without addressing the link between this operational performance and manufacturing involvement at senior levels within the firm.

It is unsurprising therefore that the success of transfer of Lean principles to Service sectors, including Healthcare, is still debated and that a broader approach, as used in Operations Strategy, is advocated (Mazzocato et al., 2010, Burgess and Radnor, 2012, Sloan et al., 2014).

Lean in Services

Findings indicate that the Lean approach is just as applicable to service operations as to assembly-line manufacturing, although there are major contingencies required for each setting (Ahlstrom, 2004, Smith, 2013). Liker and Morgan (2006) found that in the adoption of Lean by service industries, most efforts represent limited, piecemeal approaches - noted as quick fixes to reduce lead time and costs, and to increase quality - that almost never create a true learning culture. Their research then offered a systems approach that effectively integrates people, processes, and technology in a strategic manner, rather than being seen as a set of techniques. Abdi et al. (2006) attempted to develop supporting processes for facilitating Lean adoption in service, as, more recently, did Malmbrandt and Åhlström (2013), who also suggested the ability to discriminate between high and low adoption as well as portraying changes over time during Lean adoption.

Lean processes have been adopted with some success within a range of back-office environments, including government departments and libraries (Beuster, 2011, Kleback, 2012, Wallace, 2012). However, problems with adopting Lean in services have been well-documented. For instance, Seddon and O'Donovan (2010) posed doubts about Lean's

ability to deal with variety within services. They discuss how standardisation within service organisations has to be modified to deal with variety and how this can only be achieved by understanding the value demands from the customer's view. Their focus on Her Majesty's Revenue & Customs (HMRC) indicated that standardisation of taxation services has caused failure demand. Carter et al. (2011) investigated the impact of Lean on labour processes in HMRC. They argue that Lean has a detrimental effect on employees, their working lives, and the service that is provided to the public. They conclude that the consequences of Lean on public sector work are highly problematic.

Carlborg, and Kowalkowski (2013) found difficulties in reconciling 'standardised services' with increasing reliability in service processes through Lean principles. They found that although Lean can increase efficiency, the demands of high diversity make the application of Lean principles increasingly difficult. This is similar to the complexities highlighted in healthcare, with the seemingly opposing forces of increasing quality and reducing costs needing to be reconciled and the mixed interpretations and results already noted (Papadopoulos et al., 2011, Burgess and Radnor, 2012, Matthias and Buckle, 2015).

Using case studies of large UK Government departments, Radnor and Johnston (2012) concluded that although some public service organisations recognise that Lean can improve their internal processes, they have not linked this to value or customer service. In 2013, Radnor and Osborne posed doubts about the applicability of Lean to public services because of the lack of context-specific attention that is needed to make Lean 'successful' within the public sector. They found implementation of Lean to have been "defective" because of the over-emphasis on the technical tools of implementation rather than an over-arching business logic to validate Lean processes. These are the same issues around Lean that concerned

Brown (1996), listed earlier, regarding the transfer of Lean within manufacturing: the problem appears to be the absence of a strategic perspective.

Thus, the ‘success’ of Lean practices within Services generally and public services more specifically is, at best, mixed. The adoption of Lean in Healthcare presents a similar picture of mixed results and the absence of a strategic perspective.

Lean in Healthcare

The adoption of Lean processes within Healthcare has created some excitement and attention in both trade and academic journals since it seemingly offers a response to the simultaneous pressures to improve quality and lower costs (Graban and Swartz, 2012, Robinson et al., 2012, Vegting et al., 2012). Toussaint and Berry (2013) define six principles for the success of Lean in healthcare environments. They explain how since healthcare is for patients, all healthcare resources, directly or indirectly, should be used to improve value for patients. At the same time, they state, this benefits other aspects such as fewer hospital-acquired infections, faster theatre turnaround and improved care-team communication. Although they do not actually use the term ‘operations strategy’, the wide-ranging spread of their principles for success are aligned with a broad, organisation-wide approach seen in such strategies, rather than focusing only on the tools of Lean. These principles go some way to define the over-arching business logic Radnor and Osborne (2013) saw as necessary to validate Lean processes. Toussaint and Berry (2013) outline the case for the adoption of Lean compellingly, and there are examples of Lean being applied successfully to Healthcare services in a number of countries.

For example, in Hong Kong, Chan (2012) examined how applying Lean improved the pre-consultation patient time in outpatient services and found that Lean worked well if used by

a multidisciplinary health team. Results led to reduced congestion in the patient waiting area, improved patient flow, reduction in patient complaints, reduced staff workloads and improved internal air quality. In their research, Bhat and Jnanesh (2014) showed how Lean Six Sigma methodology had been applied to reduce the cycle time of out-patient department service in a rural Indian hospital from 4.27 minutes to 1.5 minutes. They also noted a 97% reduction in average waiting time in the system and 91% decreases in queue length.

LaGanga's (2011) research in outpatient service operations in the USA showed how a Lean process improvement project conducted to increase new patients admissions capacity increased throughput by 27% and reduced the no-show rate by 12%. Hagan's (2011) research showed how Seattle Children's Hospital in Washington streamlined the hospital's myriad processes at all levels to ensure high-quality and effective delivery of services after embarking on a continuous improvement initiative using the Lean approach. In contrast to the 'benefit to only one stakeholder' research noted by some, this case study has a range of benefits including to the organisation, its staff members at all levels, and its patients, showing a Lean project can have strategic outcomes. Murphree et al. (2011) also noted that a range of benefits are possible to a variety of stakeholders when Lean is implemented as a continuous process, similar to the notion of continuous improvement, rather than as a series of mini-projects.

