LEAN HIGHER EDUCATION AND ITS IMPACT ON EMPLOYEE WORKING CONDITIONS AND OUTCOMES

By

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ABSTRACT

Over the last decade, cuts to government funding for higher education (HE) have forced UK higher education institutions (HEI) to increase tuition fees paid by students by over 200%. This has increased students' demand for HEIs to deliver a high-quality service, and consequently increased pressure on their professional services to do more with less. Increasingly, institutions have to compete with each other to attract students, who typically rely on service quality metrics such as; University Rankings, National Student Surveys (NSS) scores, and scores from the Teaching Excellence Framework (TEF), to inform their choice of institution. Within this context, Lean higher education (HE) has been heralded as the path to efficiency improvement in the modern UK HEI and hence, has gained significant traction over the last decade. Nonetheless, research on the state, progress and impact of Lean HE has lagged. This research sets out to contribute towards filling this gap in Lean HE research by exploring a number of inter-related research questions. These questions focus on (1) the extent to which higher educational institutions (HEI) in the UK have adopted Lean management practices, (2) the benefits and challenges of adopting Lean in a higher education context, (3) the impact of Lean on employee working conditions, and (4) the impact of Lean on employee outcomes.

Using the Socio-Technical Systems (STS) Theory as a theoretical lens to unpack the research questions, the research adopts a qualitative research approach, collecting data through interviews with Lean practitioners working on Lean projects within UK HE. The research proceeds in two phases; phase I (a pilot and an initial study) and phase II (the main study). The initial phase of the study collects data through interviews with 12 practitioners working within one UK HEI. The pilot and the initial study is critical to understanding Lean HE practice and fine-tuning the interview protocol. The second phase involves interviews with 32 Lean practitioners across 7 different HEIs. Besides the transcribed interview data, the researcher also draws inferences from archival data on Lean projects obtained from a few of the participating institutions. With the help of Nvivo, a thematic analytical framework (based on the interview protocol) is deployed to identify and explore recurring themes within the data.

By way of findings, this research has documented the perceptions of practitioners working in Lean HEI projects focusing on their thoughts about what Lean entails and its suitability for HEIs. The research finds that practitioners within this environment share the views of Lean documented in the extant literature, albeit, with a strong focus on the "respect-for-people" principle. The benefits enjoyed by applying Lean in different sectors is shared by

institutions adopting Lean in the HE sector. The research documents some of the unique challenges faced by institutions adopting Lean, notably the presence of silos and the autonomous nature of various units within HEI. To the researcher's knowledge, this is the first study exploring the impact of Lean on employee working conditions and outcomes in the UK HE setting. Overall, the research finds that Lean has improved employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication within this context. There is some evidence that Lean leads to work-related stress. The findings on how Lean impacts on employee workload are mixed, with some respondents arguing that Lean increases workload while others arguing otherwise. There was no clear evidence on how Lean has impacted employee retention in UK HE.

Further, this study explores the perceptions of two key groups of stakeholders directly involved in the deployment process; Lean team leaders/managers and Lean team members. Summarily, there is broad consensus amongst team leaders and team members that Lean improves job satisfaction, employee autonomy and communication. However, there is a general lack of consensus on how Lean impacts on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. In several cases, the lack of consensus arises from the fact that either leaders or members are unsure about the impact of Lean on a specific issue. Importantly, the study raises some concerns about differences in the perceptions of key stakeholders on the impact of Lean. Given the importance of communication in successful Lean implementation, this finding generates new questions about the nature of Lean deployment in this context. Finally, the research highlights the fact that Lean leaders within HE do not fully understand the impact of Lean on employees. Data on this issue is not routinely collected and there are rarely any processes to collect feedback from employees on how Lean impacts on them, as the focus is typically on how employee characteristics shape Lean success. This research is vital as part of efforts to promote sustainability of continuous improvement initiatives in the UK HE sector. It is an essential part of the debate on Lean's relevance for HEIs and how Lean can be tailored to better suit the HE environment.

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LIST OF ACRONYMS

Acronym	Meaning
	Japanese: Seiri, Seiton, Seisō, Seiketsu, and Shitsuke.
5S	English: Sort, Set In order, Shine, Standardize and Sustain
BI	Business Improvement
ABS	Association of Business Schools
BI	Business Improvement
BS	Business Services
CI	Continuous improvement
DMAIC	Define, Measure, Analyze, Improve and Control
EU	European Union
HE	Higher Education
HEFCE	Higher Education Funding Council for England
HEI	Higher Education Institution
HESA	Higher Education Statistics Agency
HM	Her Majesty
HMRC	Her Majesty Revenue and Customs
HR	Human Resources
HRM	Human Resource Management
IT	Information Technology
JIT	Just-In-Time
KAUST	King Abdullah University of Science and Technology
KPI	Key Performance Indicator
LOS	Length of Service
NHS	National Health Service
NSS	National Student Survey

Acronym	Meaning
OD	Organisational Development
OFS	Office for Students
OLT	Organisational Learning Theory
PE	Payroll and Expenses
PG	Postgraduate
PI	Process Improvement
QAA	Quality Assurance Agency
REF	Research Excellence Framework
RIE	Rapid Improvement Event
RIW	Rapid Improvement Workshop
RQ	Research Questions
SA	Student Administration
SDWT	Self-directed work teams
SI	Service improvement
SSE	School Support Enhancement
STS	Socio-technical Systems
TEF	Teaching Excellence Framework
TPM	Total Productive Maintenance
TPS	Toyota Production System
TQM	Total Quality Management
UG	Undergraduate
UK	United Kingdom
US	United States

CHAPTER 1: INTRODUCTION

1.1 Overview of the thesis

Prior research focusing on Lean manufacturing (e.g., Womack and Jones, 1996; Chavez et al., 2013; Bhamu and Sangwan, 2014) has established that Lean adoption in the manufacturing sector generally leads to increased efficiency and effectiveness at operations and supply chain levels. Similar results have been reported by researchers looking at Lean in the non-manufacturing, service and some public (e.g., Health services) sector settings (e.g., Staats et al. 2011; Hadid and Mansouri, 2014; and Radnor et al., 2012). Despite the substantial changes in the UK Higher Education landscape, Lean Higher Education (HE) has received much less attention from researchers. Specifically, several changes in government policy over the last decade, means that institutions now directly generate a significant proportion of their income directly from students. In order to remain competitive in the market for students, institutions "will need to do more with less, …, differentiate by being distinct in the products and services it offers, offer a greater value-adding proposition to the student and continue to be more 'customer' focused" (Antony et al., 2015, p. 983). Lean HE, particularly in the UK, has emerged as one of the potential solutions to address the changing landscape of UK HE funding challenges (see section 1.2), with several institutions looking to Lean as a suitable improvement methodology that allows them to compete effectively. Several surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005, Fearn, 2010; Thomas et al., 2015; Cianco 2018; Gupta et al., 2020) have consequently explored ideas around Lean HEI with a focus on HE stakeholders' perception of Lean, the process (and tools) of Lean implementation, as well as, the benefits and challenges of implementing Lean in this unique context. Notwithstanding, this research is still at its infancy (see, Thomas et al. (2015) and Gupta et al. (2020) for discussions on limitations of current Lean HEI research) and there is, perhaps, need for in-depth studies looking at Lean adoption across different HEIs.

While much has been said about Lean practice across different institutions, much of the current research focuses on key aspects such as benefits achieved by implementing Lean (Hadid and Mansouri, 2014), Lean tools, drivers and barriers or inhibitors of success Lean implementation (Achanga et al., 2006; Bhasin and Burcher, 2006; Kilpatrick and Osborne 2006; Hines et al., 2008), amongst others. Nonetheless, little is known about soft side of Lean i.e., how Lean implementation impacts on employee working conditions and outcomes. Prior

research by Rinehart et al. (1997), Post and Slaughter, (2000), Hadid and Mansouri (2014), Neirotti (2018), Lindsay et al (2019) suggest that soft elements or people factors are important for successful Lean implementation and Lean sustainability, hence these soft elements should be assessed, evaluated and managed. The lack of research on this emerging issue (Lean in the HEI context) couple with the noticeable dearth of research on the soft side of Lean creates an opportunity for this thesis to contribute to the Lean literature in the context of HEI. Therefore, this thesis first explores Lean adoption in the context of UK HEI by documenting the experiences of Lean adopters within this context. Here, the thesis explores the perception of Lean from the perspective of different stakeholders, some of the benefits of Lean HEI, unique challenges faced by implementing organisations and strategies used to facilitate Lean adoption in this context. The research scope is the professional services / administrative department within the UK HEI such as admissions/registry team, finance department, the UG/PG hubs dealing with program-related queries from students such as module delivery, assessment, field trips etc. Majority of the Lean HE studies reports that the professional services/administration department is more mature than other departments in implementing Lean. This is another reason for focusing on administrative functions that will allow for an in-depth investigation on how Lean is perceived and implemented by employees of the HEIs. In the professional services environment, the research further investigates the impact of Lean adoption on employee working conditions and outcomes in the HE setting, focusing on the perceptions of Lean team leaders (managers) and Lean team members (followers). In more detail, the study explores how Lean HE affects employee autonomy, workload, psychological safety, motivation, work-related stress, job satisfaction and retention, as perceived by employees themselves (Lean team members) and by implementing managers (Lean team leaders).

This chapter provides a broad overview of the research. Section 1.1 discusses the background of the UK Higher Education Sector which is the context for the current study. This is followed by a statement of the research problem (section 1.3). The aims and objectives of this study together with the research questions are summarised in section 1.4. This is followed by a brief discussion of the theoretical lens for exploring this issue (section 1.5) and an indication of the underlying research methodology (section 1.6). The key findings and contributions of the study are presented in sections 1.7 and 1.8, respectively. The structure of the rest of the thesis is then explained in section 1.9.

1.2 Background of the UK Higher Education System

This study focuses on Lean in UK HEIs, hence, a review of this particular context is necessary. The UK, perhaps, has one of the most developed higher education sectors in the world. Recent statistics from the Higher Education Statistics Agency (HESA) suggest that in the 2017/18 academic year, total income and expenditure from 164 HEIs in the UK amounted to £38.2 billion and £37.2 billion, respectively. During this period, the sector employed over 429 thousand staff and was home to about 2.34 million undergraduate and postgraduate students (Universities UK, 2019)[1].

The higher education system varies from one country/state to another within the UK as the management of education affairs is devolved to respective governments. Specifically, the UK government is responsible for education in England, while the Northern Ireland Executive, Scottish and Welsh Governments are respectively responsible for educational affairs in Northern Ireland, Scotland and Wales. There are notable differences in HE policies across the different countries, most notably, in terms of fees charged to students. While students in England and Wales are charged up to £9,250 a year (2017/18 academic year), HE in Scotland is free for residents.

On a micro level, different HEIs are organised as independent, self-governing bodies which provide services in the area of teaching, research and scholarship. These institutions are incorporated by Royal Charter or legislation and most are organised as charities which are partly funded by the UK government. The funding formula generally takes into account the institutions performance across a matrix of indicators which may include research and teaching excellence including research outputs and quality, enrolments, size, student performance, amongst others.

By law, universities have the freedom to develop their provisions and award degrees. Despite this autonomy, academic standards remain arguably high across the board. These standards are established and maintained by the institutions following established and shared quality assurance guidelines produced by the Quality Assurance Agency (QAA). Other professional, statutory and regulatory bodies such as the Higher Education Funding Council for England (HEFCE), Office for Students and Research England (operating within United Kingdom Research and Innovation), also maintain oversight on the work of institutions. The HEFCE (now defunct and replaced by the Office for Students and Research England) assesses

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[1] https://www.universitiesuk.ac.uk/facts-and-stats/Pages/higher-education-data.aspx

the quality of teaching and research across UK HEI through its development of the Research Excellence Framework (REF) and Teaching Excellence and Student Outcomes Framework (TEF). The TEF emphasises the rights of students (as paying "customers") by providing information that can allow them to potentially judge the quality of the service they receive. Additionally, the UK government limits the amount of tuition fees that institutions (in England and Wales) with no TEF award can charge (to £9,000 for 2018 entry while those with TEF awards can charge up to £9,250 in the same year).[2] The REF, on the other hand, assesses research quality across institutions by looking at research outputs, research impact and the research environment. REF performance determines research income and some university rankings (a measure of reputation).

Besides these external forces (oversight by HEFCE and its predecessors), competitive forces within the industry ensures that institutions pursue quality processes to attain or maintain accreditation, remain competitive and attract the best talent and students. Given the TEF, which focuses on student outcomes in particular, Lean management has the potential to allow institutions to maintain quality and competitiveness in the industry.

In terms of student numbers, Universities UK (2019) reports that there were over 2.35million students in UK HEIs in the 2017-18 academic year. Of this 75.8% were undergraduates, 78.8% were full-time students, 5.9% of students came from other EU countries, 13.6% were classed as overseas students (from non-EU countries), 56.9% were female and 58.7% were classed as mature students (aged 21 and over).

Universities UK (2019)[3] reports that in 2017-18 the total income to UK HEIs increased to £38.2 billion. Of this amount, 7.8% is funding from the UK government to support teaching activities, 47.3% is income generated from tuition fees, 13.3% represents research funding support from the UK government, 8.1% represents other research income from grants, 2.2% comes from endowments and other investments and 21.2% is classed as other income which includes knowledge exchange activities such as income from the provision of continuing

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[2] It is worth noting that, despite the continuous increase in cost of operations due to inflation, universities have generally fixed their tuition fees at the £9,250 threshold. Given limited capacities (i.e., ability to take on more students), this strategic decision to hold fees at the £9,250 threshold might thus increase pressure on finances. The recent Augar Review (https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2019/impact-auger-review-independent-assessment.pdf) has also recommended that tuition fees be reduced to £7,500. If implemented, this will further increase pressure for Universities to pursue efficiency strategies.

[3] https://www.universitiesuk.ac.uk/facts-and-stats/data-and-analysis/Pages/facts-and-figures-2019.aspx

professional development, consulting services, facilities and equipment-related services and income from intellectual property (Universities UK, 2019).

1.3 Research problem

Universities are fundamentally organised for teaching and research (services) and this service must be provided in a way that guarantees optimal student experience (measured by student satisfaction). As a consequence of the financial crises, the UK government has significantly reduced its funding of HE, instituting tuition fees which are borne by students (Thomas et al., 2015). There is growing competition between institutions to attract students. There is now more impetus than ever to pursue efficiency in HE to minimise resource use (e.g., time) on processes which do not add value to students (Thomas et al., 2015).

There is consensus amongst researchers that most organisations adopting Lean practices have enjoyed a significant decline in inefficiency and waste, evidenced by improved performance, greater productivity, improved product and service quality, greater throughput, reduced costs of operations, smoother operations, lower waiting times and less fire-fighting, amongst others (Womack and Jones, 1996; Bhamu and Sangwan, 2014). Notwithstanding, prior research exploring Lean implementation and the benefits of Lean adoption focus on the private sector, profit-making, and to a large extent, manufacturing companies (Chavez et al., 2013). The relatively small number of studies exploring the adoption, implementation and success of Lean in the non-manufacturing, service and public sector setting (e.g., Staats et al. 2011; Hadid and Mansouri, 2014; and Radnor et al., 2012) have generally corroborated the argument for Lean implementation in such organisations.

A few surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005; Fearn, 2010; Antony et al., 2012; Douglas et al., 2015; Thomas et al., 2015; Svensson et al., 2015; Balzer et al., 2016; Sunder and Antony, 2018; Kazanconglu and Ozkan-Osen, 2019; Balzer, 2020; Cudney et al., 2020) have explored the recent adoption of Lean management in higher education institutions (HEIs). Focusing on the process of deployment, Svensson et al., (2015), for example, explored Lean implementation at King Abdulaziz University. The researchers document the process of training and coaching staff, the tools used, the selection of projects and the involvement of executives within the Lean project. Similarly, Douglas et al. (2015) and Kazanconglu and Ozkan-Ozen (2019) focuses on sources of wastes in HEIs, showing how Lean could be applied to curb wastes in processes such as photocopying, mark and grade submissions and funding applications. Sunder and Antony (2018) and Cudney et al. (2020) establish the relevance of

Lean for HE while highlighting the need for further research into the challenges and benefits of implementing Lean in this setting. Overall, current studies on Lean in HEI typically focus on the process of Lean HEI deployment (Svensson et al., 2015), the challenges and barriers to implementation, the tools and techniques employed to deploy Lean within this environment (Antony et al. 2012) and the translation of Lean philosophy (e.g., the identification and elimination of waste) to the new HEI context (Douglas et al., 2015).

One other key issue motivating the current study is the fact that a lot of Lean researchers take Lean as a given and, hence focus on how organisations can better implement Lean to achieve the benefits which it promises (Womack and Jones, 1996; Radnor et al., 2006; Bhamu and Sangwan, 2014; Douglas et al., 2015; Thomas et al., 2015; Thomas et al., 2015; Svensson et al., 2015; Balzer et al., 2016; Narayanamurthy et al., 2018). These studies sometimes see people, culture and workplace practices as impediments to successful Lean adoption e.g., through resistance to Lean change (Radnor et al., 2006; Narayanamurthy et al., 2018). These studies generally ignore the potential for Lean to impact on employees, adversely or positively, thereby shaping employees' reception of Lean initiatives and the sustainability of Lean initiatives. Indeed, researchers, such as Rinehart et al. (1997), Post and Slaughter, (2000) and Neirotti (2018), suggests that the impact of Lean on people i.e., soft elements or people factors, are important for successful Lean implementation and Lean sustainability, hence these soft elements should be assessed, evaluated and managed. Nonetheless, these soft elements have been downplayed or ignored in prior studies (Chavez et al., 2013; Arlbjorn and Freytag, 2013; Bamford et al., 2015; Secchi and Camuffo, 2016; Hadid et al., 2016; Marodin et al., 2018; Ghobadian et al., 2018) thus providing this study an opportunity to contribute to the burgeoning literature.

When assessed against the Sustainable Lean Iceberg model (Figure 2.4.2) and the milestones of Lean maturity model (Figure 2.4.3), Lean HEI appears to still be at its infancy. This issue is discussed in more detail in section 2.4.8. While several studies have documented the experiences of some of early implementers (Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017), the role of the soft side of Lean has been generally ignored and several unanswered questions around Lean HEI still remain. More depth on the subject could therefore be provided through further research. Specifically, there is, perhaps, a need to explore the experience of current UK HEI Lean implementers, the motivations for adopting Lean, the process of Lean implementation, the challenges of implementing Lean and the impact of implementing Lean in this context. Additionally, as noted above, while a lot has

been said about Lean adoption in different contexts (manufacturing, services, public services), very little is known about how Lean impacts on employees—a cornerstone of successful Lean adoption. In this regard, the role of the 'soft' side of Lean management, such as the impact of Lean on soft elements (such as employee working conditions and outcomes) is under-researched. This study, therefore, explores the benefits and challenges of implementing Lean in the public sector by focusing on the implementation of Lean in the context of higher education. Further, the study investigates how Lean adoption has affected employee working conditions and outcomes (including autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention).

1.4 Research aims, questions and objectives

The overarching aim of this study is to explore Lean adoption in HEIs focusing on the case of UK HEIs. The aims of the study can be achieved by answering the four inter-related main research questions:

- To what extent have higher educational institutions in the UK adopted Lean management practices?
- What are the benefits and challenges of adopting Lean in a higher education context?
- How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., psychological safety, motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?
- How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?

1.5 Theoretical framework and lens

This study draws on Holden's (2011) framework. For ease of reference, the framework is presented below (Figure 2.8-1) but again presented and fully discussed in section 2.8. The starting point is that Lean adoption leads to changes in work structure and design which will, in turn, have effects on employee outcomes such as employee autonomy, job stress and workload. This direct outcomes of Lean (employee autonomy, job stress and workload, amongst others) may then have other (indirect) effects on employee motivation, job satisfaction and retention, with spill-over effects on the end customer. Clearly, employee outcomes can impact on customer outcomes. The effects of Lean on employees is then, perhaps, critical to Lean success and sustainability given that Lean focuses on driving value for the end customer.

This framework for understanding the impact of Lean on employees and how this shapes Lean success and sustainability is further discussed in section 2.8.

Figure 1.5-1: Framework showing Lean relationships in HEIs
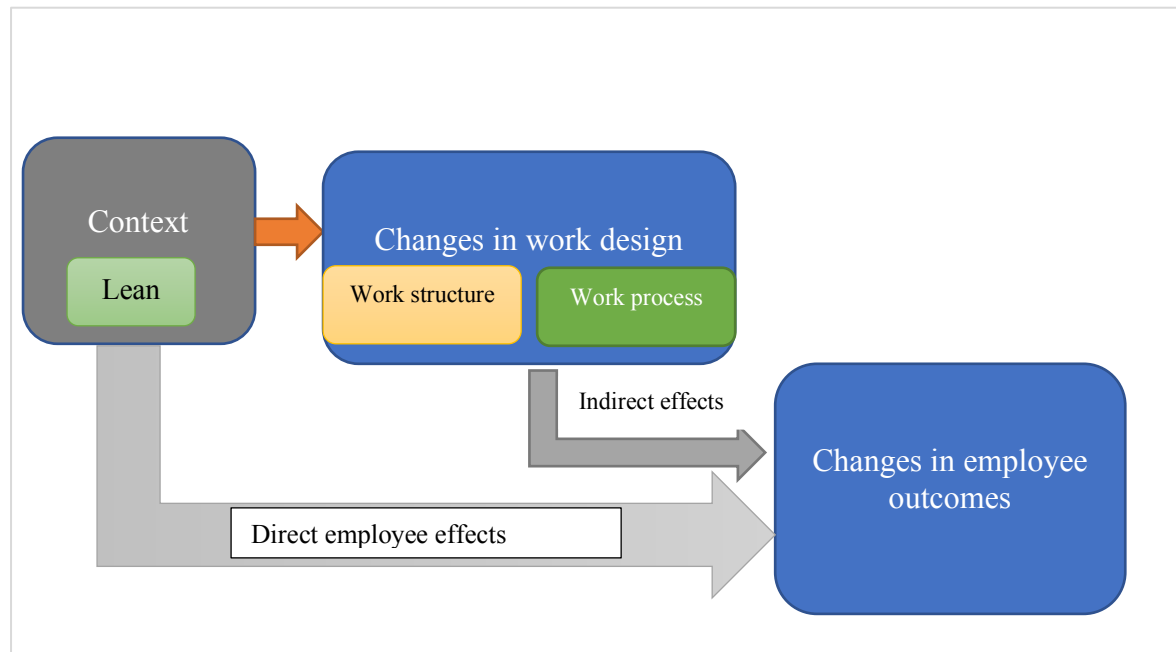
Adapted from Holden (2011)

The study draws on the Socio-Technical Systems (STS) Theory (Trist and Bamforth, 1951; Trist, 1981) which has been used in recent Lean research (Hadid et al., 2016; Soliman et al., 2018), as a theoretical lens to address the research questions (noted above). STS encompasses the technical systems (hardware, software systems, devises tools techniques that are needed in order for an organisation to transform its inputs to outputs) and social systems (employees, managers, their skills, values, attitudes, work culture, reward systems etc.) within the work place. The theory argues that the objectives of an organisation can best be achieved not by the optimisation of the technical system and the addition of a social system to an optimised technical system, but by the joint optimisation of the technical and social system (Cherns, 1976; Hicks et al., 2015). In the context of this research, STS therefore advocates for optimisation of both Lean and its constituents (as a technical subsystem) and employees working on Lean projects (as the social subsystem), thereby providing a systems-based approach to unpacking the relationship between technology (hardware, software), tools, processes, people, organisations and society in work place design. Specifically, this study draws on STS to unpack the relationship between Lean tools and techniques (as a technical subsystem) and people implementing Lean (employees within the organisation), as they

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interact to deliver the service. The focus is on how (i.e., strategies and processes) people adopt Lean, how Lean impacts on the social system (i.e., employees) and how Lean (as a component of the technical system) affects the entire socio-technical system or organisation (i.e., strategies, benefits, challenges) in its bid to achieve its mission or deliver excellent services to enhance student satisfaction.

1.6 Research approach

By nature, the research questions focus on explaining how a phenomenon (Lean) is perceived by different subjects, as well as, the subjects' perceptions of how Lean impacts on them and their colleagues. These perceptions are likely to be based on experience which are unique to individuals and not generalizable. Hence, the study adopts an interpretivist philosophical stance. In terms of ontology, it takes a relativist stance, believing that multiple realities exist. In terms of epistemology, the research assumes a transactional and subjectivist perspective as opposed to an objective perspective. The research approach is therefore qualitative in nature. Data is collected through semi structured interviews. An inductive (as opposed to deductive) approach is adopted to explore the data. Specifically, this study focuses on understanding meanings of Lean and its impact in this context and how these meanings are made and understood by individuals (research questions 1 and 2). Additionally, it focuses on exploring different realities, perceptions and narratives of how Lean impacts on different actors in the organisation (research questions 3 and 4).

The first phase of the study—referred to as "the pilot and initial study"—explores the research issues by drawing evidence from a single case study. The case study for this phase of the research is a UK HE institution which has considerable experience in implementing Lean. In this phase of the study, data is collected from 12 interviewees with extensive experience and involvement in multiple Lean projects within this case institution. This phase of the study allowed the researcher to gain a deeper insight of Lean in the HEI context. It also allowed the researcher to further develop the research instrument (semi-structured interview protocol), as well as, identify suitable respondents or interviewees and institutions for a more extensive study. Particularly, the findings from initial study indicated difference in perceptions of team leaders and team members of Lean projects in the administrative functions. Thus, it influenced the protocol development and sample selection for the main study.

The second phase of the research—dubbed "the main study"—involved 32 interviews with interviewees drawn from 7 different UK HEIs. Respondents in the main study held varying

roles across these institutions, were involved in Lean projects in different capacities (either as team leader or team members) and had varying levels of knowledge and experience in Lean implementation. Each of the interviews in the initial study and main study lasted between 50 and 80 minutes. The interview data is supplemented by archival data on relating to Lean and Lean projects obtained from Lean leaders within each institution. The interview data is transcribed and later analysed using standard textual analysis strategies including the use of software (Nvivo). Specifically, following Braun and Clarke (2006), a thematic analytical framework, based on the interview protocol, is deployed to identify and explore recurring themes within the data.

1.7 Summary of main findings

The results from this study shed light on the benefits, challenges and impact of Lean implementation within this unique context. The main results are highlighted here and discussed in more detail in section 7.3. The evidence from both phases of the study suggests that several universities are tending to Lean to make efficiency gains. Practitioners within this context are clear about Lean theory and the benefits of adopting Lean. However, the nature of Lean in this context is different from Lean in other settings such as private manufacturing and service sector companies. For example, it was found that in some cases Lean implementation takes a structured approach where employees are empowered through training and encouraged to adopt Lean practices at their desks. In some cases, employees do Lean as something additional to (or outside) their main role. Perhaps, this unstructured approach is due to the fragmented nature, the existence of silos, and the bureaucratic nature of HEI leadership. Often, certain decisions had to be made at the faculty-level and in most cases, it was not clear that senior management at that level were in full support of Lean adoption. This was evident as employees frequently noted the lack of resources as an impediment to Lean implementation.

In general, several of the main benefits of Lean (e.g., improving customer satisfaction, increased efficiency etc.) in the manufacturing, service and other public sector organisations (such as the NHS) documented in prior research are also shared by Lean HEIs. Nonetheless some of the challenges faced by Lean HEIs are, seemingly, unique to HEIs (and other public organisations such as NHS). These include the difficulty of implementing Lean techniques in the areas of research and teaching and, perhaps, the challenge of bringing together previously (or culturally) autonomous units, departments and faculties.

Incidentally, while the evidence suggests Lean had led to efficiency in HE service provision, its impact on working conditions and outcomes of frontline staff is, perhaps, not fully understood even by deployment managers. There are peculiar differences in perceptions of Lean managers and Lean team members in terms of the benefits of Lean with HEI and its impacts on employee working conditions and outcomes. HEI Lean managers in the pilot case study, believed Lean had a positive impact on their employees in terms of job satisfaction, motivation, and work-related stress. This was however not fully supported by the views of the Lean team members. In this phase of the study, there was broad consensus that Lean improves the working environment and the psychological safety of employees but does not decrease employee workload.

In the main phase of the study exploring Lean across 7 different UK HEIs, the views put forward by employees suggest that, overall, Lean has improved employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication within this context. There is some evidence that Lean leads to work-related stress. The findings on workload are mixed, with some respondents arguing that Lean increases workload while others arguing otherwise. There was no clear evidence on how Lean has impacted employee retention in the UK HE. When the results are explored by taking into account the role of respondents (i.e., whether they were team leaders/managers or team members within Lean projects), the lack of consensus or agreement between Lean leaders and team members on the impact of Lean on soft elements, was again identified. Summarily, there is broad consensus amongst team leaders and team members that Lean improves job satisfaction, employee autonomy and communication. However, there is a general lack of consensus on how Lean impacts on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. In several cases, the lack of consensus arises from the fact that either leaders or members are unsure about the impact of Lean on a specific issue.

It is worth reiterating that, basing on the sustainable Lean iceberg (Figure 2.4.2) and the milestones of Lean maturity models (Figure 2.4.3), as found in the case institutions, Lean HEI is still at its infancy. Besides the limited number of studies exploring Lean HEI, the emphasis across several of the universities sampled in this study is not a University-wide Lean adoption but the use of Lean methods to improve efficiency and effectiveness in the delivery of support and administrative services. Consequently, there is really no hard evidence beyond convincing conjectures that Lean had made a difference in implementing HEIs. There is a case for

institutions to routinely collect data on how Lean impacts on employees (Rinehart et al., 1997; Post and Slaughter, 2000; Neirotti, 2018), something which is not done at the moment.

1.8 Key contributions of the study

The key contributions of this thesis are briefly highlighted here and discussed in more detail at the end of the study (section 7.4). The study makes a number of contributions to the literature and to Lean practice. To the researcher's knowledge this study is the first attempt at an in-depth exploration of Lean adoption in UK HEIs focusing on multiple case studies. Previous studies looking at Lean in UK HEI (Emeliani 2004, 2005; Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017; Sunder and Antony, 2018; Kazanconglu and Ozkan-Osen, 2019; Balzer, 2020; Cudney et al., 2020) have focused on documenting the proliferation of Lean practices and the types of Lean tools deployed by Lean implementers. The current study provides a more extensive and in-depth narrative of the experience of Lean implementers. Specifically, the study compiles perspectives of implementers on what Lean entails and why Lean is important for HEIs. Different from prior studies, the current study also documents the challenges, benefits and strategies for Lean implementation in this context.

The study draws on the STS theory as a theoretical lens to unpack the relationship between Lean (as an integral unit of the technical subsystem with HEIs) and people (as an integral part of the social subsystem). Consistent with Cherns (1976), Trist and Bamforth (1951), Trist (1981) and Hicks et al. (2015), the study highlights the importance of both subsystems in driving an organisation's vision. While Cherns (1976) argues that both subsystems need to be optimized in order to drive performance (implicitly assuming that the systems are independent of each other), this study documents an interaction (both impeding and strengthening) between the two subsystems.

The first research question explores the extent to which UK HEIs have adopted Lean management practices. The study confirms findings from prior studies (Comm and Mathaisel, 2003; Emiliani, 2004; Hines and Lethbridge, 2008; Taylor, 2012; Radnor and Bucci, 2012; Thirkell and Ashman, 2014; Antony, 2014; Francis, 2014; Svensson et al., 2015; Balzer et al., 2016; Lu et al., 2017, Ciancio, 2018, Gupta et al., 2020) but also generates novel findings which are summarised in Table 7.4.1. Specifically, the study finds that Lean in UK HEIs was not implemented at an institutional-wide level (the absence of a holistic or systems approach to Lean deployment). It was mainly driven by professional services (research and teaching

portfolios were exempt). There was substantial emphasis on respect for people. The term "Lean" was associated with negative connotations, which may explain why Lean, as an activity, was sometimes done but not termed "Lean". Lean adoption in HEIs is generally driven by the presence of a Lean champion or by leadership interest and adopters expect Lean to reduce waste, improve efficiency, address bureaucracy and workload problems. Success stories from other Lean implementers appear to motivate other institutions to adopt Lean.

The second research question explores the benefits and challenges of adopting Lean in the HE context. Similar, consistent with prior studies (Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017), the study finds that Lean adoption leads to efficiency through time saving and improvements in the student experience but implementers have to contend with challenges including resistance to change from employees and the bureaucratic structure of HEIs (including the presence of function silos) which impedes successful Lean adoption (de Souza and Pidd, 2011; Antony et al. 2012). Different from other studies, this study finds that Lean adoption leads to improvements in staff experience, increases employee engagement (due to participation in a shared vision), improves team working and enhances the working environment. Also implementers face additional barriers including misunderstanding of Lean and its role, stress and anxiety surrounding Lean implementation, job insecurity, prior poor experience with Lean programmes and issues around resource availability and responsibilities.

The third research question explores Lean's indirect impact on employee outcomes through its transformational effect on work structures and processes. Novel to this study, there is evidence of significant disparities between the views of leaders and team members on the indirect impact of Lean on employees. Deployment managers generally over-estimate, or at least, do not fully understand the impact of Lean on employees. There is evidence that, by transforming work structures, Lean has generally improved employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication within this context. However, Lean also leads to work-related stress and does not necessarily improve retention. Surprisingly, the study finds that implementers do not routinely assess how Lean impacts on their employees—an issue which is critical to the sustainability of Lean.

The four research question extends the third by exploring the direct impact of Lean adoption on employees independent of its impact on work structures and processes. Here, the

study documents that Lean implementation has a direct effect (generally positive) on employees (in terms of organisational commitment, motivation, satisfaction, working environment), irrespective of whether they are involved or not in Lean projects. For example, through better communication and empowerment, staff are more engaged, satisfied and motivated by the knowledge that their views are shaping the vision and future of the HEI.

Building on the views of Rinehart et al. (1997), Post and Slaughter (2000) and Neirotti, (2018) who highlight the importance of understanding how Lean impacts on employees, the current study (research questions 3 and 4) explores the soft side of Lean—an issue that has received limited attention in prior Lean Public Sector research. To the researcher's knowledge, in spite of the importance of employees in ensuring successful Lean deployment and Lean sustainability, particularly within the unique HEI context, no prior study looks at how Lean impacts on employees in this context. The research documents significant differences in perceptions between Lean leaders and/or deployment managers and Lean team members. This suggest that deployment managers do not fully understand how Lean impacts on those involved. Given the importance of communication in successful Lean implementation, this generates new questions about the nature of Lean deployment in this context. Importantly, this study uncovers the lack of focus on the soft-side of Lean by deployment managers. In spite of the critical nature of soft issues on successful Lean deployment and sustainability (Rinehart et al., 1997; Post and Slaughter, 2000; Neirotti, 2018), the research uncovers that very little was done across institutions to assess and manage Lean's impacts on employees.

With respect to contributions to practice, the research documents the tendency for Lean leaders to overestimate the benefits (or positive impact) of Lean to employees. It is suggested that the gap in perceptions can be narrowed through bottom up communication and through the deployment of formal and informal feedback channels. Secondly, there is need to routinely assess the impact of Lean on employees as employees (and their continuous involvement) are critical to the sustainability of Lean programmes. Finally, to the researcher's knowledge, the study is the first to explore the nature and extent of Lean adoption across UK HEIs, in-depth (through interviews). Prior studies have used surveys, perhaps, only providing a surface view. This study has documented the experiences of implementing organisations, highlighting some of the challenges that they have faced, some of the areas in which Lean has been applied with positive impacts on efficiency and organisational effectiveness and the scope of Lean in HEIs. This therefore provides a yardstick to several UK HEIs who might be turning to Lean to address the current challenges HEIs face in the ever changing institutional landscape.

1.9 Structure of the thesis

This chapter has provided an overview of the thesis. Chapter 2 discusses the Lean theory and related literature. The chapter also identifies the research gap and puts forward the research questions. Chapter 3 discusses the methodology underlying the initial and main phases of the study. It discusses the research process and presents the research tools. Chapter 4 presents the results of the initial phase of the study. This is followed by chapter 5 which discusses the results from the main study. Chapter 6 discusses the results from the two phases of the study. Concluding remarks are drawn in chapter 7. More details on the coverage of each chapter is provided in the figure below.