Within NHS Hospitals most change initiatives tend to follow the path of incremental, rather than breakthrough, change and improvement (Ritchie, 2002, Umble and Umble, 2006). This is partly due to cultural constraints, since change in the NHS is framed by an increasingly prescriptive and centrally-driven set of performance measures (Currie and Suhomlinova, 2006). It is also partly due to professional and policy constraints, arising from a mosaic of professions, large-scale structural change and the presence of central targets (Currie and

Lockett, 2011). Consequently, given findings such as those presented by Murphree et al. (2011) and Hagan (2011), it would appear that the adoption of Lean thinking and practice would be an ideal approach to engender the kind of change that policy-makers seem to want. However, Burgess (2012) and Matthias and Buckle (2015) note a continuation of piecemeal Lean implementation, where the tools and techniques of Lean are used only for discrete, targeted areas of improvement across the NHS.

This review of literature on implementing operations strategy and Lean in service industries and healthcare in particular raised a number of questions:

1. Is there a structured, planned approach to service or operational delivery?
2. Where and how does behavioural and performance improvement feature as part of operations strategy planning?
3. Who is responsible for operationalising and achieving policy and performance objectives within hospitals?
4. Are the specifics of Lean criteria set in place within the NHS and, if so, are they well known and understood at all levels?

These issues became the basis upon which the primary research was conducted.

METHODOLOGY

The purpose of this research was to explore the degree to which senior-level personnel within the NHS understand and practice Operations Strategy and Lean, two key aspects of Operations Management. The objective was to track strategy development and implementation as it cascaded through the new (as of 2014) structure, starting with NHS England, through the clinical commissioning groups (CCGs) to hospitals.

Participant identification and selection

To enable a full grasp of the processes and people involved, a two-stage approach was adopted. The first stage was to understand how corporate-level strategy was established.

For this, NHS England and a local CCG were approached with the request to participate in this project. The second stage was to understand how strategy was operationalised, and to establish and compare the processes used. Six hospitals were used as case studies.

Case research is an appropriate method when contextual conditions are pertinent to the phenomenon being studied and the research questions include an explanatory and theory-building component (Creswell, 2009, Yin, 2009). Case study research is synonymous in business with a specific aspect of organisation, such as seeking to understand how a process is constructed and works, and most of the evidence comes from interviews (Myers, 2013). This research falls within the criteria identified by these authors.

Hospitals were chosen from a list: <http://www.nhs.uk/servicedirectories/pages/acutetrustlisting.aspx>.

Whilst Myers (2013) determines one well-researched and presented case is enough, the plan was to work down the list, choosing a range of hospitals based on accessibility to the primary researcher rather than a prescribed hospital type until enough data had been collected. 'Enough' is derived from two criteria (Seidman, 2006). Sufficiency, being the reflection of typicality and difference in process and experience, is the first. The second criterion is saturation of information. This is the notion of 'keeping going' until further data collection appears to add little or nothing to what has already been captured and 'learned' (Robson, 2002, Seidman, 2006). As each hospital was studied, the interview was transcribed. This enabled sufficiency to be determined as it occurred, rather than have to cancel interviews retrospectively. In the end, all hospitals were urban, northern and teaching, ranging in size from 4,000 to 15,000 staff. It is possible that a high level of homogeneity within the sample meant sufficiency was reached sooner. The final number of cases thus became six, representing 58,000 NHS staff.

Data Collection

A semi-structured interview protocol was developed (Appendix A) comprising a set of questions regarding corporate and operations strategy development, and operations strategy implementation and monitoring, and directly asking how Lean featured. The interviews focused on encouraging the flow of information to encourage richness in the disclosure of detail to enable understanding of the process and a case comparison if appropriate.

A Director and a senior researcher at NHS England agreed to be interviewed. Following the first interview, with the NHS England senior researcher, it emerged that the CCGs (Clinical Commissioning Groups) role is essentially a commercial, contractual one for which operations strategy is not a key component other than to ensure commercial frameworks are compliant with the general intention of the overall strategic direction. Thus, the criteria for success are judged in terms of financial factors rather than by operations-specific parameters such as quality, space reduction, inventory levels, or patient throughput times – the typical components of Lean. Given that CCGs did not get involved operationally and given the focus of the questions, CCGs would not be suitable contributors. The local CCG confirmed this.

Within each hospital, the interviewee sample was purposive, seeking executives involved in strategy development and implementation. Each interviewee was a Director of Strategy, Operations or an equivalent title. All interviews were face-to-face, in the participants' offices, or by telephone, and took place July 2014 – August 2015. Interviews typically lasted half an hour, ranging from 25 minutes to 1.25 hours. They were recorded and transcribed immediately after they took place. Everyone was asked the same questions, to ensure consistency.

Data Analysis

The descriptions of the strategy development and implementation process were analysed.

This approach allowed the exploration of the process as described mechanically and from an involvement, evolution and success perspective. Broadly, this is a thematic analysis without the commitment to theory development (Denscombe, 2007). Each of the research questions provided the foundation for the initial themes to be explored. The focus was on identifying and describing both implicit and explicit ideas within the data, to enable comparison and discursive interpretation based on context of process steps identified (Boeije, 2010).

The hospital participants are identified numerically as Executives, in the order in which the hospitals contributed.

FINDINGS

The interview questions firstly focused on the broader picture of the drivers of strategy and in particular, how strategy is developed, devolved and operationalised. Then, strategy implementation and performance and continuous improvement as part of a more detailed execution within the planning cycle were explored, including how and why Lean fits into the UK NHS healthcare landscape.

Setting the Strategy

“The development and creation of the strategy tends to be a positive process. It is the enacting of the strategy and the political cycle which *removes the positivity*”

(NHS England Executive 1)

The Government and NHS England develop and create the NHS strategy collaboratively. They set out national expectations at a high level. The context of strategy development is

the NHS mission “high quality care for all”, as advocated in the Darzi Report (DoH, 2008) and the need to produce a more productive NHS to make up the shortfall of funding to service requirement, as advocated by Sir David Nicholson (2010).

There are two drivers: Politics and Health (clinical and epidemiological), with a disconnection between the two. Politics is a critical feature, and yet,

“...politicians have attempted to distance themselves from direct control of the NHS, leaving themselves with an inability to influence *sufficiently*” (*ibid*)

In recent years the recession and a greater understanding of ageing population impacts, both clinical and social, have come together with the consequence that in 2013 NHS England set CCGs the task of planning services over a 5-year horizon to bring out tension between demand and affordability in a transparent way. Strategic direction is formally developed July-December each year by NHS England (which commissions primary care), the CCGs (who commission all other care) and local authorities (who commission social care). In December, with the consent of the Secretary of State, strategy planning guidance is released to the Areas.

“It sets out the overall strategic direction, including immediate priorities. The Area Teams are tasked with translating that into specifics for their local area. The conclusion of that process should be a 5-year vision backed up by a 3-year operational plan.” (NHS England Executive 1)

The CCG role is to control and to try and influence the flow of patients to hospitals.

Potentially, if hospitals attract more patients they get more money. However:

“The total money is fixed, so if every hospital in the country wanted to cover their increased costs by income generation (growth) they would all fail, so essentially that is a zero-sum game.” (NHS England Executive 1)

The outcome is a set of contracts with different providers so that at the annual review there is a point check, and an annual 4% cost cutting/efficiency improvement challenge. The money flows because:

“Commissioners determine *what services and what price*” (NHS England Executive 2)

Again the issue is to around financially driven criteria, which then helps shape an “operations strategy” response. The hospital participants broadly concurred with the process outlined by NHS England. There were some differences and contextual nuances. For instance, Executive 4 stated that there is less direct policy now than in the first decades of the NHS. He believed the DoH was left to set a more granular approach and local health economies are left to determine how they implement towards that direction. Executive 2 opined that the strategy for provider organisations (hospitals) has a different set of drivers from a CCG. Executive 6, however, stated that “*it’s a whole system approach*” because the NHS sets the scene, the ambition and the direction, which incorporates funding and efficiency savings and “*sets out at a high level the national expectations*”.

There was alignment amongst all participants that strategies become operationalised by the broad national ‘direction of travel’ being contextualised at the local Area level. The key content areas come from the national expectations as stated in policy documents and then outlined annually in the planning guidelines issued each December. In this respect, strategy is mandated. However, the detail is developed by each hospital, combining national targets and requirements with Commissioner influence around what they want to buy and local demographics. The nature of the patients coming into hospitals impacts capacity, funding, workforce impact and cost improvement targets.

Strategy Development

Hospitals' first responsibility is to make sure that services can be delivered to standard, reliably, 24/7. However, underlying this are political, public demand, productivity, performance and organisational ambition considerations.

All hospitals agreed that ultimately the CEO owns the strategy and it is operationalised by engaging with front-line staff so that the context for strategy can be set by the organisation. The actual development of strategy was a combined effort of all clinical directorates, aggregated into an overall strategy. All described the broad themes which they saw as their key developmental categories and around which financial and operational plans were built. Executive 5 emphasised the inclusive nature of strategy development:

“...it includes workforce implications, estates, finance, service developments, and kind of service improvement, cost improvements and efficiencies. It has full engagement across the board”

As far as the planning goes, year one is robust and detailed, and the responsibility for implementing directly through the operational management of the organisation. Subsequent years are sequenced with less detail and subject to change based on progress and the outcomes required when the annual planning cycle is refreshed. Annual plans are thus essentially sequenced actions detailing the routemap for each identified key theme.

Executive 3 explained how the triumvirate of Clinical Directors, General Managers and Nurse Directors for each directorate/service unit populated the detailed action, engaged with clinical staff and created the individual clinical business strategy, whose components are activity, financial plan and a scoping vision for each service.

“The pressure to deliver ‘more for less’ drives the improvement programmes often developed based on specific feedback that ‘something is not working optimally’ or cannot meet targets if it continues to work in the same way. ” (Executive 1)

This possibly accounts for the attraction of Lean to be adopted tactically and operationally for specific tasks that people are being asked to do. For example, treating patients within 4 hours in Accident and Emergency (A&E), termed emergency room (ER) outside the UK, is all about the constant and consistent management of the flow of patients through a hospital, for which Lean provides helpful tools.

Implementation and performance monitoring is an ongoing activity and, like strategy development, engages and involves the whole organisation.

Strategy Implementation and Performance Improvement

All hospitals reported that teams are held accountable for outcomes through a series of monthly meetings to monitor performance against the plan. Operational realities of delivery mean focus inevitably moves amongst the key objectives.

“Overall, we are looking for a steady hand on the tiller against all the objectives”
(Executive 3)

All of those interviewed also discussed how services change, citing examples such as drug regimens, dispensing, and operations involving overnight stays moving to day-case then to outpatients. Such clinical pathway changes alter the fabric of provision, but not the process. They are integral to the overall direction movements outlined by NHS England, such as the move towards greater service provision outside hospitals. However, process improvements are a fundamental part of operationalising strategy. Executive 5 observed:

“We don’t use badges, but we do have very clear efficiency programmes, that you could call Lean, that reduce waste and give more throughput”.

Executive 6 provided headline results of three process change projects successfully completed which respectively resulted in patient flow time halving, surgical daycare capacity increasing by 35% and medical day-care capacity increasing by 32%.