Figure 1.9-1: Structure of the thesis

Chapter 1 Introduction	• Background of Lean/UK HEI • Research questions, approach • Main findings and contributions
Chapter 2 Literature Review	• Lean concept, why Lean fails • Lean in differect sectors • Review of research on impact of Lean on employees • Research gap, research questions and theoretical lens.
Chapter 3 Research Methodology	• Philosophical stance; ontology, epistemologyt and methodology. • Research process, design and strategy
Chapter 4 Pilot Study	• Motivation for Lean adoption in HEIs • Strategy, scope, benefits, challenges of adoption. • Impact of Lean on employees
Chapter 5 Main Study	• Perception, objectives, strategies, benefits and challenges of implementation. • Impact of Lean on employees
Chapter 6 Discussion of Findings	• Motivation, objectives and benefits of adopting Lean • Challenges and barriers faced by adopters • Lean impacts on employees • Divergence in views of leaders and team members
Chapter 7 Conclusion	• Research questions and Key findings • Contributions, limitations and future research.

CHAPTER 2:   LITERATURE REVIEW

2.1 Introduction

This thesis examines Lean implementation in UK higher education institutions (HEIs). This literature review explores the concept of Lean, why Lean fails as well as, behavioural and psychological issues relating to Lean. Empirical research exploring Lean in the manufacturing, service and public sector, as well as, prior research exploring cases of Lean implementation in some UK HEIs are explored. The review ends with the identification of several research gaps, the advancement of research questions which underlie this chapter and a review of how socio-technical theory has been used in Lean research.

Limited research has been conducted on Lean in the UK HEI setting. This review draws from a number of articles that have been published over the last two to three decades. The search for suitable articles is conducted in different phases. First, the researcher reviews all key operation management journals on the Association of Business Schools (ABS) list published in 2018 (e.g., Journal of Operations Management, International Journal of Operations and Production Management, Production and Operations Management, Manufacturing and Service Operations Management, Journal of Supply Chain Management). The strategy is to identify all articles published in these journals with "Lean" as a keyword. The search is primarily conducted using the Cardiff University Library "SearchAll@Cardiff" tool. Also, standard external databases including Google Scholar and Science Direct are also used to complement this search. Preference is shown for articles published in highly rated journals. The initial search across operations management journals serves as a useful starting point to understand the evolution of Lean. Specifically, this allows the researcher to identify most of the early research exploring Lean in manufacturing and service industrial settings.

Second, a more general search is conducted across several electronic databases using key words: Lean, TQM, Six Sigma, UK, public sector, healthcare and Higher Education. The abstracts of all articles obtained are read through to judge their relevance for this study. All relevant articles (obtained from phases one and two) are then reviewed for relevance and inclusion in the literature review. Finally, a snowballing technique is used to identify additional articles which are not collected in the first two phases but are identified by prior studies as relevant to the subject. Specifically, the bibliography of the articles obtained from phases 1 and

2 are read through, to identify related research which is relevant to the current study. These articles are then used to inform the review of prior Lean literature.

The structure of this literature review chapter is as follows. The emergence of the Lean phenomena is discussed in section 2.2. A definition of Lean (both as a managerial tool and a management philosophy) is provided in section 2.3. Critical success factors and barriers to Lean implementation are discussed in section 2.4. Behavioural and psychological factors relating to Lean are discussed in section 2.5. Prior research on Lean in different sectors including manufacturing, service and public are reviewed in section 2.6. Section 2.7 opens up discussions on Lean in the UK HEI setting. The peculiarity of the setting is established and a few case studies Lean implementation in this setting are discussed. This allows research gaps to be identified and research questions to be framed (in section 2.8). Section 2.9 identifies a suitable theoretical lens for addressing the research questions.

2.2 The emergence of Lean

Lean emerged as a radical alternative to Fordism or mass production (Holweg, 2007), which was hitherto, adopted as a strategy for ensuring optimal efficiency, low cost and quality. As discussed by Holweg (2007), mass production and batching were characterised by a goal of generating economies of scale, obtained by keeping unit costs low and output high. This was achieved by standardisation across batches as in the case of the production of Ford's Model T. Mass production and batching techniques are built on the beliefs that excess stock insures against uncertainty and that high quality and product specificity (to customer requirements) costs more. Under this system, efficiency is pursued by detecting errors and correcting them when they occur. Production emphasizes minimise local costs and accepts imbalances at system level (Holweg, 2007). The overall focus is to anticipate the level of demand (irrespective of the needs of the customer), produce in high quantities, and then 'push' the end product out to customers. As suggested by Womack et al. (1990), Lean puts forward a radical alternative, advocating small batches to minimize costs, low (or no) stocks, as stocks hide problems and impedes improvement, high quality, as it reduces costs by eliminating wastes, and error prevention (not correction) through process control. Under a Lean production system, production emphasises a flow through system with possible inefficiencies at a local level, trumped by the holistic supply system being more efficient. The overall focus of Lean is to identify customer needs and value considerations, tailor the product to meet these needs and

let production be informed by customer demand i.e., 'pull' rather than 'push' (Womack et al. 1990). The emergence of Lean is further discussed below.

The practice of "Lean management" has its roots in the Japanese automotive industry (particularly, Toyota Production Corporation) and appears to have been developed around the 1950's (Scott and Walton, 2010). Taiicho Ohno is credited with developing a hybrid responsive production system (Lean production system) by combining elements from handcraft production and mass production. The term Lean appears to have been first used in 1988 by John Krafcik in reference to research work carried under the International Motor Vehicle Program – a program which set out to discern the reasons underlying the US' Auto Industry's underperformance of its Japanese counterpart (Womack et al. 1990). *'The Machine that Changed the World'* by Womack et al. (1990) remains a seminal piece in the Lean literature – one of its key findings being its ability to explain how the Japanese outperformed the Americans, not by recourse to their culture, but by their style of manufacturing management. Not surprisingly, given the success of their seminal piece, James Womack and Daniel Jones, followed up with other books on Lean management – notably 'Lean Thinking: Banish Waste and Create Wealth in Your Corporation' (1996). The pillar of this later work is its development of the science of Lean as it puts forward five principles which can supposedly guide Lean implementation across corporations. These will be further discussed below.

2.3 The concept of Lean

2.3.1 Lean defined

Several definitions of Lean have been put forward in the extant literature. While some studies provide a more general definition of Lean, others advance a definition of Lean as applicable to different contexts e.g., Lean manufacturing and Lean service. A summary of definitions for Lean manufacturing, for example, is presented in Bhamu and Sangwan (2014). The common themes underlying the 33 definitions of Lean manufacturing presented in Bhamu and Sangwan (2014) are 'efficiency, minimum input, minimum costs, maximum output and zero waste'. By synthesising these 33 definitions, Bhamu and Sangwan (2014) contend that prior studies perceive Lean management as 'a way, process, set of principles, approach, concept, philosophy, system, program and paradigm' (p. 925). The meaning of Lean appears to vary depending on how Lean is viewed – as a way, process, set of principles, approach, concept, philosophy, system, model, program and paradigm.

As an approach, for example, Taj and Morosan (2011) contend that Lean is 'a multidimensional approach that consists of production with minimum amount of waste (JIT), continuous and uninterrupted flow (cellular layout), well-maintained equipment (TPM), well-established quality system (TQM), and well-trained and empowered work force (HRM) that has positive impact on operations and competitive performance (quality, cost, fast response and flexibility)' (p. 334). As a model and a philosophy, Alves et al. (2012) argue that 'Lean production is evidenced as a model where the persons assume a role of thinkers and their involvement promotes continuous improvement and gives companies the agility they need to face the market demands and environment changes of today and tomorrow' (p. 221). Alves et al. (2012) further argue that Lean is an all-encompassing philosophy through which an organisation sustains growth, improvement and competitiveness in a dynamic environment. This, it achieves by transforming its people into thinkers and empowering them to perform their tasks and run their processes in ever more improved ways.

The extant research suggests that there are different ways of operationalising Lean within an organisation (Rothenberg and Cost, 2004). MacDuffie (1995), for example, notes that the success of Lean (in manufacturing) is derived from a combination of practices, policies and philosophies. In this regard, different organisations, adopt different combinations of practices, policies and philosophies. At the heart of Lean, nonetheless, at least in manufacturing, are buffer minimisation ("just-in-time"), work systems and human resource management (Rothenberg and Cost, 2004, MacDuffie, 1995).

Womack and Jones (1996) discuss the operationalization of the Lean philosophy within the context of industry and research i.e., how Lean philosophy can be implemented across the operations of companies. In some respects, their work can be viewed as a development of the science of Lean as they put forward five principles which form a roadmap for the transformation of traditional business processes to Lean business processes. The underlying assumption is that these principles are general and will apply across all organisation types. Womack and Jones (1996, p. 15) contend that Lean thinking allows companies to 'specify value, line up value-creating actions in the best sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively'. The underlying principles of Lean thinking include; Value, Value Stream, Flow, Pull and Perfection. These areas are summarised in the table (Table 2.3.1) below:

Table 2.3.1: The underlying principles of Lean thinking

	Principle	Description
I	Value	Identify what customers value and run the business to address this
II	Value Stream	Identify all activities (from design to order to raw material to delivery) required to produce a product or service whether adding or non-adding value
III	Flow	Ensure that adding-value activities necessary to produce and deliver a product or service flow without interruptions
IV	Pull	Produce according to customers demand
V	Perfection	To continuously seek improvements to the process.

Notes: Principles summarised from Womack and Jones (1996)

As per the Womack and Jones (1996) framework, value refers to "capability provided to customer at the right time at an appropriate price, as defined in each case by the customer" (Womack and Jones, 1996, p. 311). "Value" is the starting point for Lean thinking, its identification and definition which must be done from the perspective of the end customer. What represents value to the customer will therefore change from one product or service to the other, and not surprisingly, from one customer to the next (Womack and Jones, 1996). It is therefore imperative that, in the context of the provision of services, value is defined from the perspective of a particular end customer.

Womack and Jones (1996, p. 311) define value stream as all "specific activities required to design, order, and provide a specific product, from concept to launch, order to delivery, and raw materials into the hands of the customer". The creation of a value stream requires the identification of all activities (from design to order to raw material to delivery) required to produce a product or service whether adding or non-adding value). As discussed in Womack and Jones (1996, p. 20), the activities in the value stream can then be classified into three categories; Value-Added (activities that unambiguously create value for the end customer), Type One Muda[4] (those which create no value but are seemingly unavoidable given the state of current technologies or company assets) and Type Two Muda (those which do not create value and can be easily avoided). Clearly, waste or type two Muda needs to be minimized or eliminated for any company to remain efficient and competitive. In the case of Lean thinking, what is considered Muda is far-reaching. This could include waiting time, spillages, defects, shortages, customer returns (i.e., goods which fail to meet customer specifications), scrap,

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[4] Muda is the Japanese word for "waste".

stock or inventory, amongst others. Indeed, Ohno (1988) identified 7 types of waste including; overproduction, over-processing, motion, transportation, inventory, waiting and defects.

Womack and Jones (1996, p. 306) define "flow" as the "progressive achievement of tasks along the value stream so that a product proceeds from design to launch, order to delivery and raw materials into the hands of the customer with no stoppages, scrap or backflows". The emphasis here is on a system or holistic view of an organisation and its process. This suggests that the efficiency of one unit within a system might be sacrificed if it allows the entire system to be more efficient.

Womack and Jones (1996, p. 309) define "pull" as the "system of cascading production and delivery instructions from downstream to upstream in which nothing is produced by the upstream supplier until the downstream customer signals a need". The alternative ("push") system which was advocated by production systems such as Batch and Mass production (as discussed early on) focused on production with the hope to convince the consumer to consume what had been produced. Lean advocates a pull system wherein products are only produced when demanded. Under this system, consumer demand is the signal which switches on the production process. The pull system prevents unnecessary build-up of inventory – which is considered as waste under the Lean philosophy.

Womack and Jones (1996, p. 308) define "perfection" as the "complete elimination of Muda so that all activities along a value stream create value", potentially a never-ending process! This is what makes Lean a process of continuous improvement. Lean is therefore not an end in itself but a means to an, arguably unachievable end – perfection.

The 5 principles put forward by Womack and Jones (1996) are broad – broad enough to be implemented across every industry. Yet, these principles are, arguably, too broad such that one would expect organisations to implement them with varying levels of success.

Other frameworks for operationalising Lean have been proposed. Kringe et al. (2006) for example, proposed a four steps process for implementing Lean in a government organisation. These four steps include; (1) Assess and plan, (2) Train, (3) Implement, and (4) Embed. The authors argue that this process can be used by both private and public-sector organisations to implement Lean. In the first stage (Assess and plan), implementer focuses on understanding the organisation's needs and processes through the use of observations interviews of managers and staff as well as secondary data collection and analyses. This stage is followed by a training and Lean capacity building phase where in the top executives build a

thorough understanding of and commitment to Lean improvement. In the third stage (Implement), implementers apply knowledge and skills of Lean in different ways depending on the duration of the improvement effort. Kringe et al. (2006) propose the use of relevant Lean approaches and continuous improvement tools. Kringe et al. (2006) note that sustainment is the most challenging but perhaps, the most important aspect of Lean improvement. The "Embed" stage involves weaving the culture of continuous improvement into the very fabric of the organisation. The authors content that this process can be facilitated through monitoring of key performance measures and continuous coaching and mentoring of Lean implementers.

From the above review of Lean perspectives and for the purpose of the current study, it is argued that two main strands of (or ways of viewing) Lean are prevalent in prior research– Lean as a set of management tools and Lean as a philosophy. These two different perspectives will now be explored in more detail in turn since they are considered as one of the most important perspectives regarding this study.

2.3.2　Lean as a management tool

The first strand of the Lean literature views Lean as a set of management tools for minimising waste. Manrodt et al. (2008) for example, define Lean as a systematic approach for enhancing value to the end customer by identifying and eliminating waste (including waste of time, effort and materials) through continuous improvement, by flowing the product at the pull of the customer, in pursuit of perfection. In this respect, prior studies (e.g., Shah and Ward, 2003, 2007) contend that the Lean management strategy can be operationalized through key practices (i.e., the adoption of tools) including Total Quality Management (TQM), Just-in-Time (JIT), Human Resource Management (HRM) and Total Preventive Maintenance (TPM). Shah and Ward (2003) term these practices "Lean bundles" noting that each bundle has its unique practices. This position is not unique to Shah and Ward (2003, 2007).

Indeed, several studies have explored the content of Lean production practices and bundles (Shah and Ward, 2003; Flynn et al. 1999; White et al., 1999 etc.). Based on the review by Shah and Ward (2003), the most popular practices and bundles associated with Lean across research focusing on Lean manufacturing in particular, include; continuous improvement programmes, cross-functional work-force, JIT/continuous flow production, lot size reductions, preventive maintenance, pull system/Kanban, quick changeover techniques, self-directed work teams and total quality management. Table 2.3.2 summarises some of practices and bundles in manufacturing, as identified by research.

Table 2.3.2: Lean practices and bundles in manufacturing

Practice	Discussion	References
JIT/Continuous flow production	JIT defined as a holistic management approach consisting of various practices that contribute to elimination of waste and continual improvement of the manufacturing system. White (1993) notes that JIT consists of several management practices including focused factory, reduced set up times, group technology, total productive maintenance, multifunction employees, uniform workloads, JIT purchasing, Kanban, total quality control and quality circles.	Sakakibara et al., 1997, Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999, Agus and Hajinoor, 2012, Azevedo et al., 2012, Campos and Vazquez-Brust, 2016, Govindan et al., 2015, Govindan et al., 2014, Shah and Ward, 2003, Wiengarten et al., 2013, Sugimori et al., 1977 Shah and Patel, 2018
Lot size reductions	Inventory management and hence lot sizing is critical to the quality of customer service (in terms of product availability and delivery speed) and cost management.	Flynn et al., 1999, White et al., 1999, Nieuwenhuyse and Vandaele, 2006, Anwar and Nagi, 1997, Glock et al., 2014
Total productive maintenance	Maintenance of equipment and machinery accounts for a significant share of manpower and capital in industrial organisations. It is critical to continuous production and the success of Lean initiatives.	Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999 Suliman and Jawad, 2012 Sangwa and Sangwan, 2018
Pull system/Kanban	Subsystem of the Toyota Production System, created to control (quantity and timing of) inventory levels, the production and supply of components and raw material. Inventory management is critical to Lean production.	Sakakibara et al., 1997, Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999, Junior and Filho, 2010, Minovski et al., 2018
Quick changeover techniques	Rapid changeover is a fundamental component of modern manufacturing as it enables responsive, JIT, small batch manufacturing and minimises losses due to downtime. This is therefore critical to Lean production.	Sakakibara et al., 1997, Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999, Arai (2017)
Self-directed work teams (SDWT)	Empowerment and respect for individuals as core to Lean philosophy. Organisation of work into SDWT (partially responsible for managing their own work) has been shown to increase performance, flexibility, and product and service quality while maintaining high levels of employee satisfaction.	Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999, Hoffman (2017)

Total quality management	TQM focuses on various organisational practices (HRM, quality control, information analysis etc.) which work together to improve performance – mainly assessed through internal and external customer satisfaction.	Choi and Eboch, 1998, Koufteros et al., 1998, Flynn et al., 1999, White et al., 1999, Viada-Stenger et al., 2010, Harrington and Keating, 2006, Hellsten and Klefsjo, 2000, Nicholas (2016)

Just-In-time is a production system in which only the necessary products, at the necessary time, in the necessary quantity are manufactured (and distributed), and in addition, the stock on hand is held down to a minimum. The purpose of this approach is to minimise costs while being responsive to demand by streamlining the manufacturing process. In practice, Lean and JIT share the same approach to change and improvement – eliminate waste, minimise inventory through the adoption of a pull system. Shah and Ward (2003), for example, identify JIT production as one of the four bundles that make up Lean manufacturing – the others being total quality management (TQM), total preventive maintenance (TPM) and human resource management (HRM). This perspective of Lean bundles is widely adopted in the literature (Longoni and Cagliano, 2015). This suggests that, consistent with Naslund (2008), Lean is perhaps an extension or improvement of JIT production philosophy.