Only NHS England Executive 2 offered a detailed account of how Lean became embedded in NHS thinking. He referred to the planning document “Everyone Counts”¹ and what have become known as the six characteristics. These characteristics include using technology to improve quality and reduce cost and set out the need to intensify re-design in order to leverage existing capability without cutting quality. Specifically, characteristic 5 has made Lean a fundamental component of delivering the requisite operational improvement in the NHS. Agencies such as NHS IQ introduced Lean thinking to help NHS providers achieve this goal². Some hospitals approached the productivity and quality challenge using Lean with more vigour than others. They formed the QUEST network³, and now number 16 trusts as members. Research participant Hospital 2 is the only QUEST member in this project.

Executive 4 posited that Lean is a catch-all for a variety of improvement methodologies which consider:

“...how can we do what we’re doing in a different way, which is more productive, provides a better patient experience and improves patient outcomes so that we can ultimately do more with the NHS resource available to us?”

He went on to suggest that Lean is ‘just common sense’ because “it forces you through a strictly defined process to get the most out of what you do”. For the past two years his trust has had a Transformation Team. The remit is to develop and embed the continuous improvement ethos and deliver on driving the change process through to the end point.

Hospitals 3 and 5 similarly reported having Service Improvement Teams.

Performance reporting takes place upwards and downwards, as well as inwards and outwards, because: “*we are a data-driven sector, monitored and regulated from every perspective*” (Executive 5).

¹ <http://www.england.nhs.uk/wp-content/uploads/2013/12/5yr-strat-plann-guid-wa.pdf>

² http://www.institute.nhs.uk/quality_and_value/productivity_series/productive_ward.html

³ <http://www.quest.nhs.uk/>

Monthly performance meetings identify key issues, support and any further actions required to rectify drift from the plan. Progress tends to be monitored in a binary fashion. Less tangible, softer targets such as stakeholder management and relationship development become part of a rounded end-of-year performance review for a division/directorate. The process of ‘Refreshing’ is linked back to the strategic plan and to the staff appraisal process and risk register. All staff who have an appraisal, have objectives linked back to the annual plan and by implication, therefore, back to the strategy.

DISCUSSION

This research project set out to understand the degree to which senior-level personnel within the NHS understand and practice Operations Strategy and its application within the NHS, and Lean as part of a range of operations criteria that could be applied in Healthcare. The findings demonstrate that both are practised. Operations strategy appears to be understood and applied with some rigour and a high level of practice conformance amongst participants. Lean is also practised, but differently amongst participants. Table 2 indicates similarities and differences, summarised from the Findings section.

Table 2: Hospital Participants – Homogeneity and Variance in Implementing Operations Strategy through Lean Processes

Hospital	Strategy Development	Strategy Implementation	Lean Adoption
1	Strategy is effectively mandated. The CCGs drive the strategy because they take the overall guidelines and convert them into contracts, which ultimately determines what services and what price	We work out what we can do, based on the CCG contracts and ensuring we can meet the national (and our own) KPIs, especially those around clinical effectiveness and patient experience	Zero-based planning for every initiative. Lean is used tactically to help execute the strategy.
2	Nationally the strategic drivers are standards and quality and provider organisations have to align the themes, funding and national directives	Arguably it is a series of 5 one-year plans with less detail the further ahead it goes. The core components are the clinical business strategy, the financial plan and a scoping vision for each service	QUEST member. Lean is used tactically to help execute the strategy.

Hospital	Strategy Development	Strategy Implementation	Lean Adoption
3	The key drivers are the deliverables which key government commitments require for the NHS and key constitution targets. These have to be combined with local stakeholder demands, including staff	Each executive Director across the Trust has objectives against their name for an overview of them and the real implementation is in each clinical service unit.	Lean implemented in Pharmacy. Use of Lean methods encouraged in improvement plans. Service Improvement Team drives continuous improvement.
4	The CCGs, through the commissioning process, incentivise, penalise, and encourage providers to deliver those national targets.	Each individual business unit has a business plan designed to meet the high level organisational objectives and professional practice issues which come from the DoH and NHS England by a different route, and this is then further translated and sub-divided into team action plans	Lean implemented in Pharmacy. Lean thinking is embedded in the way people work. Uses Lean to publish and publicise process and managerial changes. Has a Transformation Team to develop and embed continuous improvement.
5	A whole system approach – national and local, immediate and the 7-year forward view – sets the ambition and the direction.	It starts at the top, devolves to the clinical directorates and then aggregates back up.	Lean is not used per se. Service Improvement Team drives continuous improvement as part of delivering performance change.
6	Requirement to deliver all the mandatory standards in line with the NHS constitution and all the regulatory requirements.	Strategy is implemented through a series of annual plans, which evolve year on year and is sense-checked against the strategy overall as that too evolves	Lean projects are used tactically to improve performance.

Whilst personal flavours, contexts and interpretations are apparent, Table 2 shows how, to an extent, operations' role is purely reactive to the already set out high-level national expectations as devised by the collaboration between the Government and NHS England. This conforms to the Hayes and Wheelwright (1984) concept of internally neutral contribution to the organisation which ensures operations personnel will not disrupt the over-riding intention of the organisation. However, the detail of strategy development as outlined by each hospital indicates that the approach taken shows not only participant homogeneity but also a high degree of operations being internally supportive, which is grasping overall strategic goals and supporting them by developing a credible operations strategy.

When compared against the Brown et al. (2013) criteria, there is evidence that hospitals do practice operations strategy well, up to a point. The disconnect between the political, clinical and management demands, where politicians are driven by the political cycle, clinicians by their professional allegiances and managers having a short role-life as they move through the NHS for career advancement means that truly exploiting opportunities for potential market segments, optimally leveraging resources and developing superior operational capabilities are stunted.

As stated earlier, four research questions were set:

1. Is there a structured, planned approach to service or operational delivery?
2. Where and how does behavioural and performance improvement feature as part of that planning?
3. Who is responsible for operationalising and achieving policy and performance objectives within hospitals?
4. Are the specifics of Lean criteria set in place within the NHS and, if so, are they well known and understood at all levels?