Six sigma involves a set of techniques and tools for business process improvement. These tools focus on employing statistical-based techniques (data driven) to reduce the probability of defects. The purpose is to lower costs by reducing variability in processes - leading to decreased defects. It also improves process capability, enhances throughput, reduces waste, increases customer satisfaction and improves performance (Naslund, 2008 and Nave, 2002). Lean Six sigma (as a process improvement methodology) combines principles of Lean (speed) and Six Sigma (quality). It relies on collaborative team effort to remove waste and reduce variation in order to enhance performance. Consistent with Lean, its purpose is to remove all waste, reduce variation and eliminate defects (Bahensky et al., 2005; Naslund, 2008).

Total Quality Management (TQM) and Total Productive Maintenance (TPM) are closely related. They both aim to improve plant competitiveness (Modgil and Sharma, 2016). Importantly, both emphasise organisational focus on continuous improvement of processes, products, services and workplace culture management, through a customer-focused approach,

total employee involvement, process-centred operations and the development of integrated systems. This should ensure long term organisational success through sustained customer satisfaction (Deming, 1986). The difference between TQM and TPM lies in their focus; TPM focuses on shop floor operations while TQM focuses on strategic elements, such as innovation, quality, research and development and innovation activities within organisations (Modgil and Sharma, 2016).

TQM and Six Sigma (Lean Six Sigma) rely on a wide variety of tools. These tools are useful in project planning and implementation, idea creation, process analysis, data collection and analysis, cause analysis, project evaluation and decision making (Naslund, 2008). Tauge (2005) identifies over 150 tools which could potentially be used. The key difference between six sigma and TQM appear to be statistical process control. As suggested by Deming (1986), the difference between TQM and Six Sigma is statistical process control – as the Deming Wheel of TQM and the DMAIC cycle of Six Sigma are basically the same (Naslund, 2008).

Clearly, Lean (when considered as a management tool) is integrally linked with these continuous improvement models and some of these models are sometimes considered as part of Lean. Research suggests that Lean is closely linked to several other continuous improvement methods, strategies and philosophies including Total Quality Management (TQM), and Six Sigma, amongst others. Indeed, some studies view Lean as an extension or expansion of some of the above-mentioned methods. Naslund (2008), for example, contends that 'Lean and six sigma have mainly replaced – but not necessarily added to – the concepts of JIT and TQM' (p. 269). The researcher contends that Lean and Six Sigma are repackaged versions of JIT and TQM (Naslund, 2008). Consistent with this view, other studies including Alagaraja (2010) and Dahlgaard and Dahlgaard-Park (2006) argue that Lean is an extension of TQM, and hence should be viewed as such, rather than as a unique management philosophy.

2.3.3 Lean as a management philosophy

The second strand of the literature (e.g., Scherrer-Rathje et al. 2009) views Lean as a management philosophy – a way of doing things – which focuses on identifying "waste" and eliminating all such "waste" at every point along the value stream. The focus here is on the soft elements within the Lean environment (culture, values, relations, norms), which allows things to be done in such a way as to minimise "waste". Bortolotti et al. (2015), for example, describe Lean as a managerial approach for improving organisational processes based on a complex system of interrelated socio-technical practices. This thesis is embedded within this boarder set

of literature – Lean as a management philosophy. Specifically, following Bortolotti et al. (2015), the working definition of Lean in this thesis is that Lean is a managerial approach for improving organisational processes, relationships and outcomes through the continuous improvement of interrelated socio-technical practices within the organisation. The emphasis here is that Lean focuses beyond waste reduction to encapsulate socio-elements including employees' wellbeing and empowerment, developing CI culture and encouraging participation, with waste reduction and profits seen as an outcome but not the objective of Lean.

Organisational culture can be seen as a starting point to create the required philosophy to embed Lean practices. The importance of organisational culture and its impact on the success of organisations has been explored in research. Different definitions of culture have been put forward. In its simplest form, culture can be thought of as 'the way we do things or think about things around here' (Williams et al., 1994). Johnson and Scholes (1984) see culture as the deeper level of basic values, assumptions and beliefs, shared by organisational members. Schein's (1984) view of culture seems to be widely shared by researchers as it has been adopted across different studies. Schein (1984) views culture as 'the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaption and internal integration, and that have worked well enough to be considered valid, and, therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems'.

In prior discussions in this chapter, it was noted that Lean is integrally linked to other continuous improvement methods such as TQM and JIT. Indeed, it was noted that these are constituents of Lean bundles. Research has explored the relation between organisational culture and TQM (Prajogo and McDermott, 2005; Naor et al., 2008; Baird et al., 2011), culture and JIT (Yasin et al., 2003), as well as, culture and Lean (Atkinson, 2010; Liker and Rother, 2011; Bortolotti et al., 2015). Studies posit that organisational culture is a critical success factor for the success of Lean implementation programmes – and a source of poor effectiveness of such programmes (see, for example, Sim and Rogers, 2009; Atkinson, 2010; Liker and Rother, 2011; Bortolotti et al., 2015).

Lean starts when an employee does things differently and leads to organisational transformation only when all employees consistently do things differently. That is, when 'doing things differently' becomes part of the culture of the organisation. In effect, Lean requires a change in organisational culture—how we do things—in order to have the transformational

effect it promises. Consistent with this view, Scott et al. (2003, 2003b) suggest Lean implementation will lead to success through a change of organisational culture. This is so because Lean (as a philosophy on how work is done) becomes embedded and sustained in work practices, when Lean underlies norms and shared values in the work place. Organisational culture can be changed if an organisation has a discernible culture in other words culture affects performance; the cultural attributes that impact on performance are identifiable; key players can develop strategies that impact on the formation of beneficial culture and the benefits of such managed cultural renewal outweigh any negative consequences (Scott et al., 2003). Hence, understanding the culture of an organisation and how it can be changed is critical to successful Lean implementation.

Organisations have been viewed as complex socio-technical systems (Huber and Brown, 1991; Shah and Ward, 2003, 2007; Malmbrandt and Ahlstrom, 2013; Hadid and Mansouri, 2014; Hadid et al., 2016; and Soliman et al., 2018). The socio-technical system (STS) approach was developed in the 1950's. It proposes the introduction of autonomous work groups as the basic unit of organisational design and emphasized the unity of preparation, execution, and control at the lowest possible level in an organisation (Hyer et.al., 1999). The system emphasizes the joint optimization of the social and technical systems of an organisation by providing a conceptual framework and methodology to enhance the overall systems performance (Clegg, et al., 2017). The issue of socio-technical systems as applied in the context of Lean is fully discussed in section 2.8. Researchers also agree that Lean consists of a complex system of hard and soft practices, elements or bundles, whose impacts on organisations are, perhaps, not yet clearly understood (Samson and Terziovski, 1999; Rahman and bullock, 2005; Taylor and Wright, 2006; Shah and Ward, 2007; Fotopoulos and Psomas, 2009; Bortolotti et al., 2015). Notwithstanding, the softer elements are likely critical to the development of a sustainable continuous improvement culture.

Rahman and Bullock (2005), Fotopoulos and Psomas, (2009) and Bortolotti et al., (2015) identify hard Lean practices akin to Lean tools, which have been recurrently explored in research, including set-up time reduction, JIT delivery, equipment layout for continuous flow, Kanban, anonymous maintenance and statistical process control. Much less research has focused on soft practices within the Lean environment, hence, the focus of this study (Matsui, 2007; Shah and Ward, 2007; Bortolotti et al., 2015). These soft practices include; top management Leadership for quality, small group problem solving, employee training, supplier partnership and customer involvement (Bortolotti et al., 2015). The table (Table 2.3.3) below

provides a summary of these soft practices and their relation to Lean. These have been developed based on the work of Flynn et al. 1995; Cua et al., 2001; Matsui, 2007; Bortolotti et al., 2015 ; Longoni, Cagliano, R. (2015); Matthias and Brown, 2016; Hirzel et al., 2017; Panwar, et al., 2018).

Table 2.3.3: Soft Lean practices explored in prior literature

Soft Lean practices	Relevance to Lean
Top management Leadership for quality	Strong management and organisational commitment ensures goal congruence, clear strategy and employee commitment and compliance. Management also has responsibility to develop and environment or culture in which quality, efficiency and continuous improvement (Lean practice) is expected, encouraged, sought and rewarded.
Small group problem solving	Leads to decentralisation of decision making. Critical for handling uncertainty and improving efficiency in decision making. Results in responsiveness, innovativeness and employee empowerment.
Employee training	Quality, speed, effectiveness or Lean programmes depends on employee skills. Skill development should be fostered and multi-skilling rewarded as it supports continuous improvement and Lean effectiveness.
Supplier partnership	Material and purchased parts are a major source of quality problems. Strong relationships will enable responsive JIT processes, reducing the need to hold inventory i.e., minimise waste.
Customer involvement	Critical for establishing customer needs and for obtaining feedback on the extent to which needs are being addressed.

It is worth noting that all of the research findings noted in the Table 2.3.3 focus on how this, perhaps, limited set of soft practices (i.e., inputs into the socio-technical system) impact on Lean initiatives. For example, Flynn et al. (1994) argues that top management leadership and strong customer relationships are vital to enabling continuous improvement and ensuring customer satisfaction. Relatively few prior studies (see, for example, Lindsay et al., 2019; Dellve et al., 2015; Carter et al., 2013; Hasle et al., 2012; Saurin and Ferreira, 2009) have explored how the adoption of Lean itself shapes these and other soft practices (i.e., outcomes from the socio-technical system). These studies are discussed in section 2.5.

The preceding sections have explored different perspectives of Lean focusing on two main strands of the Lean literature; Lean as a management tool and Lean as a management philosophy. The next section explores some of the critical success factors in Lean implementation. As will be discussed below, some of the soft practices identified under the Lean philosophy perspective (e.g., leadership) tend to be critical in efforts to implement and sustain Lean.

2.4 Why Lean fails: Barriers to Lean implementation

2.4.1 Overview of critical success factors and Lean failure

This section first provides an overview of critical success factors in Lean implementation and the literature on drivers of Lean failure, before the review moves on to discuss some of the factors in more detail. Factors selected for further discussion are those relevant to the current research. Prior studies have explored the factors that are critical to successful implementation of Lean (Hirzel et al., 2017; Netland and Aspelund, 2014; Marodin and Sauriin, 2013). Related to this strand of research, other studies have documented the reasons why Lean fails across different contexts (Achanga et al., 2006; Bhasin and Burcher, 2006; Kilpatrick and Osborne 2006; Hines et al., 2008). The table (Table 2.4.1) below summarises some of the key factors that have been raised.

Table 2.4.1: Critical success factors in Lean implementation

Critical success factor	References
Management commitment/involvement	Radnor et al., 2006; Marodin and Sauriin, 2013; Netland and Aspelund, 2014; Raval et al., 2018
Training and education	Marodin and Sauriin, 2013, Netland and Aspelund, 2014; Netland, 2016
Employee participation and empowerment	Marodin and Sauriin, 2013, Netland and Aspelund, 2014; Antony et al., 2018
Alignment to long term strategy	Worley and Doolen, 2006; Alpenberg and Scarbrough, 2016; Ainul et al., 2017
Culture and managing cultural change	Bortolotti et al., 2015; Canning and Found, 2015; Laureani and Anthony 2018
Cross-functional integration	Sreedharan et al., 2018
Performance measurement	Lande et al., 2016
Sustain continuous improvement	Alhuraish et al., 2017
Clear communication	Worley and Doolen, 2006; Alpenberg and Scarbrough, 2016; Alhuraish et al., 2017
Rewards and recognition	Kerr and Slocum,2005; Veldman et al.,2014; Marodin and Sauriin,2013; Netland et al.,2015; Sreedharan et al., 2018
Resource adequacy	Achanga et al., 2006; Radnor et al., 2006; Netland 2016 ; Maijala, et al., 2018
Organisational readiness	Al-Balushi et al., 2014; Garza-Reyes et al., 2015; Narayanamurthy et al., 2018; Worley and Doolen, 2006; Alpenberg and Scarbrough, 2016; Douglas et al., 2017
Process management	Laureani and Anthony 2018
Benchmarking and knowledge transfer	Netland, 2016

These issues are further discussed here. The pivotal role of senior management in the success of Lean implementation programmes has been extensively documented (Marodin and Sauriin, 2013; Netland and Aspelund, 2014). Radnor et al. (2006) contend that senior management commitment is critical in giving full recognition and facilitating progress of Lean programmes within organisations. Management commitment is likely to improve employee engagement in Lean programmes, thus enabling success and sustainability.

A suitable culture for Lean implementation is one in which staff are willing to accept initiatives and develop a sense of ownership of such initiatives. Bortolotti et al. (2015) highlight the importance of organisational culture to Lean success. Their results, for example, show that successful Lean plants are associated with higher institutional collectivism, future orientation, humane orientation and low level of assertiveness (Bortolotti et al., 2015). While a suitable culture is necessary for successful Lean implementation and Lean sustainability, attempts to change organisational cultures, have sometimes been met with stiff resistance from staff, which impedes on the success of the Lean implementation programme (Canning and Found, 2015).

Organisational readiness involves the creation of a "vision of a fully-integrated Lean organisation from the outset; being realistic about the timescales involved in making changes and embedding Lean; helping staff to understand how Lean may impact upon the organisation; and evaluating the degree to which a process and customer view already exist within the organisation" (Radnor et al., 2006, p. 4). The vision sets up the entire organisation on the path of change. The development of a clear and shared vision can help employees to identify current gaps and areas for development within the organisation. Readiness should, perhaps, extend further to help employees understand the background of Lean, the rationale for Lean implementation and how Lean can potentially improve their work processes and the performance of the entire organisation.

Lean implementation is a resource intensive process (Achanga et al., 2006; Radnor et al., 2006; Netland 2016). Radnor et al. (2006) contend that considerable resources (i.e., in terms of staff time and financial resource to employ management consultants) are required for successful implementation Lean programmes. In their study of Lean implementation in Scottish public sector, Radnor et al. (2006) find that external consultants are initially needed to kick-start Lean projects. Their role is the development of manageable Lean processes and the transfer of skills to internal managers, who are then responsible for managing the Lean programme. External consultants are therefore an invaluable resource to such projects. Hence,

resource limitations e.g., the inability to release staff from their current duties and work pressures, to allow them participate in the development of the Lean project, constitutes a major limitation to Lean implementation (Achanga et al., 2006; Radnor et al., 2006).

Effective communication is key to the success of any change implementation process (Worley and Doolen, 2006; Alpenberg and Scarbrough, 2016). In the context of Lean implementation, communication can be enhanced through meetings, intranet, workshops and awareness-raising sessions (Radnor et al. 2006). These open two-way communication channels can help to increase staff engagement with the programme, which in turn, can increase support and instil a new culture of continuous improvement. Alpenberg and Scarbrough (2016) find that positive engagement[5], the use of soft words and blending[6] facilitated the successful embedding of Lean in organisational culture. On the contrary, negative engagement, the use of hard words and separation[7] were associated to Lean failure or weak Lean (Alpenberg and Scarbrough, 2016).

Most researchers agree that Lean must be woven into the fabric of the organisation's strategy for the Lean programme to be successful (Worley and Doolen, 2006; Alpenberg and Scarbrough, 2016). Radnor et al. (2006, p. 5) contend that "the ability to synchronise improvement activities with the strategic objectives of the organisation helps to prioritise improvements and make them an integral part of the organisation's core activity for all staff to see". In the case of the Scottish public sector, Radnor et al. (2006) find a lack of integration between improvement activities and strategic planning and development. The authors contend, that while this might not impact on Lean in the short term, it might stifle the development of a culture of continuous improvement and the sustenance of Lean in the long term.

As shown on the table (Table 2.4.1) above, prior researchers have documented several other factors which are critical to successful Lean implementation including employee and management training and education (Marodin and Sauriin, 2013, Netland and Aspelund, 2014),

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[5] Positive and negative engagement practices are discussed in Alpenberg and Scarbrough, (2016). In positive engagement, the manager is always positive in their interaction with employees in an attempt to inject energy into work systems. A positive manager will approach problems/waste by asking questions such as "Why is it done this way?" and "Is this a better way to do it?" On the contrary, negative engagement is a practice whereby the manager acts as a part of a control system in the sense of solely noting control failures. The manager will make statements like "You made a mistake with this part. Do not do it again" (Alpenberg and Scarbrough, 2016).

[6] Blending is a communication practice where the manager attempts to become part of the workers' work situation, rather than being an outside actor, e.g., by using phrases such as "we…" instead of "you..." (Alpenberg and Scarbrough, 2016).

[7] A communication practice where managers separate themselves from the work of employees e.g., by using phrases such as "I want you to…" or "your team…" (Alpenberg and Scarbrough, 2016).

organisational readiness (Al-Balushi et al., 2014; Garza-Reyes et al., 2015; Narayanamurthy et al., 2018) and the use of effective rewards and recognition systems (Kerr and Slocum,2005; Veldman et al.,2014; Marodin and Sauriin,2013; Netland et al.,2015) amongst others.

Importantly, any of these critical success factors on their own, is unlikely to allow for success in Lean implementation. For example, clear and effective communication channels, without a sufficient management commitment or the devotion of adequate organisational resources is unlikely to lead to successful Lean implementation.

Closely linked to research on critical success factors, several studies have examined the reasons why Lean fails in different contexts – manufacturing, service and public. Larry (1995) noted 10 most frequent problems leading to failure of Lean. The reasons put forward by Larry (1995) together with statistics are presented in the table (Table 2.4.2) below:

Table 2.4.2: The occurrence of ten most frequent implementation problems (Source: Larry, 1995)

	Implementation problem	%
1	Implementation took longer than planned	76
2	Major unanticipated problems occurred during implementation	74
3	Lack of effective co-ordination of implementation activities	66
4	Competing activities and/or crisis distracted attention from implementation	64
5	Deficiencies in skills and abilities of implementation team	63
6	Lapses in training and communication with front line employees	62
7	Impact of uncontrollable factors in external environment	60
8	Inadequate leadership and direction from managers	59
9	Lack of detail in the definition of key implementation tasks and activities	56
10	Lack of adequate information systems to monitor implementation	56

Table reports the 10 most frequent problems leading to Lean failure (Source; Larry, 1995)

Additionally, a survey of 999 practitioners by the Lean Enterprise Institute (2004) identified common obstacles in Lean implementation (noted in Emiliani and Stec, 2005). These common obstacles are summarised in the chart below:

Figure reports the percentage of 999 practitioners who identify each item as an obstacle to Lean implementation. Source: Emiliani and Stec (2005).