Table 2 indicates there is a structured approach to strategy-setting. Participant responses incorporated behaviour, performance targets and monitoring as an integral part of the planning process, thus answering question 2. The findings indicate homogeneity across hospitals regarding the answer to question 3. However, answers to question 4 highlighted greater variations between the hospitals. The specifics of Lean are known and understood in all participating hospitals. The issue could lie in the fact that cost is a driver of performance improvement even though the strategy and service literature emphasises quality (Ferdows and De Meyer, 1990, Patricio et al., 2008, Smith et al., 2010, Wallace, 2012, Smith, 2013, Makarem and Al-Amin, 2014).

Three of the six hospitals have established service improvement teams for the creation of a learning culture geared towards continuous improvement, which is entirely in keeping with

Lean's overarching principles (Womack et al., 1991, Jones and Mitchell, 2006). Even so, the evidence points to the NHS still using Lean mainly as unpacking and delivering toolkit activity, as a 'quick fix' tool, in keeping with Burgess (2012), Liker and Morgan (2006) and Matthias and Buckle (2015).

The focus for Lean activity appears to be on "components of the production line" rather than the production line itself, which could be the patient journey. Lean thinking requires looking laterally across the components of the organisation (Womack et al. 1991), as does experiential service design in healthcare (Melton and Hartline, 2013, Makarem and Al-Amin, 2014). If the idea of the healthcare production line is the patient journey, then the idea of integrating multi-touchpoints of care aligns itself better with the strategic nature of Lean rather than its 'toolkit' aspect which has taken precedence thus far. Evidence is presented of hospitals trying to integrate multi-interface service levels and experiences through their work on patient pathways, showing an emergent focus on service quality as advocated by such as Patricio et al. (2008), Hagan (2011), LaGanga (2011) and Burgess and Radnor (2012).

Applying the concepts suggested in the operations strategy literature (for example Hill and Hill, 2011), the starting premise should be the patient experience. This would make performance and service improvement 'built-in' rather than a reactive add-on. However, the starting point is cost as presented in the contracts CCGs produce at the beginning of each strategic planning cycle, as outlined in the strategy-setting section.

Similar to the improvements noted earlier in Hong Kong, India and the US (LaGanga, 2011, Chan, 2012, Bhat and Jnanesh, 2014), performance improvement results are specific to activities and clinical units, as shown with the pharmacy departments noted in Table 2. However, further research (and probably development work in hospitals) can be carried out

to provide a more holistic perspective around for example the extent pharmacy influences the length of stay of a non-elective inpatient, thus going some way towards integrating care and service delivery, and providing patient-centred hospital performance. This would also be in keeping with the characteristics of Lean as listed by Womack et al.(1991), specifically regarding integrating production, pulling production in response to customers rather than in-house needs and integrating the complete supply chain.

Silo management precludes effective pathway management, although emerging evidence suggests silo thinking is beginning to be broken down. An important issue, indicative in the way overall strategy is being set in the NHS, is that there is an increasing reliance on a variety of providers for service delivery, working towards the ‘modern model of integrated care’, which is characteristic 3 in the Everyone Counts planning document. As the trailblazer for this, Devo Manc⁴ should provide research opportunities to evidence the success of this idea as regards both service quality and cost. In the meantime, the key remains encouraging clinical leaders to develop skills in networking and in working in partnerships . This develops a cultural change to the current silo working and begins the journey of integrated and patient-focused service delivery, as advocated by Lean thinking. Further research is required to gauge the progress in this area.

The close vertical relationships required by an integrated supply chain become feasible in a hospital if a patient-centred strategy is adopted. It provides a single focus as well as a spotlight on the elapsed time of the care journey. This is fundamental to Lean’s emphasis on continuous flow and view that waiting time is one of the causes of Muda in service,

⁴ NHS England, 12 NHS Clinical Commissioning Groups, 15 NHS providers and 10 local authorities have a framework for health and social care - with plans for joint decision-making on integrated care to support physical, mental and social wellbeing in Greater Manchester (<http://www.agma.gov.uk/gmca/gmca-devolution-agreement1/caring-for-gm-together/index.html>)

especially healthcare, environments. Developing such supplier relationships for integrated care allows cross-fertilisation of skills, collaborative working and increased influence laterally, across an organisation or a patient journey and encompasses the operations strategy areas of value, process, capacity and technology management as noted by Brown et al. (2013).

LIMITATIONS AND CONCLUSIONS

This research project has established that there is a broad operations strategy in place of which Lean activity forms a part. Lean is well-known throughout the NHS and structured Lean activity is commonplace, either standalone or supported by external agencies or networks. Lean tools are implemented in order to try and achieve already identified issues in specific areas rather than Lean thinking to engender long-term sustained cultural and behavioural change.

Even though cost rather than quality continues to be the key driver, contrary to the exhortation of Jones and Mitchell (2006) and Ferdows and De Meyer (1990), there is a movement towards a longer-term view expressed in Toussaint and Berry's (2013) '6 characteristics' and in the evolution of strategy development in the NHS. Still currently separate, with strategy being developed top-down and improvement initiatives a bottom-up response to centrally-set targets, the development of themes and the increasingly inclusive translation of strategy into implementable plans, indicate that a positive commitment to long-term sustained performance improvement as advocated by Lean thinking may yet be possible in the UK NHS.

Each participating hospital practised the criteria identified by other research but because the implementations were in "piecemeal sections" of the production line, the overall success

could not be seen in the way Jones and Mitchell (2006) believed was possible.

Responsibility for operationalising and achieving Lean capabilities does not yet emanate from a strategic or cultural imperative for improved service delivery.