Other studies have identified several other reasons why Lean fails. These reasons can broadly be classified as strategic (i.e. involving the organisation's long term direction), managerial (relating to management activities such as planning, organising, controlling), structural (relating to resources needed to ensure performance), organisational (relating to shared values and norms) and operational (relating to daily procedures and processes). Clearly, there are overlaps between these categories. Some of the salient reasons identified in prior studies are summarised in the table (Table 2.4.3) below. In addition, the soft issues (consistent with those discussed in section 2.3.3) have been identified.

Table 2.4.3: Reasons for failure in Lean implementation

Reason	Broad categories	Soft issue	References
No clear vision and strategy	Strategic	No	Backer (2002); Emiliani and Stec (2005); Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher (2006); Kilpatrick and Osborne (2006); Hines et al. (2008)
Failing to understand the scope of Lean	Strategic	No	Backer (2002); Emiliani and Stec (2005); Bhasin and Burcher (2006); Tracey and Flinchbaugh (2006);
Lack of senior management commitment, engagement and involvement	Strategic Managerial	No	Backer (2002); Emiliani and Stec (2005); Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher (2006); Kilpatrick and Osborne (2006); Tracey and Flinchbaugh (2006); Worley and Doolen (2006); Hines et al. (2008); Marodin and Sauriin (2013), Netland and Aspelund (2014), Jadhav, et al., (2014), Bevilacqua, et al., (2017), Berlec et al., 2017)
The absence of strong leadership	Strategic Managerial	No	Backer (2002); Emiliani and Stec (2005); Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher (2006); Hines et al. (2008)
Poor organisational structure; hierarchy issues, high level of compartmentalisation	Strategic	No	Radnor et al. (2006), Bhasin (2012); Al-Balushi et al. (2014), Garza-Reyes et al. (2015)
The absence of a structured approach to Lean implementation project management.	Managerial	No	Backer (2002); Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher, (2006);
The absence of supportive human resources (HRM) policies; no rewards and recognition, threats of downsizing amongst employees.	Structural	Yes	Emiliani and Stec (2005); Achanga et al. (2006); Kilpatrick and Osborne (2006); Worley and Doolen (2006); Hines et al. (2008)
Lack of resources; lack of time, lack of capital funds, Plant size, high cost of implementation.	Structural Operational	No	Achanga et al. (2006), Radnor et al. (2006), Netland (2016)
Lack of skills and expertise in Lean implementation, failure of past Lean efforts, lack of training, low skill workers.	Structural Operational	Yes	Backer (2002); Achanga et al. (2006)
Lack of fully resourced dedicated implementation team	Structural	No	Emiliani and Stec (2005); Kilpatrick and Osborne (2006)
Poor (ineffective) communication across functions and down the hierarchy	Organisational	Yes	Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher, (2006); Kilpatrick and Osborne (2006); Tracey and Flinchbaugh (2006)
Poor employee engagement/ change resistance	Organisational	Yes	Backer (2002); Lucey et al. (2005); Bhasin and Burcher, (2006); Tracey and Flinchbaugh (2006); Hines et al. (2008)

Lack of appropriate organisational culture; Negative staff attitudes, inability to see long term Lean benefits, willingness to achieve quick results, lack of awareness and knowledge, backsliding into old ways of working.	Organisational	Yes	Backer (2002); Achanga et al. (2006); Bhasin and Burcher, (2006); Hines et al. (2008); Bortolotti et al., (2015)
Resistance to change from supervisors and workforce	Operational	Yes	Backer (2002); Emiliani and Stec (2005); Lucey et al. (2005); Achanga et al. (2006); Bhasin and Burcher, (2006); Kilpatrick and Osborne (2006); Tracey and Flinchbaugh (2006); Worley and Doolen (2006); Hines et al. (2008)
Poor evaluation metrics/ failure to monitor outcomes	Operational	No	Emiliani and Stec (2005); Bhasin and Burcher, (2006); Kilpatrick and Osborne (2006)
Failure to expand Lean implementation into supply chain initiatives	Operational	No	Backer (2002); Emiliani and Stec (2005); Bhasin and Burcher, (2006); Hines et al. (2008)
Failure to sustain and build on Lean/ expand improvements to other functions/department	Operational		Emiliani and Stec (2005); Bhasin and Burcher, (2006)
Lack of infrastructure, insufficient technical resources	Operational/ technology	No	Khanchanapong et al., (2014); Sartal et al. (2017)

A majority of the studies that have explored why Lean fails across different organisations have focused on the hard issues which mainly related to managerial and strategic factors. Other studies have explored softer issues relating to employees but the perspective has largely been on how these soft issues (such as communication) impact on Lean implementation success. The current study aligns with prior studies exploring soft issues (people aspect) of Lean. In the sections below, the researcher focuses on the key barriers that are, perhaps, relevant to the current study (including; leadership failure, Lean terminology, organisational momentum, challenges in data collection, resistance to change, compartmentalisation).

2.4.2 Leadership failure: lack of process thinking and ownership

Successful 'Lean practice is not based on finding quick, temporary solution to problems, but on understanding the root causes of delays and other impediments to flow' (de Souza and Pidd, 2011, p. 62). Nonetheless, as noted by Ben-Tovim et al. (2007), managers, particularly, in health care, are recruited based on their problem-solving and fire-fighting ability. This can, perhaps, result in a situation where managers try to improve processes when problems occur (Antony et al., 2012). These abilities are developed from their past experiences and are unlikely to be evidenced-based. Lean thinking and continuous improvement requires evidenced based decision making (de Souza and Pidd, 2011), necessitating the ability to gather

and analyse quantitative and qualitative data as well as, the ability to anticipate and tackle potential problems even before they occur (waste prevention). It also requires that problems, if they occur, are not resolved in isolation but with due regard to the end-to-end process under which the problem occurs (Antony et al., 2007). This foresight and the associated skills and abilities are not always possessed many managers (Ben-Tovim et al., 2007; Antony et al., 2016; Radnor et al., 2006).

In some cases, managers and senior executives, charged with institutionalising Lean thinking, initiatives or strategies lack the awareness of how to implement Lean programmes, as well as, the benefits of implementing such programmes (Mathaisel and Comm, 2000; Antony et al., 2012). In other cases (such as in HEIs), the work culture is such that employees and managers have traditionally focused on tasks and procedures, and not entire processes (Antony et al., 2012). Indeed, Matthias and Brown (2016), have documented the tendency for Lean implementation in public service organisations (such as the NHS) to focus on 'components of the production line' as opposed to 'the production line'. Instituting Lean thinking in these cases requires and overhaul of organisational culture and a change of the mindset of managers and employees. This is because Lean thinking emphasises a holistic approach which involves looking laterally across all components in an organisation which influence the service delivery (Matthias and Brown, 2016).

2.4.3 Lean implementation terminology

The implementation of Lean comes with a new "language" or vocabulary to describe the way things are done. Implementers frequently use Japanese words; Muda (waste), Kanban (production signal), Kaizen (continuous improvement), etc. Other non-Japanese phrases such as push/pull systems, value-adding activities, are frequently used. While, the introduction of new terminology might be perceived as an unwarranted complexity of Lean, a challenge and barrier to the implementation of Lean in some contexts, such as HEIs (Antony et al., 2012), prior research (De Souza and Pidd, 2011; Fillingham, 2007, 2008) would suggest that such a change, when applied consistently across and organisation, supports efforts to change the organisational culture. Nonetheless, as noted by Radnor et al. (2006), poor communication, the over-use of jargon and the lack of a clear message to staff, can potentially stifle Lean efforts.

2.4.4 Organisational momentum

Lean thinking and its implementation needs to be a sustained process which evolves over time rather than a 'series of conceptual events that happen at discrete points of time' (De

Souza and Pidd, 2011, p. 63). As will be discussed, culture change is critical to Lean sustenance. Once Lean is implemented, it is expected to ripple through the organisation as its benefits become eminent. This allows it to evolve over and across time. This is not always the case. As noted by Radnor et al. (2006), the lack of resources to see through full implementation as well as, frequent changes in strategy (e.g., in the health care industry and national government policy) can stifle the sustenance of Lean.

2.4.5 Challenges in data collection and performance measurement

Successful Lean or continuous improvement implementation requires continuous data collection and performance measurement. In the context of Healthcare, de Souza and Pidd (2011) note the inadequacy of performance measurements which negatively impacts on management's ability to identify areas for improvement. De Souza and Pidd (2011) add that, even when performance measures are adequate, performance results are poor, suggesting the need for entire culture change. The need to collect performance data, as well as, the requirement for a broader culture change is likely to generate scepticism amongst employees and presents a barrier to Lean implementation (De Souza and Pidd, 2011).

2.4.6 Resistance to change

Resistance to change has long been identified as a barrier to Lean implementation due to general scepticism about change programmes (Radnor et al., 2006; Narayanamurthy et al., 2018). In the context of Lean, Radnor et al. (2006) content that the improvement team members are often those willing to get involved, rather than those who should do so. Several reasons have been put forward to explain why employees might resist change – the introduction of Lean thinking. de Souza and Pidd (2011), for example, argue that the lack of understanding of Lean principles and the myth that Lean belongs to the manufacturing industry can stifle its adoption in the non-manufacturing setting. Lean, in particular, requires staff participation, empowerment and engagement – without which, Lean implementation fails. Staff are unlikely to be engaged in the process if they do not fully understand the benefits of Lean implementation.

Prior evidence suggest that Lean generally results in significant cost cutting (increase in efficiency) which might, unfortunately, be achieved through the reduction of staff. de Souza and Pidd (2011), for example, discuss various case studies alluding to this fact. The introduction of Lean can therefore be perceived by staff as a justification by management to

cut costs through the reduction of employee numbers (layoffs). If this is the case, employees are likely to resist such change, hence impeding Lean adoption.

2.4.7 Compartmentalization; functional and professional silos

Antony et al. (2012) contend that poor communication at various levels across organisations, particularly HEIs, can lead to the development of a silo culture across various departments. Such a culture means that there is a lack of communication across functional and professional units – with each acting as a stand-alone entity, its activities and processes developed independent of, but feeding as inputs to the other. This presents a challenge and barrier to the implementation as of Lean in such a setting as Lean requires a holistic view taking into consideration end-to-end processes. de Souza and Pidd (2011) also find that the existence of functional and professional silos also impedes the implementation of Lean in the UK health sector. Within this sector, functional units include healthcare administration, call centres, pharmacies, and professional units include general practitioner (GP) and specialist/consultant surgeries. The argument is that compartmentalisation, i.e., the fact that each unit acts independently, impedes the flow of patients (customers), goods and information, hence the implementation of Lean in the healthcare setting. It is insufficient for one unit to implement Lean processes, when the end-to-end process which delivers healthcare services to a customer is in itself not Lean.

The issues enumerated above (as documented across prior studies) can be grouped into 6 categories including; leadership, Lean implementation terminology, organisational momentum, resistance to change, challenges in data collection and performance measurement and compartmentalisation.

Table 2.4.4: Factors accounting for failure in Lean implementation

Factors	Reason	References
Leadership	No clear vision and strategy Lack of senior management commitment, engagement and involvement The absence of strong leadership	Ben-Tovim et al., 2007; Antony et al., 2016; Radnor et al., 2006; Matthias and Brown, 2016; de Souza and Pidd, 2011
Lean Implementation Terminology	Failing to understand the scope of Lean Lack of skills and expertise in Lean implementation, failure of past Lean efforts, lack of training, low skill workers.	de Souza and Pidd, 2011; Fillingham, 2007, 2008; Radnor et al. 2006

	Lack of infrastructure, insufficient technical resources	
Organisational Momentum	The absence of supportive human resources (HRM) policies; no rewards and recognition, threats of downsizing amongst employees. Lack of resources; lack of time, lack of capital funds, Plant size, high cost of implementation. Poor organisational structure; hierarchy issues, high level of compartmentalisation. The absence of a structured approach to Lean implementation project management. Poor (ineffective) communication across functions and down the hierarchy. Lack of appropriate organisational culture; Negative staff attitudes, inability to see long term Lean benefits, willingness to achieve quick results, lack of awareness and	de Souza and Pidd, 2011; Radnor et al. 2006
Resistance to change	Poor employee engagement/ change resistance. Resistance to change from supervisors and workforce	Radnor et al., 2006; Narayanamurthy et al., 2018
Challenges in data collection and performance measurement	Poor evaluation metrics/ failure to monitor outcomes	de Souza and Pidd, 2011; Radnor et al. 2006
Compartmentalization	Failure to expand Lean implementation into supply chain initiatives. Failure to sustain and build on Lean/ expand improvements to other functions/department Lack of fully resourced dedicated implementation team.	Antony et al. 2012; de Souza and Pidd, 2011

2.4.8 Lean sustainability and maturity

The previous discussions identify Lean as a management tool but also as a management philosophy – a way of doing things. Also as discussed, prior research has documented high rates of failures of Lean initiatives (see, for example, Ben-Tovim et al., 2007; Antony et al.,

2016; Radnor et al., 2006). Hines et al. (2008) contend that Lean fails to sustain mainly due to reasons associated with people, leadership and the failure of people and leaders to engage in the Lean journey. As noted from the preceding discussions, Lean generally fails due to issues associated with leadership failure (see section 2.4.2), behaviour and engagement (see section 2.4.6 on resistance to change), as well as lack of coherence in strategy, a shared vision and organisational alignment (see sections 2.4.2, 2.4.4 and 2.4.7). In support, Hines et al. (2008) contend that the failure of Lean due to people and leadership problems is compounded by an overemphasis on the visible aspects of Lean (i.e., the deployment of Lean tools and processes) over the invisible but enabling drivers of Lean (i.e., culture, strategy, leadership, engagement) during Lean implementation. Hines et al. (2008) propose an Iceberg model which captures the visible and invisible aspects of Lean and their (relative) importance. The Lean Iceberg model is presented in Figure 2.4-2.

Figure 2.4-2   The Sustainable Lean Iceberg Model (Hines et al., 2008)

Hines et al. (2008) draw analogy from the case of the infamous "sinking of the Titanic" by emphasising that what is generally important in Lean is not what you see (i.e., the tip of the iceberg) but what you do not see (Hines et al., 2008). In the case of Lean, the visible or above waterline elements of Lean include process management, technology, tools and techniques. This may include, for example, the application of JIT systems, Kaizen Blitz and TPM and Pull system/Kanban, amongst others.

These visible elements of the model (Figure 2.4.2) generally focus on reducing waste—an important but not the sole target of Lean (Ohno, 1988). The invisible or

below waterline drivers of sustainable Lean are critical aspects (such as strategy & alignment, leadership, behavior and engagement) that constitute enablers, which, if ignored, will lead to the failure of Lean initiatives. Indeed, Hines et al. (2008) argue that engagement and empowerment (i.e., the invisible or enabling factors) can be considered as more important as they drive long lasting change. Consistent with this view, Schmidt (2011) contends that minimising waste should be the outcome or result and not the goal of Lean. The author adds that empowerment of employees to contribute towards the development and accumulation of knowledge is critical to Lean sustenance and the neglect of knowledge accumulation in favour of avoidance of waste is likely to contribute towards Lean failure (Schmidt, 2011). For sustainable Lean, Lean implementers need to therefore focus on both the visible aspects of Lean and the enabling drivers of successful Lean. Overall, the emphasis on the Lean enabling environment is consistent with an emphasis on the people aspects of Lean. These people-related issues are further explored in the next section.

Lean maturity is achieved when Lean is successful and sustained, so that the organisation evolves and progresses through increasing levels of efficiency and improvements in outcomes. Building on the iceberg model, Hines (2011) proposes a more formal maturity model which identifies five critical milestones of Lean maturity or the Lean journey. The framework is adapted in Figure 2.4.3 below.

Stage 1: Reactive	•Some dispersed activity may be going on in pockets. This may be driven by individuals but is not yet a formalised standard or shared across the business.
Stage 2: Formal	•A structured approach is in place and being used in some pilot areas. Knowledge is held in a small pool of resource with plans to roll-out after proven success.
Stage 3: Deployed	•The approach is clear, agreed and aligned with business goals. The systems, roles and behaviors are established and are found throughout the organisation.
Stage 4: Autonom ous	•Continuous improvement of this process is happening at all levels of the organisatioin. Teams work to not only maintan standards but to improve the process and approach taken.
Stage 5: Way of life	•Continuous improvement is a way of life at every level of the organisation. The organisation extends learning and improvement across the entire value stream.

Figure 2.4-3 The milestones of Lean maturity (Hines, 2011)

At the beginning of the Lean journey, Lean activities occur in small dispersed pockets across the organisation and is not shared across the organisation. The next stage in the Lean development journey sees Lean gaining some structure and being deployed in different areas (e.g., as a pilot). At this stage, knowledge relating to Lean is still held by a few experts, leaders or champions. At the third stage, the Lean approach is clear, agreed and aligns with business goals. The required framework (systems, roles, behaviours) for Lean deployment is put in place across the organisation. The final two stages are characterised by increased emphasis on continuous improvement. At the final stage, where Lean becomes "a way of life" within the organisation, the emphasis is on sustainability (learning and continuity) and deployment across all segments of the value stream.

Indeed, for Lean to become "a way of life" at every level of the organisation, it must be supported by employees. Lean is likely to gain employee support if it positively impacts employee outcomes such as motivation, satisfaction, autonomy, job stress and workloads, amongst others (Treville and Antonakis, 2006; Hirzel et al., 2017). The next section further explores the impact of Lean on employees.