The full range of potential operations/capability benefits is not yet fully developed.

Evidence suggesting that ‘best practice’ either for the patient experience or organisational effectiveness being disseminated across the NHS is sparse. Thus, although Lean may be attractive for Healthcare at a micro level, the full strategic, and not costs savings only, benefits of Lean are not able to be realised.

This research supports the findings cited earlier of Carlborg, and Kowalkowski (2013) who found difficulties in reconciling ‘standardised services’ and increasing reliability in service processes through Lean principles. It extends the cited work by making the research focus the strategic planning process within the NHS. From the sample, the conclusion is that there is not perceived to be ‘one best way’ for devising and implementing Lean within the Health Service. The very nature of the ‘life and death service’, as one of the senior-level managers noted, makes the stakes for “getting things right” high, but the whole process is defined, and ostensibly inhibited, by ongoing financial pressures. Gaining buy-in and acceptance from a range of stakeholders, and disseminating Lean processes on a national level and within the context of a cohesive operations strategy, remain challenges for the NHS.

Unsurprisingly, this research is limited by its scope. The purpose was to ascertain the degree to which senior-level personnel within the NHS really understood what Lean was and if they knew the range of operations criteria that could be applied in Healthcare. This objective has been achieved. However, much deeper investigation is required. These findings will help to promote the formulation and testing of further research into strategic operations and Lean, including the role of operations strategy. Such research could involve

additional detailed case studies, longitudinal research of selected hospitals, and multiple case studies of groupings of hospitals based on their performance rankings, as our research encompassed. Given the huge scope and size of the Healthcare sector, further empirical survey work is also to be encouraged.

REFERENCES

- (2010), Health Landscape Review. Public Accounts Committee. Oral evidence taken before the Public Accounts Committee, Una O'Brien and Sir David Nicholson ed. Available at: www.publications.parliament.uk/pa/cm201011/cmselect/cmpubacc/c764-i/c76401.htm www.parliament.uk.
- (2012), The Health and Social Care Act. C7. UK: <http://www.legislation.gov.uk/ukpga/2012/7/contents/enacted/data.htm>.
- Abdi, F., Shavarini, S. K. and Seyed Hoseini, S. M. (2006), Glean Lean: How to Use Lean Approach in Service Industries? *Journal of Services Research*, 6, 191-206.
- Ahlstrom, P. (2004), Lean Service Operations: Translating Lean Production Principles to Service Operations. *International Journal of Services Technology & Management*. Vol. 5 Issue 5/6, p1, 5, 545 - 564.
- Bamford, D., Forrester, P., Dehe, B. and Leese, R. G. (2015), Partial and Iterative Lean Implementation: Two Case Studies. *International Journal of Operations & Production Management*, 35, 702-727.
- Bamford, D. and Griffin, M. (2008), A Case Study into Operational Team-Working within a Uk Hospital. *International Journal of Operations & Production Management*, 28, 215.
- Berry, L., L. and Bendapudi, N. (2007), Health Care: A Fertile Field for Service Research. *Journal of Service Research*, 10, 111-122.
- Beuster, P. (2011), DWP Lean Journey - Improving Customer Service Delivering Efficiency. *Management Services*, 55, 8-9.
- Bhat, S. and Jnanesh, N. A. (2014), Application of Lean Six Sigma Methodology to Reduce the Cycle Time of out-Patient Department Service in a Rural Hospital. *International Journal of Healthcare Technology & Management*, 14, 222-237.
- Boeije, H. 2010. *Analysis in Qualitative Research*, Thousand Oaks, CA, Sage.
- Brown, S. 1996. *Strategic Manufacturing for Competitive Advantage : Transforming Operations from Shop Floor to Strategy*, New York, Prentice-Hall.
- Brown, S., Bessant, J. R. and Lamming, R. 2013. *Strategic Operations Management*.
- Burgess, N. (2012), *Evaluating Lean in Healthcare*. Doctor of Philosophy in Business PhD, University of Warwick.

- Burgess, N. and Radnor, Z. (2012), Service Improvement in the English National Health Service: Complexities and Tensions. *Journal of Management & Organization*, 18, 594-607.
- Butler, T. W., Leong, G. K. and Everett, L. N. (1996), The Operations Management Role in Hospital Strategic Planning. *Journal of Operations Management*, 14, 137-156.
- Carlborg, P., Kindström, D. and Kowalkowski, C. (2013), A Lean Approach for Service Productivity Improvements: Synergy or Oxymoron? *Managing Service Quality: An International Journal*, 23, 291-304.
- Carter, B., Danford, A., Howcroft, D., Richardson, H., Smith, A. and Taylor, P. (2011), Lean and Mean in the Civil Service: The Case of Processing in HMRC. *Public Money & Management*, 31, 115-122.
- Chan, C. K. (2012), Applying Lean Management to Improve the Pre-Consultation Patient Journey in Outpatient Services: A Hong Kong Case Study. *Asia Pacific Journal of Health Management*, 7, 28-33.
- Creswell, J. W. 2009. *Research Design : Qualitative, Quantitative, and Mixed Methods Approaches*, Thousand Oaks, CA. ; London, Sage.
- Currie, G. and Lockett, A. (2011), Distributing Leadership in Health and Social Care: Concertive, Conjoint or Collective? *International Journal of Management Reviews*, 13, 286-300.
- Currie, G. and Suhomlinova, O. (2006), The Impact of Institutional Forces Upon Knowledge Sharing in the Uk NHS: The Triumph of Professional Power and the Inconsistency of Policy. *Public Administration*, 84, 1-30.
- de Souza, L. B. (2009), Trends and Approaches in Lean Healthcare. *Leadership in Health Services*, 22, 121-139.
- Denscombe, M. 2007. *The Good Research Guide : For Small-Scale Social Research Projects*, Maidenhead, Open University Press.
- Dey, A., Sinha, K. K. and Thirumalai, S. (2013), IT Capability for Health Care Delivery: Is More Better? *Journal of Service Research*, 16, 326-340.
- DoH (1989), *Working for Patients*. In: HEALTH (ed.). London: HMSO.
- DoH (2008), *High Quality Care for All: NHS Next Stage Review*. London: Department of Health.
- Ferdows, K. and De Meyer, A. (1990), Lasting Improvements in Manufacturing Performance: In Search of a New Theory. *Journal of Operations Management*, 9, 168-184.
- Francis, R. (2013), *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry*. The Stationery Office: House of Commons.
- Graban, M. and Swartz, J. E. (2012), Change for Health. *Management Services*, 56, 35-39.
- Hagan, P. (2011), Waste Not, Want Not: Leading the Lean Health-Care Journey at Seattle Children's Hospital. *Global Business and Organizational Excellence*, 30, 25-31.
- Hayes, R. H. and Wheelwright, S. C. 1984. *Restoring Our Competitive Edge : Competing through Manufacturing*, New York; Chichester, Wiley.