2.5 Lean impact on employees

2.5.1 Introduction

A few studies have explored the effect of Lean on job characteristics (such as autonomy and skills) as well as its impact on employee outcomes (such as job satisfaction, employee commitment, health and wellbeing) in different context (Lindsay et al., 2019; Dellve et al., 2015; Carter et al., 2013; Hasle et al., 2012; Saurin and Ferreira, 2009). These issues represent the soft-issues in the Lean environment. Lean is founded on the idea of continuous improvement through elimination of organisational slack and waste (Neirotti, 2018). The removal of slack might discourage creativity and enforce constraints which are likely to impact on staff wellbeing (Carter et al., 2013). Consistent with this view, Hasle et al. (2012) suggest Lean always impact the wider working environment in which it is introduced. They find strong evidence that Lean negatively impacts on the working environment, employee health and wellbeing, particularly, in cases of manual work with low complexity. Nonetheless the relationship is not simple or determinable (one-way) as it depends on how Lean is applied or implemented (Hasle et al., 2012). They draw this conclusion as they find several studies reporting positive Lean effects. For example, studies in manufacturing (Saurin and Ferreira, 2009) and healthcare environment (Dellve et al., 2015; Lindsay et al., 2019) reported positive impact of Lean practices on employees' working condition and stress levels. This suggests that the impact of Lean on the working environment is a function of Lean practices and how they are implemented. Hence, further research focusing on specific cases (case study research) and using more in-depth analysis (qualitative, discursive, explorations) will benefit the literature.

As a starting point for the empirical part of this research, an extensive review of the literature is conducted to understand how Lean may impact on employees i.e., soft issues or people aspects of Lean. The focus of the review in this section was to identify the key people aspects or employee soft issues that are impacted by Lean and hence, the review explored narratives in the literature on how Lean impacts actors within organisations. As noted previously, the literature exploring Lean's impact on employees is comparatively limited but the researcher is able to identify several studies exploring the impact of Lean on employee motivation, job satisfaction, employee retention, employee autonomy, worker job stress and employee workload (Mitchell 1982; Robbins 1993; Kanter, 1993; Hackman and Oldman 1980; Tomer 2001; Dellve et al. 2015). These six (6) soft issues form the starting point for the empirical part of the current study. As will be subsequently discussed, as part of this study, the researcher finds evidence that Lean may also impact on employee's psychological safety, the

working environment and the nature of communication in the workplace. This latter set of issues are not well-established in the literature. In this section, the focus is on reviewing the soft issues that have been documented in prior studies including employee motivation, job satisfaction, employee retention, employee autonomy, worker job stress and employee workload (Mitchell 1982; Robbins 1993; Kanter, 1993; Hackman and Oldman 1980; Tomer 2001; Dellve et al. 2015). Clearly, these issues are interrelated and some can be subsumed under others, but for simplicity, they are differentiated in the discussions below.

2.5.2 Lean and employee motivation

It is generally believed that motivated employees are more productive and more likely to remain with their employer in the long term (retention) hence, drivers of employee motivation have been studied in different contexts. Motivation derives from the Latin word "movere" which means "to move". Mitchell (1982, p. 81) defines motivation as "those psychological processes that cause the arousal, direction, and persistence of voluntary actions that are goal oriented". In relation to this, Robbins (1993) defines motivation as "the willingness to exert high levels of effort toward organisational goals, conditioned by the effort's ability to satisfy some individual need". These researchers generally agree that motivated employees are more persistent, exert more effort, are more committed, driven and task oriented. They are therefore more likely to record better performance than their unmotivated counterparts.

Motivation can generally derive from intrinsic or extrinsic factors. Legault (2016) contends that intrinsic motivation refers to engagement in behaviour that is inherently satisfying or enjoyable. More broadly, Di Domenico and Ryan (2017) contend that intrinsic motivation refers to individuals' spontaneous tendencies to be curious and interested, to seek out challenges, and to exercise and develop their skills and knowledge, even in the absence of operationally separable rewards. On the one hand, intrinsically motivated individuals, presumably, engage in activities due to interest and because of the satisfaction they derive from participation. On the other hand, extrinsically motivated individuals engage in activities as a means to attain rewards or other outcomes or avoid punishment.

Motivation has been studied in the context of Lean (Womack et al., 1990; Treville and Antonakis, 2006), but the results appear inconclusive. One the one hand, several studies (Hopp and Spearman, 1996; Womack et al., 1990) argue that workers under Lean production environments are intrinsically motivated, more driven and more productive, than their

counterparts in traditional work environments. Neirotti (2018) also contends that employee involvement in continuous improvement processes can lead to overall satisfaction. This could particularly, be the case when employees receive positive feedback, and recognition (financial and social) for their contributions in improvement efforts. On the other hand, several opponents of Lean (Rinehart et al. 1997; Post and Slaughter, 2000) argue that Lean creates alienating and highly limiting work conditions, which stifles intrinsic motivation, creates tension and employee resistance, and leads to the deskilling of workers. Pulling these two schools together, Treville and Antonakis (2006), argue that worker motivation is shaped by the configuration of Lean production practices, noting that motivation (particularly intrinsic motivation) is limited by excessive Leanness.

2.5.3 Lean and job satisfaction

Job satisfaction as defined by Brief (1998), is an internal state (of happiness) that results from the affective and cognitive evaluation of the job. Generally, HRM practices such as reward and recognition, feedback, employee support, training and development, empowerment, are key to shaping perceived job autonomy and hence, employees' evaluation of their fulfilment or satisfaction with their job. While Toyota Production System (TPS) approaches Leanness by building on its principle of respect-for-humanity, anecdotal evidence suggests that the outcome of Lean is often Lean-becomes-mean (Bruno and Jordan, 1999). This suggests that while Lean should lead to employee job satisfaction in principle, this may often not be the case in practice. Prior research on employee satisfaction shows that job satisfaction impacts on performance, retention and absenteeism (Hackman and Oldman 1980; Tomer 2001). Tomer (2001), for example, finds that employee empowerment (with greater responsibility), allows better skill and competency development which in turn results in more creative and cooperative employees. There is some evidence pointing to the tendency for Lean to empower employees (Hirzel et al., 2017). Indeed, Hirzel et al (2017) find that the implementation of continuous improvement programmes such as Lean leads to employee empowerment, though with a time lag. This suggests that Lean implementation might not have an immediate impact on employee outcomes as it takes time for Lean benefits to diffuse through the organisation.

Reinhart et al. (1997) contends that excessive Leanness always results from Lean production implementation programmes. This results in the removal of all slack from the system leading to a decline in worker satisfaction and hence, performance (Reinhart et al., 1997; Neirotti, 2018). An alternative view supported by proponents of Lean (Womack et al.,

1990) is that Lean leads to removal of waste from the system, allowing workers to use their time, effort and resources in a more productive manner, leading to higher productivity and hence, better job satisfaction.

Research looking at the impact of Lean on employees does not always corroborate these arguments. For example, Carter et al. (2011) who investigate the case of the impact of Lean on labour process in Her Majesty's Revenue & Customs (HMRC) conclude that Lean, as implemented in this organisation, detrimentally impacts on employees' working lives and the service they are able to provide to customers.

2.5.4 Lean and employee retention

Employees represent, perhaps, the most important assets of many organisations, particularly in service industries. Finding the right employees, with the right skills and the right fit within the organisation is both a time consuming and expensive task of HRM. Hence, employee retention (particularly, retention of motivated, skilled and productive employees) is vital to ensure success and organisational performance (Kyndt et al., 2009). Retention is integrally linked to job satisfaction as satisfied employees are more likely to stay on in the organisation compared to their unsatisfied counterparts. Some research, particularly in the field of occupational psychology, suggests that Lean leads to job strain, creates intensified work pace, increases demands on employee effort, with adverse health effects (Landsbergis et al. 1999). The result is that few employees can withstand this strain, and hence, employees with viable employment options (i.e., better skills which are in demand) are likely to move on to other jobs. This complements other studies (e.g., Kyndt et al., 2009) which suggest that retention is a function of individual benefits – wherein, employees with leadership skills and seniority are more likely to be retained while their counterparts with high levels of readiness and learning attitude are less likely to be retained in such environments.

2.5.5 Lean and employee autonomy

Employees are an integral part of Lean implementation. The larger objective of Lean (Lean sustainability) is to create an organisational culture where employees are self-driven and able to take initiatives to organise their work in a manner consistent with the philosophy (Womack et al., 1990). It is this sense of autonomy combined with knowledge and skills that allows Lean to be sustained over time. A number of studies have shown that empowering employees to work autonomously improves or increases the effectiveness of employee

behaviour in continuous improvement (such as Lean) programmes (Lam et al., 2016; Jurburg et al., 2016; Hirzel et al., 2017).

Drawing evidence from a large financial services provider, Hirzel et al. (2017), argue that a continuous improvement programme (such as Lean) which aims to implement Lean in a sustainable manner must focus on empowering employees to drive the programme rather than expecting these employees to implement the programme independently. Employee empowerment, in this case, could be achieved through more effective resource allocation (financial support, time, supplies, and equipment), training and development, the provision of relevant information and knowledge, guidance and feedback (Kanter, 1993). Indeed, Hirzel et al. (2017) find that implementation levels (i.e., how well Lean was being implemented) increase after employees are empowered. This perspective is consistent with the Lean principle of respect-for-humans which advocates trust in employees' ability to think, to grow and to seek to do good in the work environment. The empowerment of employees to take responsibility of how work is organised within their units and the adoption of flat corporate structures with self-directed teams as advocated by Lean proponents (Womack et al., 1990) should all create the sense of autonomy. Research suggests that autonomy leads to job satisfaction, retention and performance (Lange, 2012).

2.5.6 Lean and worker job stress

By design, the implementation of Lean techniques is reliant on several changes to the design of work systems. Some of these changes can create new psychological problems (e.g., job stress) while others have the potential to solve existing problems. One objective of Lean in a manufacturing setting is to improve flow and eliminate wasteful contingencies including people, materials and machinery (Conti et al., 2006). This is likely to create a high intensity work environment with zero slack and increased reliance on individual employees. Such an environment is prone to psychological issues such as job stress. On the other hand, Lean promises the elimination of wastes through quality assurance (such as the need to rework customer returns). It also promises better communication and better flow across the production chain. This can potentially reduce employee levels of frustration, and hence, enhance psychological welfare.

Several studies have investigated the psychological impacts of Lean implementation on employees by, for example, looking at whether Lean implementation increases employee stress levels (Conti et al., 2006; Dellve et al., 2015). Stress is generally perceived as physiological

and psychological reactions occurring when an employee meets a challenge for which they consciously or subconsciously perceive as beyond their immediate capacity (Conti et al., 2006, p. 1014). Conti et al. (2006) study the impact of Lean production on worker job stress (mental and physical). The study polls 1,391 workers at 21 sites across 4 different UK industrial sectors. The researchers conclude that Lean production is not inherently stressful, job (mental and physical) stress arises from management decisions in designing and operating Lean production systems. Similar conclusions, i.e., Lean does not lead to increased physical, cognitive and mental stress, have been reached by Dellve et al. (2015).

2.5.7 Lean and employee workload

Workload distribution and manageability is critical to organisational efficiency, output and performance but also to employee health and wellbeing in the workplace. Low workloads lead to inefficiency as many more staff will be required to generate the same output. High workloads lead to employee strain, job dissatisfaction, employee turnover and poor performance. Hence, balancing workloads is critical. The relation between Lean and employee workload has been investigated in various contexts (Holden, 2011; Lewchuk and Robertson, 1996; Landsbergis et al., 1999; Sprigg and Jackson, 2006).

In a study of call centre employees, Sprigg and Jackson (2006), for example, find that the introduction of Lean created new tasks such as dialog scripting and performance monitoring; this in turn, led to lower job control, lower task variety, lower role clarity, lower skill use and higher workload. This negatively impacted on employee outcomes by creating job strain, anxiety and depression (Sprigg and Jackson, 2006). Studies by Dickerson et al., (2008, 2009) suggest that sometimes this increased workload that comes with Lean adoption is created by employees, not necessarily imposed on them by their superiors. They find that workers tend to take on extra responsibility in a bid to improve on their work – this extra responsibility leads to higher workload (Dickerson et al. 2008, 2009).

2.5.8 Concluding remarks

Section 2.5 has explored some employee-related issues in Lean with a focus on employee motivation, job satisfaction, retention, autonomy, job stress and work load. In summary, the extant research suggests that Lean has significant impacts on these employee-related aspects, although the direction of impact (positive or negative) is not always clear. More research is required as these issues can determine the success or failure of Lean initiatives as discussed in Section 2.4. The next section explores Lean research in various sectors including

the manufacturing, service and public sectors. It sets the scene for the discussion of Lean in HE- the context of the current research.

2.6 Lean across different sectors and industries

2.6.1 Overview

The purpose of this section is to provide an overview of Lean research across different sectors and industries, primarily, manufacturing, service and the public sector. Issues that have been discussed in previous sections are not duplicated, but simply referred to. Where possible, the review explores research looking at soft (employee-related) issues in the specified context. These discussions will allow the researcher to then discuss research on Lean in HEIs in the next section (section 2.7).

2.6.2 Lean in the manufacturing sector

Much of Lean research has been conducted in the manufacturing industry (see, sections 2.2 and 2.3). Prior Lean research in the manufacturing sector explores the proliferation, implementation and impact of Lean management. Several studies have looked at the impact of Lean adoption on different outcome variables (e.g., performance), with most agreeing that Lean adoption results in net benefits such as a positive impacts on performance (Chavez et al., 2013; Arlbjorn and Freytag, 2013; Bamford et al., 2015; Secchi and Camuffo, 2016; Hadid et al., 2016; Marodin et al., 2018; Ghobadian et al., 2018). For example, Chavez et al. (2013) studied 228 manufacturing companies in Ireland. Their results show that Lean adoption has a positive and significant impact on delivery, quality, flexibility and cost. Consistent with this view, Piercy and Rich, (2009) note that Lean manufacturing directly generates benefits in terms of lower inventory holding costs, reduced write-off costs on perishables, better ability to manage unpredictable customer demands. Similar conclusions have been drawn by Kroes et al. (2018) who assess operational Leanness (achieved through inventory and capacity slack reduction) in US retail firms over a 35-year period. The study contends that Lean thinking explains the performance of retail firms i.e., Leaner firms are associated with improved performance. A few studies have reported mixed effects (see, for example, Eroglu and Hofer, 2011; Jackson and Mullarkey, 2000), where other variables (such, as the nature of work) moderate the relationship between Lean adoption and performance. Isaksson and Seifert (2014) document a non-linear relation between inventory Leanness and performance, while Kesavan and Mani (2013) document a non-linear relation between inventory levels of US retailers and their next-period profitability.

The current research deviates from the above strand of research by focusing on the soft-side (employee-related issues) of Lean. A few prior studies have explored the soft side of Lean within the manufacturing sector. Only a handful of studies have explored the impact of Lean on employee wellbeing and this issue has been largely ignored in recent research (Womack et al., 2009; Saurin and Ferreira 2009). Hasle et al. (2012), for example, find that Lean adoption has a negative effect on working environment, employee health and employee well-being for employees involved in low complexity manual work. Their conclusion is drawn from a review of 11 papers discussing the subject. Other recent papers (such as Azedegan et al. (2013) and Moyano-Fuentes and Sacristan-Diaz (2012)) have investigated the effect of environmental and geographical contexts on Lean practices. Azedegan et al. (2013), for example, conclude that the external operating environment (in this case, environmental complexity and dynamism) impacts on the success of Lean programs. This line of research highlights the potential moderating effect of external factors (e.g., operating environment, regulation, customs and traditions, culture) on Lean deployment. The table (Table 2.6.1) below presents key findings on the soft side of Lean from across different studies.

Table 2.6.1: Lean (soft) outcomes and impact on employee wellbeing

Researchers	Industry	Outcomes/impacts assessed	Impact on employee wellbeing (soft side of Lean)
Womack et al. (2009)	Car manufacturing	Work demands: Repetition, force and posture	Lean does not increase risk of musculoskeletal disorders (when a Lean plant is compared to a traditional plant). Faster work speed but lower use of force in Lean plants.
Saurin and Ferreira (2009)	Equipment (Harvesters) manufacturing	Working conditions; nature of work, pressure, intensity and job stress.	Perceived improvement in working conditions. Lean systems preferred to traditional by employees. Increases in work pressure, intensity and stress identified.
Jackson and Mullarkey (2000)	Garment manufacturing	Autonomy, work demands, social climate, and psychological well-being measures such as job-related anxiety and depression and job satisfaction.	Both positive and negative direct effects of team-working on aspects of autonomy, work demands, and social climate. Also finds both positive and negative direct effects of work design on psychological health. Combines to give no overall impact. Concludes that the balance between positive and negative effects of Lean production team-working

			depends on management choices in the form of work design.
Anderson-Connolly et al. (2002)	Manufacturing	Intensity, autonomy, skilling, teamwork, overload, role ambiguity, stress, job satisfaction, harmful behaviors, health, job control	For employees; impaired health variables related to intensity, skilling and teamwork. Improved health variables related to autonomy For managers, impaired health variables related to intensity and autonomy Improved health variables related to teamwork and skilling.
Brenner et al. (2004)	Cross-industry (large survey)	Cumulative trauma disorders	Cumulative trauma disorders associated with quality circles and JIT
Lewchuk et al. (2001)	Car manufacturing or automotive industry	Control over work methods, work pace, breaks, work intensity and pressure, physical workload, awkward positions, physical pain, feeling tense, exhaustion	Explores physical pain and exhaustion, feeling of tenseness, stress across several companies implementing Lean. Impact of Lean varies across companies and between countries, and is a function of management's capacity to shift to new standards and labours ability to protect its interests.
Bruno and Jordan (2002)	Car manufacturing	Satisfaction with a number of company policies, working environment, and job satisfaction	Impairs commitment, increases depression levels, and impairs self-efficacy.
Parker (2003)	Car manufacturing & assembly	Work characteristics: job autonomy, skill utilization, participation in decisions, role overload outcomes: commitment, job anxiety, job depression, role breadth, self-efficacy	No significant correlations with job-related strain and job satisfaction
Schouteten and Benders (2004)	Bicycle assembly	Completeness, cycle time, difficulty, autonomy, interaction, information Outcomes: commitment, need for recovery, job satisfaction, physical health, emotional strain	Impairs commitment, reduces job control, work is monotonous and repetitive, but leads to lower errors (because of routinized work not continuous improvement). While job satisfaction is low, intension to resign is also low as workers have limited job prospects out of their current roles.
Seppala and Klemola (2004)	Metal industry	Experience with change management, job content, social relations, health and well-being	Increased opportunities for participation, worker control and learning. Combination of sociotechnical and Lean thinking leads to development

			of more challenging and enlarged jobs. Job satisfaction and stress varies depending on whether workers are blue collar (lower stress) and white collar (higher stress).
Conti et al. (2006)	Metal industry	Physical and mental stress	Significant correlation between Lean and stress. Work intensity, resource removal, long hours. Short cycle time, doing work for absent employees, blame on ergonomic constraints, lack of tools. Teamwork, task support, participation in process improvement.
Godard (2001)	Cross industry survey (with good representation from goods manufacturers)	Belongingness, task involvement, empowerment, workload, stressfulness, fatigue, self-esteem, job satisfaction, commitment, motivation, citizenship	Moderate level of alternative work practices including Lean elements' results in positive impact on Job satisfaction, self-esteem, motivation, commitment, citizenship, belongingness High levels of AWP increased stress.