- Hill, A. and Hill, T. 2011. *Essential Operations Management*, New York, Palgrave Macmillan.
- Hill, T. 1985. *Manufacturing Strategy : The Strategic Management of the Manufacturing Function*, Basingstoke, Macmillan.
- Jones, D. T. and Mitchell, A. (2006), *Lean Thinking for the NHS*. In: UK, L. E. A. (ed.). London: NHS Confederation.
- Kleback, C. (2012), *Lean Library Management: Eleven Strategies for Reducing Costs and Improving Customer Services* [Online]. [Accessed 2 82].
- Krafcik, J. F. (1988), *Triumph of the Lean Production System*. *Sloan Management Review*, 30, 41-52.
- LaGanga, L. R. (2011), *Lean Service Operations: Reflections and New Directions for Capacity Expansion in Outpatient Clinics*. *Journal of Operations Management*, 29, 422-433.
- Lewis, J. and Cooper, J. (2015), *Expenditure on Healthcare in the Uk*. Office for National Statistics.
- Li, L. X., Benton, W. C. and Leong, G. K. (2002), *The Impact of Strategic Operations Management Decisions on Community Hospital Performance*. *Journal of Operations Management*, 20, 389-408.
- Liker, J. K. and Morgan, J. M. (2006), *The Toyota Way in Services: The Case of Lean Product Development*. *Academy of Management Perspectives*, 20, 5-20.
- Makarem, S. C. and Al-Amin, M. (2014), *Beyond the Service Process: The Effects of Organizational and Market Factors on Customer Perceptions of Health Care Services*. *Journal of Service Research*, 17, 399-414.
- Malmbrandt, M. and Åhlström, P. (2013), *An Instrument for Assessing Lean Service Adoption*. *International Journal of Operations & Production Management*, 33, 1131-1165.
- Matthias, O. and Buckle, M. (2015), *Accidental Lean - Performance Improvement in an NHS Hospital and Reflections on the Role of Operations Strategy*. In: RADNOR, Z., BATEMAN, N., ESAIN, A., KUMAR, M., WILLIAMS, S. & UPTON, D. (eds.) *Public Services Operation Management: A Research Companion*. London: Routledge.
- Mazzocato, P., Savage, C., Brommels, M., Aronsson, H. and Thor, J. (2010), *Lean Thinking in Healthcare: A Realist Review of the Literature*. *Quality and Safety in Health Care*, 19, 376-382.
- Melton, H. L. and Hartline, M. D. (2013), *Employee Collaboration, Learning Orientation, and New Service Development Performance*. *Journal of Service Research*, 16, 67-81.
- Mitchell, B. R. 2011. *British Historical Statistics*, Cambridge, Cambridge University Press.
- Moyano-Fuentes, J. and Sacristán-Díaz, M. (2012), *Learning on Lean: A Review of Thinking and Research*. *International Journal of Operations & Production Management*, 32, 551-582.
- Murphree, P., Vath, R. R. and Daigle, L. (2011), *Sustaining Lean Six Sigma Projects in Health Care*. *Physician Executive*, 37, 44-48.
- Myers, M. D. D. a. 2013. *Qualitative Research in Business and Management*, London, Sage.
- Panchak, P. (2003), *Lean Health Care? IT Works! (Cover Story)*. *Industry Week/IW*, 252, 34-40.