The studies reviewed above have looked at the impact of Lean on various employee wellbeing variables including; stress, anxiety, depression, job satisfaction, motivation, workloads, self-esteem, commitment, health, need for recovery, amongst several others. Clearly, the impact of Lean on employee wellbeing (i.e., soft side of Lean) is not direct, with several studies showing either positive or negative effects. The results suggest that various factors including management, firm, culture, industry and country factors, mediate the effect of Lean on employee wellbeing.

2.6.3 Lean in the service sector

As noted by Hadid and Mansouri (2014) Lean service is a relatively new concept when compared with the traditional notion of Lean manufacturing. Osborne et al. (2013) highlight three main characteristics of services which makes them different from goods and generates new challenges for their management. These include; intangibility, simultaneous production and consumption, and end-users (or customers) as co-producers of services. The intangible nature of a service means that ascertaining whether customer outcomes are met (intended benefits are attained) is more of a challenge. Drawing on prior research, Radnor and Osborne (2013) note that, while customers expect a service to be fit-for-purpose, their judgement of the

quality of service is based not only on outcomes but also on the congruence of their expectations and their experience of the service delivery process. In the development of their service-dominant theory of service management, they concur that 'influencing and understanding a user's expectations of a service is fundamental to their experience of, and the satisfaction with, that service – and that this experience then affects quite profoundly the effectiveness and impact of that service' (p. 277).

The simultaneous production and consumption of services (co-production of services) throws new challenges to the applicability of Lean in this context. Drawing on the example of reducing unit costs of a product to release capacity to grow the business – something which can be achieved in Lean manufacturing – prior research contends this cannot easily be achieved in the context of service provision (Radnor and Osborne, 2013). This is because service quality relies on front-line staff, their knowledge and skill (labour and quality of labour). A reduction in any input (such as labour or the quality of labour) in service provision in an attempt to reduce waste may directly lead to a reduction in the quality of service – and hence, a failure of Lean initiatives in the service context (Radnor and Osborne, 2013). Indeed, in the service industry, Lean adoption should be driven by the desire to increase service quality and not solely to reduce cost (Makarem and Al-Amin, 2014; Matthias and Brown, 2016). Whether this is the case in practice is debatable. Drawing evidence from the health care sector, Roemeling et al. (2017) point out that Lean suffers from a narrow application in service sector – a focus on the reduction of obvious waste – without due regard for more complex forms of waste such as variability and buffers.

Finally, Radnor and Osborne (2013) contend that the co-production nature of some services influences the quality and delivery of the service. Here, the customer participates in the production of the service. In the case of education for example, an unprepared student is unlikely to see the benefits of a lecture. Hence, the student's preparedness directly impacts on his/her perception of the quality of the delivery. The three issues discussed above pose new challenges to the implementation of Lean in the service delivery context.

Despite these challenges, proponents of Lean service generally argue for the applicability or transfer of traditional Lean concepts to the service industry. Some studies (e.g., Staats et al., 2011) have shown that Lean service achieves better performance outcomes when compared to non-Lean service. Indeed, Hadid and Mansouri (2014) conduct a comprehensive systematic review of the Lean service literature which analysed over 214 articles on the subject.

From the literature, Hadid and Mansouri (2014) identify 20 benefits of Lean adoption in services. These include; '(1) freeing staff time, (2) identification and elimination of waste, (3) improvements in capacity, (4) improvement in customer perception of product/service quality, (5) improvement in customer satisfaction, (6) improvement in employee satisfaction and their performance, (7) improvement in employee understanding of the process, (8) improvement in operational efficiency, (9) improvement in process flexibility, (10) improvement in productivity, (11) improvement in the organisation of work areas, (12) reduction in costs, (13) reduction in inventory, (14) reduction in lead time and cycle time, (15) reduction in reworks, (16) reduction in staff turnover and absenteeism, (17) reduction in the number of human errors, (18) reduction in work in progress, (19) savings in space, and (20) profitability' (p.762). Of these 20 benefits of Lean, it is evident that just 3 issues are related to the softer side of Lean. These include improvement in customer satisfaction, improvement in employee satisfaction and their performance and improvement in employee understanding of the process. Other issues such as employee grievances, worker stress and employee intrinsic motivation have not specifically been studied (Matthias and Brown, 2016).

Hadid and Mansouri (2014) find that the literature on Lean service is saturated or dominated by conceptual papers and case studies. They find that a majority of papers focus on Lean in the healthcare sector and office operations (see, for example, Radnor et al., 2012). Much less research has been conducted in the public-sector education. Piercy and Rich (2009) reviewed a number of articles which support the adoption of Lean manufacturing principles in non-manufacturing or service organisations. They note that Lean thinking can be used to forge closer (more beneficial) relationships with customers and suppliers.

Overall, research on Lean service suggests that the benefits of Lean manufacturing are transferable to the service industry, although the service industry faces unique challenges when applying Lean continuous improvement programmes.

Table 2.6.2: The benefit of Lean services: A review of the literature

Benefit of Lean services	Soft issue	References
Frees up employee time	Yes	Piercy and Rich (2009), Papadopoulos (2012), Bortolotti and Romano (2012), Hagan (2011), Hadid and Mansouri (2014), D'Andreamatteo et al. (2015)
Facilitates the identification and elimination of waste	No	Hines and Lethbridge (2008), Bortolotti and Romano (2012), Burgess and Radnor (2010), Hadid and Mansouri (2014), D'Andreamatteo et al. (2015)
Leads to improvements in the customer's perception of service quality	No	Piercy and Rich (2009), Hagan (2011), Hadid and Mansouri (2014), D'Andreamatteo et al. (2015)
Leads to improvements in customer satisfaction	No	Piercy and Rich (2009), Bortolotti and Romano (2010), Emiliani (2004), Hadid and Mansouri (2014), Roemeling et al. (2017)
Leads to improvements in employee satisfaction and/or performance	Yes	Piercy and Rich (2009), Hadid and Mansouri (2014), Gupta et al. (2016), D'Andreamatteo et al. (2015), Roemeling et al. (2017)
Leads to improvements in employee comprehension of processes	Yes	Piercy and Rich (2009), Hadid and Mansouri (2014)
Leads to improvements in operating efficiency	No	Bortolotti and Romano (2010), Hadid and Mansouri (2014), Gupta et al. (2016)
Leads to improvements in productivity	No	Bortolotti and Romano (2010), Hadid and Mansouri (2014)
Leads to improvements in the flexibility of processes	No	Bortolotti and Romano (2010), Chadha et al. (2012), Hadid and Mansouri (2014)
Leads to improvements in the organisation of work areas	No	Radnor et al. (2012), Hadid and Mansouri (2014)
Leads to cost and/or inventory reduction	No	Bortolotti and Romano (2010), Piercy and Rich (2009), Hadid and Mansouri (2014)
Leads to reduction in lead and cycle time	No	Piercy and Rich (2009), Hadid and Mansouri (2014), Roemeling et al. (2017)
Leads to reduction in absenteeism and staff turnover	Yes	Piercy and Rich (2009), Hadid and Mansouri (2014)
Results in a decline in work in process	No	Piercy and Rich (2009), Hadid and Mansouri (2014)
Leads to savings in space	No	Nielsen and Edwards (2010), Hadid and Mansouri (2014)
Leads to improvements in firm profitability	No	Bhatia and Drew (2007), Hadid and Mansouri (2014)

The above table (Table 2.6.2) suggests that the softer side of Lean has also been largely ignored in prior research on Lean in the service sector. Sprigg and Jackson (2006) explore the impact of Lean on work characteristics focusing on autonomy, workload, role conflict, skill utilization,

task variety, anxiety and depression. The authors find that Lean resulted in job-related anxiety and depression.

2.6.4 Lean in the public (including healthcare) sector

Compared to profit-making organisations, a considerably lower number of research articles have been published on Lean in the public sector. The public sector has traditionally been characterised by inefficiency, part of which is due to its key goal of providing essential services at no-to-low cost to the public (i.e., does not seek to generate a profit), it's very large size, its political agenda, and the seemingly unavoidable bureaucratic nature of its activities (Jerch et al., 2017; Burgess et al., 2017). The status quo appears to be changing rapidly across many nations, as new governments are increasingly banking on an agenda for change (as evidenced by campaign promises), one which promises to provide more for less by using tax payers' funds more efficiently to provide state of the art services. The UK is a prime example of this emerging trend.

The public sector (both UK and US) has seen a recent rise in the adoption of process improvement methodologies such as Lean and six-sigma (Schonberger, 2018; Antony et al., 2016; Barton, 2013). Radnor and Osborne (2013) trace the introduction of Lean in UK public services to 2001, when Lean initiatives were first adopted by the National Health Service (NHS). They note that that since 2006, such initiatives have been rolled out across several central government departments including HM Revenue and Customs, HM Court Services and the Department for Works and Pensions. Today, the implementation of Lean methods in public services spans institutions including Health, Armed Forces & Defence, Policing, central government and local government, amongst others. The need to reduce cost and increase quality, government agendas, the threat of competition, the need for service expansion, the demand for more efficient services, and the struggle with performance indicators account for the recent surge in the adoption of business process improvement methods such as Lean (Antony et al., 2016; Barton, 2013; Radnor and Osborne, 2013).

The surge in Lean adoption in the public sector has not been without its challenges. Radnor and Osborne (2013), note that, while there are several challenges surrounding the implementation of change programmes in public services, the following four challenges are unique to the implementation of Lean initiatives: An over-reliance on Lean workshops or rapid improvement events; a tool-kit type approach to Lean implementation, without an understanding of its underlying principles; public sector culture and structures (as

impediments); a lack of understanding of the centrality of the customer and the service process to Lean implementation (p. 270).

Much of the extant research Lean deployment in the public sector has focused on Lean in the public and private healthcare system (e.g., Radnor et al., 2012). In the case of the UK, this is perhaps because Lean is a widely used label for improvement programmes in the National Health Service (Matthias and Brown, 2016). Several studies exploring Lean within this context explore the motivations for Lean adoption by healthcare institutions, the challenges and limitations faced by healthcare Lean implementers and the key benefits of Lean implementation within this context. Panel A of Table 2.6.3 summarises some of the key motivations and benefits of Lean adoption in the healthcare setting while Panel B of the same table, summarises some of the key challenges facing implementers, as well as, the limitations of deploying Lean in this setting.

Table 2.6.3: Motivations, benefits, challenges and limitations of Lean adoption in healthcare settings

Factors	References
Panel A: Motivations for and benefits of Lean adoption in the healthcare sector	
To provide better services and improve service quality and customer satisfaction.	Hussain et al. (2015), Vest and Gamm (2009), Costa and Godinho Filho (2016), Crema et al. (2016), Kovacevic et al. (2016)
To eliminate waste and tasks that do not add value.	Al Balushi et al. (2013), Daultani et al. (2015), Collar et al. (2012), Waring and Bishop (2010), Grove et al. (2010)
To streamline and standardise health service processes.	Tay (2016), Fillingham (2007), Burgess and Radnor (2013), Langstrand and Drotz (2016)
To efficiently deploy (or reduce) staff and improve efficiency in administration.	Costa and Godinho Filho (2016), Radnor et al. (2012), Papadopoulos et al. (2011)
To enhance efficiency in processes and operations.	Radnor et al. (2012), Costa and Godinho Filho (2016), Efe and Efe (2016), Meredith et al. (2011), Abdelhadi and Shakoor (2014), Drotz and Poksinska (2014)
To reduce delays and improve operating (waiting) times.	Costa and Godinho Filho (2016), Abdelhadi (2015), Ishijima et al. (2016), Kovacevic et al. (2016),
Panel B: Challenges and limitations facing adopters in the healthcare sector	
Lean is a "foreign" concept being applied to the healthcare sector, hence challenging to implement.	Waring and Bishop (2010), Ishijima et al. (2016), Jorma et al. (2016), Kovacevic et al. (2016)
Lack of convincing empirical evidence on benefits of Lean (to convince top management)	Al Balushi et al. (2013), D'Andreamatteo et al. (2015), Grove et al. (2010)
Resistance to change from managers and employees	Eriksson et al. (2016), Papadopoulos et al. (2011), Esain et al. (2008), Kim et al. (2006)
"Silo" mentality and lack of cross-functional coordination	Young and McClean (2009), Rawson et al. (2016), Villa (2010), Cima et al. (2011)
Limited in-depth knowledge of appropriate tools and techniques to adopt from the broad set of tools available.	Meredith et al. (2011), McIntosh et al. (2014), Drotz and Poksinska (2014)

Consistent with Table 2.6.3, a systematic review conducted by Antony et al. (2019) and covering 101 articles from well-regarded journals concluded that the key motivations for Lean deployment in healthcare settings were to improve the quality of services, enhance process and operational efficiency, transform organisational culture, streamline processes, reduce delays, improve performance and competitive positioning, eliminate waste (including staffing and administrative inefficiencies), amongst others. This is consistent with the findings of some of the prior studies exploring Lean within this setting (Costa and Godinho Filho, 2016; Crema et al.,2016; Kovacevic et al., 2016; Tay, 2016; Fillingham, 2007; Burgess and Radnor, 2013; Langstrand and Drotz, 2016; Meredith et al., 2011; Abdelhadi and Shakoor, 2014; Drotz and Poksinska, 2014). These motivations are consistent with those driving Lean adoption in the service and manufacturing sectors (Piercy and Rich, 2009; Bortolotti and Romano, 2010; Emiliani, 2004; Hadid and Mansouri, 2014; Roemeling et al., 2017).

Antony et al. (2019) identify some of the major challenges facing Lean implementers in the health sector. They note that Lean remains a foreign concept in this area and hence, getting the required buy-in and commitment from top management and employees remains a monumental challenge. Next, there is scant empirical evidence documenting successful Lean deployment in this sector and hence, making it difficult to build the case for Lean. Resistance to challenge, lack of cross-functional integration and limited knowledge on selecting the best tools from the Lean tool-box present further challenges to successful Lean deployment in the area.

Other researchers (Papadopoulos et al., 2011; Matthias and Brown, 2016) argue that Lean implementation (for example, in the UK National Health Service) remains a challenge due to a strong focus on the application of Lean tools rather than the Lean philosophy (Matthias and Buckle, 2016). That is, limited attention has been paid to the importance of softer issues (further discussed in section 2.3.3). Some of the studies looking at Lean in this sector consider patients as analogous to materials on the assembly line, thus focusing on ways in which these 'materials' can be processed most efficiently (or with minimum waste). This analogy allows for the adoption of standard Lean manufacturing tools such as process mapping in the identification of waste and inefficiency in the system (Massey and Williams, 2005; Piercy and Rich 2009).

The general message from Lean research in the public sector is mixed. Radnor et al (2012) provide two reasons why the public sector constitutes a special case. These include (1)

the customer (residents) and commissioner (the government) are different hence 'customer value' becomes an unclear and conflicting concept, and secondly (2) Public services (such as healthcare) are capacity-led implying that demand cannot be easily influenced and excess capacity cannot be easily utilised. There is evidence attesting to the success of Lean programmes in public services. HM Revenue and Customs, for example, saved over £400 million from introducing a Lean initiative – its Pacesetter initiative (Radnor and Osborne, 2013). Nonetheless, the authors criticised this particular programme as '…'picking the low hanging fruit (and windfalls!)' of public management reform' (p. 275). Their central argument for this assertion is that, while making a saving is important in its own right, Lean is not primarily a cost-cutting strategy. Lean success should be measured in terms of the programme's effectiveness in supporting or facilitating the delivery of end-outcomes to service users and the extent to which it improves the quality of life of such users.

2.7 *Implementing Lean in HEIs: The Case of the UK*

2.7.1 Overview of prior research on Lean in HEIs

Lean management appears to be a more 'foreign' concept in management of HEIs. Klocinski (1999), Coate (1992) and Waterbury and Holm (2011), amongst others have discussed some of the reasons why this has historically been the case. Waterbury and Holm (2011), for example, argue that six major barriers (including language or terminology, lack of quality knowledge, time commitment, financial resources, lack of quality metrics and the absence of a formal reward system) account for slow adoption of Lean concepts in HEI. Universities are, perhaps, institutions with very complex structures. Several universities are organised into faculties which are subdivided into departments and further into programs. Different programs sometimes pursue different projects which are run by autonomous teams. Universities also generally have different management bodies such as committees which oversea different cross-function/departmental/faculty projects. This creates a complex web around which different subcultures are likely to emerge. It is therefore interesting to explore the implementation and impact of Lean within such a context. A few studies have looked at Lean in higher education (Comm and Mathaisel, 2003; Emiliani, 2004; Hines and Lethbridge, 2008; Taylor, 2012; Radnor and Bucci, 2012; Thirkell and Ashman, 2014; Antony, 2014; Francis, 2014; Svensson et al., 2015; Balzer et al., 2016; Lu et al., 2017, Ciancio, 2018, Gupta et al., 2020). Some of the issues raised in these studies are discussed in this section.

2.7.2 Challenges of implementing Lean in UK higher education

In the context of Lean management, UK HEIs appear to share certain similarities. Particularly, the 'end-customer' cannot be clearly identified and the 'production-lifecycle' is unusually long. Notwithstanding, UK HEIs cannot be unambiguously identified as a homogenous group given the significant differences in orientation and historical background. These two factors (i.e., unidentifiable end-customer and an unusually long production-lifecycle) make UK HEIs a unique setting to explore Lean adoption, the process of Lean implementation and the factors moderating Lean implementation and Lean maturity. These factors are briefly discussed below.