- Papadopoulos, T., Radnor, Z. and Merali, Y. (2011), The Role of Actor Associations in Understanding the Implementation of Lean Thinking in Healthcare. *International Journal of Operations & Production Management*, 31, 167-191.
- Patricio, L., Fisk, R. P., Falcao e Cunha, J. and Constantine, L. (2008), Designing Multi-Interface Service Experiences. *The Service Experience Blueprint. Journal of Service Research*, 10, 318-334.
- Radnor, Z. and Johnston, R. (2012), Lean in Uk Government: Internal Efficiency or Customer Service? *Production Planning & Control*, 24, 903-915.
- Radnor, Z. and Osborne, S. P. (2013), Lean: A Failed Theory for Public Services? *Public Management Review*, 15, 265-287.
- Rifai, A. K. and Pecenka, J. O. (1990), An Application of Goal Programming in Healthcare Planning. *International Journal of Operations & Production Management*, 10, 28-37.
- Ritchie, L. (2002), Driving Quality - Clinical Governance in the National Health Service. *Managing Service Quality*, 12, 117-128.
- Robinson, S., Radnor, Z. J., Burgess, N. and Worthington, C. (2012), Simlean: Utilising Simulation in the Implementation of Lean in Healthcare. *European Journal of Operational Research*, 219, 188-197.
- Robson, C. 2002. *Real World Research : A Resource for Social Scientists and Practitioner-Researchers*, Oxford, Blackwell.
- Samuel, D., Found, P. and Williams, S. (2015), How Did the Publication of the Book the Machine That Changed the World Change Management Thinking? Exploring 25 Years of Lean Literature. *International Journal of Operations & Production Management*, 35, null.
- Scrivener, R. 2002. *Principles for Best Practice in Clinical Audit*, Abingdon, Radcliffe Medical.
- Seddon, J. and O'Donovan, B. (2010), Rethinking Lean Service. *Management Services*, 54, 34-37.
- Seidman, I. 2006. *Interviewing as Qualitative Research : A Guide for Researchers in Education and the Social Sciences*, New York, Teachers College Press.
- Silvestro, R. and Silvestro, C. (2003), New Service Design in the NHS: An Evaluation of the Strategic Alignment of NHS Direct. *International Journal of Operations & Production Management*, 23, 401-417.
- Skinner, W. (1969), Manufacturing--Missing Link in Corporate Strategy. *Harvard Business Review*, 47, 136-145.
- Skinner, W. (1974), The Focused Factory. *Harvard Business Review*, 52, 113-121.
- Slack, N. (2015), *Operations Strategy*. Wiley Encyclopedia of Management. John Wiley & Sons, Ltd.
- Sloan, T., Fitzgerald, A., Hayes, K. J., Radnor, Z., Sohal, A. and Robinson, S. (2014), Lean in Healthcare – History and Recent Developments. *Journal of Health Organization and Management*, 28, 130-134.
- Smith, J. S., Fox, G. L. and Ramirez, E. (2010), An Integrated Perspective of Service Recovery: A Sociotechnical Systems Approach. *Journal of Service Research*, 13, 439-452.

- Smith, S. (2013), Revolutionizing Support Services with Lean. *Industrial Engineer: IE*, 45, 42-46.
- Spring, M. and Araujo, L. (2009), Service, Services and Products: Rethinking Operations Strategy. *International Journal of Operations & Production Management*, 29, 444-467.
- Tax, S. S., McCutcheon, D. and Wilkinson, I. F. (2013), The Service Delivery Network (Sdn): A Customer-Centric Perspective of the Customer Journey. *Journal of Service Research*, 16, 454-470.
- Toussaint, J. S. and Berry, L. L. (2013), The Promise of Lean in Health Care. *Mayo Clinic Proceedings*, 88, 74-82.
- Umble, M. and Umble, E. J. (2006), Utilizing Buffer Management to Improve Performance in a Healthcare Environment. *European Journal of Operational Research*, 174, 1060-1075.
- Vegting, I. L., van Beneden, M., Kramer, M. H. H., Thijs, A., Kostense, P. J. and Nanayakkara, P. W. B. (2012), How to Save Costs by Reducing Unnecessary Testing: Lean Thinking in Clinical Practice. *European Journal of Internal Medicine*, 23, 70-75.
- Voss, C. 1996. *Manufacturing Strategy : Operations Strategy in a Global Context*, London Business School.
- Voss, C., Roth, A. V. and Chase, R. B. (2008), Experience, Service Operations Strategy, and Services as Destinations: Foundations and Exploratory Investigation. *Production and Operations Management*, 17, 247-266.
- Wallace, L. (2012), *Lean Library Management: Eleven Strategies for Reducing Costs and Improving Customer Services*, John J. Huber. Neal-Schuman, New York (2010), Isbn: 978-1-55570-732-3. *The Journal of Academic Librarianship*, 38, 188.
- Waring, T. S. and Alexander, M. (2015), Innovations in Inpatient Flow and Bed Management: An Action Research Project in a Uk Acute Care Hospital. *International Journal of Operations & Production Management*, 35, 751-781.
- Womack, J. P. and Jones, D. T. 2003. *Lean Thinking : Banish Waste and Create Wealth in Your Corporation : Revised and Updated*, New York, Simon and Schuster.
- Womack, J. P. and Jones, D. T. 2005. *Lean Solutions : How Companies and Customers Can Create Value and Wealth Together*, London, Simon & Schuster.
- Womack, J. P., Jones, D. T. and Roos, D. 1991. *The Machine That Changed the World*, New York, NY, HarperPerennial.
- Yin, R. K. 2009. *Case Study Research. Design and Methods*, London, Sage.
- Zomerdijk, L. G. and Voss, C. A. (2010), Service Design for Experience-Centric Services. *Journal of Service Research : JSR*, 13, 67-82.

APPENDIX A: SEMI-STRUCTURED INTERVIEW – OPERATIONS STRATEGY IN THE NHS

(Background and Role – of participant)

1. Strategy Development

1.1 What are the drivers of strategies in the NHS?

i. Who devises them?

ii. What is their purpose?

1.2 How do the overall strategies become operationalised into an Operations Strategy?

1.3 Does the Operations Strategy evolve or is it mandated top-down?

1.4 Who is involved in developing the Operations Strategy?

1.5 What are the key content areas?

2. Operations Strategy Implementation

2.1 Who is responsible for implementing Operations Strategies?

2.2 How are they implemented?

2.3 Is implementation monitored?

2.4 How is the ongoing information captured when implementing new/existing strategies?

2.5 How is the information used?

3. Operations Strategy and Lean - performance improvement/continuous improvement

3.1 What are you seeking to improve? (throughput time, quality of service, re-work)

3.2 To what degree does Lean influence thinking?

3.3 Is Lean part of the process of a strategy being devised and implemented?

3.4 At what level does this take place?

3.5 Is private healthcare seen as a competitor? – Are they concerned about the growth of private healthcare?

3.6 To what extent does the private sector influence what the NHS does?