2.7.2.1 Research-led versus Teaching-led universities

A dichotomy has recently emerged with universities being classified as research-led (particularly, Russell Group universities) versus teaching-led universities. While the origins and applicability of the terms are unclear, a clear distinction can be made by examining the research funding that each university attracts. Heavy dependence on research funding suggests that 'students' (i.e., teaching income) are unlikely to be the primary customers for research-led universities. Another perspective is that these universities can competitively generate income from both streams; research and teaching. That is, research reputation can allow them to attract high numbers of good quality students, ensuring that they also generate sufficient income from their teaching activities. Teaching-led universities, on the other hand, are likely to generate most of their income from students, – hence, their primary customer group. Indeed, in the first year of TEF rankings in England (Office for Students, OFS, 2019) a number of Russell Group universities including London School of Economics and Political Science, University of Liverpool, and University of Southampton were awarded Bronze (the lowest) status while a number of teaching-led universities including Coventry, de Montfort university, Kent and Keele (amongst others) were awarded the Gold (the highest) status. It will be interesting to observe in near future how TEF rankings influences student numbers and income of Russell Group and teaching-led universities.

2.7.2.2 The long service life-cycle

Unlike a traditional product or service, education as a service or product takes a long time to be delivered. Students and staff work collaboratively for a long period of time (3-4 years for an undergraduate programme, 1-2 years for a postgraduate programme, and over 3 years for a research degree). This long cycle means the perception of service quality and value

to the customer (the student, in this case) is likely to change over time. Indeed, a number of universities including Buckingham, Derby, Middlesex, Plymouth, Northampton, Hertfordshire, amongst others, are now offering more streamlined (2 year) UG degree programmes which promise to increase value to students (save cost, speed up delivery). Clearly, universities are seeking to be more efficient in their activities and processes. Perhaps, Lean has a role to play but very little research has been done on the suitability or role of Lean in the modern university.

2.7.2.3 History and culture: Ancient, Red Brick, Plate Glass and New universities

Another distinction between UK Universities can be made by looking at the historical backgrounds of UK HEIs. This is, perhaps, vital to our understanding of Lean adoption, as processes, procedures and structures in most UK HEIs are likely to be shaped by their historical backgrounds, influences and traditions. As discussed in Whyte (2006), UK universities are generally classified by age within one of several categories including Ancient universities (pre 19th century), Red-Brick universities (Victorian era), Plate Glass universities (mid-twentieth century) and New universities (post-1992). The older universities are likely to be more established and more prestigious (Whyte, 2006), perhaps, making it easier for them to attract prospective students. These universities are also likely to place great emphasis on their cultural heritage and values (Whyte, 2006)—the way things are done here—with unclear impacts on Lean implementation efforts. This will result in high resistance to change initiatives (such as Lean implementation). Hines and Lethbridge (2008), for example, looking at Lean implementation in Universities, find that older universities were more resistant to change (or at best, slow to implement change initiatives). This is, perhaps, due to long standing, established structures, processes and procedures ingrained in the culture of these organisations. For some institutions, these culture, structures, processes, procedures that have been around for decades, are what makes them unique and stand-out from the competition—i.e., their competitive advantage.

2.7.2.4 The HE customer dilemma

The implementation of Lean generally focuses on streamlining operations to efficiently meet the needs and value considerations of the end customer. Successful implementation of the philosophy therefore requires the identification of end customer. Lean implementation in HE is complicated by the fact that the customer of HE is not exactly clear and at best, very diverse. The key question to answer here are 'who are the customers and what do the customers want?' The HE customer is unlike the traditional customer. Students appear to be the primary/direct

customer as they pay for and experience the provision of the service (Mergen et al., 2000; Wallace 1999; Vijaya Sunder 2016). If the student is considered as the 'customer', arguably, the focus of Lean management will be limited to continuously improving the student experience – from when they seek admission into higher education to the point when they graduate from these institutions. The identification of students as the HEI customer is, perhaps, a limited view (Owlia and Aspinwall, 1996; Kanji et al., 1999). In a broader sense, different parties including students, staff (internal service units), sponsors, the government, funding bodies/councils, employers, donors, research commissioners (i.e., those who commission research into specific issues), can be considered as 'customers' to UK HEI. Radnor and Bucci (2011), for example, find that respondents did not consider students as pure 'customers' in the traditional sense – those who pay for and receive a service. According to Radnor and Bucci (2011), students were said to engage with universities over a long period of time, during which they are taught (the service), they transform (the product) and after which they remain a part of the university over their life time (alumni). This argument allows students to be classified as partners (or co-producers of the service) rather than customers. The evidence from Radnor and Bucci (2011) suggests that it is unclear who exactly the customers of UK HE institutions are. There is therefore opportunity for further work to be carried out in this area.

The view of students as the primary customer is likely to apply to Teaching-led universities more than it does to Research-led universities. Even so, contemporary Learning and Teaching approaches (such as those promoted by the High Education Academy) position students as collaborative learners (co-producers of knowledge) rather than conformist consumers and encourages the promotion of independent learning, guided by teaching staff.

Consistent with the contentions of Radnor and Bucci (2011), Emiliani (2004) argues that in HEI context, sponsors (employers) and students can both be regarded as the customer but what is more important is defining what is perceived as good value by the customer. The researcher notes that factors such as price, time commitment, school reputation and the course quality could be indicators of value in this setting. If this is the case, Lean management should focus on delivering this value to the customer in an efficient manner.

Much of research in Research-led institutions is funded by Research Councils UK (e.g., Economic and Social Research Council, Medical research Council, Arts and Humanities Research Council, etc.) and EU research funding bodies (e.g., European Research Council) on a competitive basis. Within this context, HEIs have the task of attracting and retaining high

quality research active staff. This might suggest that, to an extent, both the government and staff (at least, research-active) can be considered as customers to such institutions. The role of universities is also to prepare graduates by empowering them with the skills, knowledge and ability to take on future roles within companies. In this sense, graduates can be considered the product and employers can be considered as the customer.

Even when students are considered as the end customer, the service is multidimensional. For example, Borden (1995) notes that student satisfaction is related to both student priorities and the campus environment while Elliott and Shin (2002) contend that the Noel-Levitz student satisfaction inventory with over 11 dimensions (including academic advising effectiveness, campus climate, campus life, campus support services, concern for the individual, instructional effectiveness, recruitment and financial aid effectiveness, registration effectiveness, campus safety and security, service excellence and student centeredness) captures HEI student satisfaction. Implementing Lean given the broad nature of the needs of the end customer can therefore present a significant challenge.

2.7.3 Case studies of Lean implementation in UK HEIs

It is worth noting that several UK universities are now adopting Lean practices, perhaps, explaining why a growing stream of research explores Lean in Higher Education (Emeliani 2004, 2005; Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017). Radnor and Bucci (2011), for example, explores the adoption of Lean management at five UK HEIs including Nottingham Business School, Cardiff University, Portsmouth Business School, Warwick Business School and the University of St. Andrews. The University of St Andrews compiles a database of Universities which are self-reported to be using Lean methodologies within dedicated Continuous Improvement teams. UK universities in this database are listed below:

Table 2.7.1: UK Universities implementing Lean (University of St. Andrews Lean Consulting, 2018)

1. Aberystwyth University	13. The University of Lincoln
2. Caledonian University	14. The University of Manchester
3. Cardiff University	15. The University of Nottingham
4. Coventry University	16. The University of Sheffield
5. Edinburgh Napier University	17. The University of Winchester
6. Leeds Metropolitan University	18. University of Aberdeen
7. Loughborough University	19. University of East Anglia
8. Nottingham Trent University	20. University of Essex
9. Queen Mary University of London	21. University of Exeter
10. Stirling University	22. University of Portsmouth
11. The University of Edinburgh	23. University of St Andrews
12. The University of Glasgow	24. University of Strathclyde

This table presents the list of UK HEIs currently (2018) implementing Lean methods as documented by (Source) University of St. Andrews Lean Consulting (http://standrewsLean.com/the-university-of-st-andrews/).

The data reveals that 24 of the 132 recognised[8] UK universities (i.e., about 18.2%) have adopted Lean to varying extents. As discussed above, Lean has the potential to transform UK universities as its principles can be used to reduce waste and enhance customer value in this setting (Emiliani, 2004; Comm and Mathaisel, 2003). Comm and Mathaisel (2003), for example, contend that one Lean tool – Value Stream Mapping – can be used to reduce costs, improve quality and increase student satisfaction. They add that this could be in terms of improvements in scheduling and assignment of resources (space and people), improvement in productivity through adequate compensation, management of customer expectations, the reduction of waiting times for key services such as registration (for courses, events, graduations etc.), cafeteria services, the publication of results and transcripts, amongst others.

Despite its potential benefits within this setting, Hines et al. (2007) show that it was unusual for Universities to apply holistic methodologies like Lean to improve their services. The "business" of offering University education has become more competitive with local Universities facing stiff competition from their local as well as international rivals. Current cuts to UK University funding, a hike in tuition fees to the £9,250 (2017/18 academic year)[9] threshold and increasing calls for Universities to offer "value-for-money" to its students,

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[8] Universities UK, the body which represents UK universities reports 132 universities in its membership rota.
[9] The Higher Education Act 2004 allowed Universities to charge variable fees of up to £3,000 a year starting from academic year 2006/07.

perhaps, now places Lean on the centre stage. Nonetheless, there is still the expectation that survival of UK universities is not a function of efficiency (Taylor, 2012).

There have been a number of studies looking at Lean adoption by UK universities. Some of these studies have explicitly named the Universities involved (e.g., Radnor and Bucci, 2012) in the case studies, and others have not (e.g., Taylor, 2012). Further details of Lean adoption strategies in different HEIs (as documented in case studies) are discussed below. This detailed case study review is critical to understanding the context underlying the current study. The studies discussed below have been selected as (unlike others) they provide substantial details on Lean adoption across different (case-study) UK HEIs.

2.7.3.1 Hines and Lethbridge (2008) – anonymous cases involving one UK University.

Hines and Lethbridge (2008) discuss the implementation of a Lean project at two universities (one in the UK and the other in the US). They note that the UK University had just been through a recent merger and was reorganising to position itself as one of the global leaders in the sector. The goal of Lean adoption in this case was *to enable internal and external users to value services as being timely, responsive and uncomplicated…encourage and support the creation of a vibrant working environment where people are confident to act and innovate and pursue perfection'* (Hines and Lethbridge, 2008, p. 53). The project was led by two external change facilitators, supported by one internal team. The project was structured in two phases. The first focused on addressing *'the most critical aspect of a Lean transformation, which is to ensure that the strategic mission of the organisation is clearly defined, concise and excellently communicated to all'* (p. 55). In the second phase, the team focused on improving three key processes, namely; the purchasing method for low cash high volume goods, the provision of programmes and support to research projects (p. 55). The authors note that the University later built on the enthusiasm and experience from the project to develop follow on projects; one of which was to roll out state-of-the-art IT infrastructure which could potentially improve all processes, from teaching to research and administration. The second follow-on project targeted improvements in welfare with the hope of creating healthy, happy and enterprising employees.

The Hines and Lethbridge (2008) study documents some of the challenges of implementing Lean in this environment, primarily, resistance to culture change. While the researchers find that several staff in their case studies were enthusiastic about the promise of Lean, the academic environment tended to be more resistant (or harder) to change than

traditional Lean environments. For example, university staff members were uncomfortable with the idea of a 'customer' in the university setting. The research suggests that the resistance to change was likely to be more common in older universities, with strategic structures which are unfamiliar to rapid change.

On a whole, this study documents an emergent approach to Lean implementation in HE settings. The approach here started with a refocus (redevelopment, emphasis and internal marketing) of the strategic mission of the HEI. Once the mission was well communicated, the implementation strategy was then to focus on different sub-projects across different departments/functional areas. While, this is arguably a safer way to proceed with the implementation of Lean, Lean supporters might argue that the sub-project (i.e., focusing on improving different processes within the institution rather than improving the institution as a whole) approach is counterproductive. This is because it creates fragmentation, and does not support the holistic approach (i.e., end-to-end view of processes) which Lean very much advocates (Womack et al., 1990; Holweg, 2007). Lean philosophy requires that the customer, as well as, his/her perception of value (of a service) be first identified. It follows that the process of service provision be designed end-to-end to promote flow and assure value delivery to the end customer. The sub-project approach in the case (discussed above) is, perhaps, attributable to peculiar nature of HEIs; multiple 'customers' or stakeholders (e.g., students, government, funders, employees, companies etc.) each with a different need, addressed by different units within the organisation.

2.7.3.2 Taylor (2012) – A study of two (2) anonymous UK Lean adopters

The Taylor (2012) study explored two institutions (UK universities), both of which had adopted Lean. The researcher interviewed 15 individuals including senior university leaders, managers and academic staff at the two Universities, and summarise their key findings in the paper. These findings are summarised by looking at key drivers of change, the motivation for adopting Lean thinking, transferring Lean to academic and administrative processes, identifying University's "customers" – those for whom value is to be created, strategic alignment and structural fit with University strategy, leadership requirements, the impact of culture, the benefits of Lean, critical factors for success, and how Lean behaviour can be sustained within this setting (Taylor, 2012).

In terms of the drivers of change, the Taylor (2012) study shows that the drive to adopt Lean was internal although external pressures provided an important context and an impetus

for change. An example, discussed in Taylor (2012), is the merger of one of the Universities with another institution that led to several inefficiencies and service duplications that needed to be addressed. Perhaps, given the timing of the study, other factors such as the reduction of government funding to Universities, the increase in Tuition fees, competition between Universities to secure local and international students and increasing calls for Universities to provide a "value-for-money" service compounded the need for change.

The choice of Lean adoption seemed to be motivated by stakeholders within the institutions. For one of the Universities (University A), the choice of Lean (as opposed to other process improvement methods) seemed to have largely come from the leadership with Taylor (2012) citing the Vice-Chancellor and Pro-Vice-Chancellor as playing an important role in initiating change. Leadership in these institutions saw Lean as critical to their long-term success with a clear alignment to the Universities' vision and strategic objectives. Taylor (2012) also notes that the second university (University B) has substantial expertise in the field of Lean. Their faculty are acutely aware of the benefits of Lean in the service sector. Interestingly, the second institution is said to have experimented with using other business process improvement tools such as Benchmarking, Six Sigma and Total Quality Management. Their resolve to settle on the adoption of Lean was due to its simplicity. Taylor (2012) noted respondents describing Lean as "simple, jargon-free and non-statistical in approach" and a philosophy which is "easy to understand and easy to suit the University's requirements." Further, respondents argued that Lean was easily scalable, could be applied at any level within the University, its ideas were customer-focused, and its value-driven approach were likely to lead to the achievement of long-term sustainable change (Taylor, 2012).

While respondents noted that Lean could be applied at any level (academic or administrative) within the University, one of the Universities had only initially adopted Lean onto its administrative processes. The argument for this was the ease of implementation of Lean to administrative processes and the contention that the benefits in administration were likely to be more substantial and much more noticeable to its "customers". The respondents in the Taylor (2012) study collectively agreed that "students" were the primary end-customers of UK universities noting that other customers included parents, employers, the government, business and research funding institutions. Notwithstanding, Taylor (2012) noted that academics in one of the institutions had not widely accepted the notion of "students as end-customers". At the other institution, business language had been encouraged throughout the

University with phrases such as "customer service, corporate strategy, business improvement, efficiency gains", amongst others, commonly being used.

The traditional structure of the typical University may pose a challenge to the adoption of the Lean philosophy within this setting. By their very nature, most UK universities are enshrined in traditions and bureaucracy with a top-down command structure or decision-making process. This was highlighted by one of Taylor's (2012) respondents who noted that these institutions needed to change in order to meet the challenges of the future. These institutions are generally led by academics who are unlikely to be professional managers. One of Taylor's (2012) respondents lamented on the issue noting that a change in mind-set and culture especially at the top of the organisation was critical to successful Lean implementation at his/her institution. Notwithstanding, in one of the Universities, the Vice-Chancellor had a business background which appeared to have underpinned his commitment to the project.

In the second University – which adopted Lean only onto its administrative processes – the Head of the Administration had championed the project. The success of the Lean project in both Universities was driven by the use of small, highly committed and dedicated teams consisting of both academic and administrative staff, in different pockets of operations across the University. Perhaps, the use of such frontline teams with sufficient diversity reflecting nature of the workplace improved acceptance by reducing resistance to change. Taylor (2012) contends that these teams played a crucial role in terms of providing support to front-line managers implementing Lean within different departments and functions. These teams were dedicated to the Lean project which meant they were not distracted by other commitments within the University. To allow for coordination and to facilitate communication, Taylor (2012) noted that the teams were also based at the centre of the institution.

As noted above, culture (bureaucracy, tradition etc.) is a salient issue which might stifle the successful adoption of Lean within UK universities. For Lean to be successfully implemented and remain sustainable, the Lean philosophy needs to be woven into the very fabric and traditions of Universities. This implies a need for cultural change. One of Taylor's (2012) respondents noted that the benefits of Lean applications accrued by his/her University could potentially be lost if Lean behaviours were not sustained through transformational and cultural change. The respondent argued that this required sustained face-to-face and effective communication with all stakeholders. The perception is that effective communication is likely to generate long-term motivation and commitment of all staff. This, added to the eminent

benefits of Lean, has the potential to encourage staff to sustain behaviour. Sustainability also requires the belief in Lean principles to be passed from one manager to another in times of management change, for example, when a new vice-chancellor is appointed. Besides these core challenges, Taylor (2012) found that the Universities were also in pursuit of other change programmes. Such competing priorities may limit the attention and allocation of resources to Lean programmes with a detrimental effect on their success.

The benefits of Lean in the University setting are presumably vast. In Taylor's (2012) first case study the benefit of lightening staff burden by reducing waste and improving process flow was cited as one of the main benefits. This frees up staff time which can then be used to support and enhance other value-adding activities such as teaching and research. The second case study cited more generalist benefits including the achievement of sustainable cultural change which will allow the University to improve efficiency in procedures, services and processes. In both cases, the institutions expected that the reduction of waste and improvement in efficiency could translate to financial savings in salary and other costs, but noted that these were not primary motivating factors.

Taylor's (2012) study suggests that the critical success factors for Lean implementation within the UK institutional context include organisational readiness and active support from senior management. Both institutions used senior management and high-ranking University officials to achieve "buy-in" from staff. The presence of these leaders in project committees created the impetus and gave the project the importance which facilitated its adoption by staff.

In summary, the study highlights the importance of Lean thinking and the adoption of the Lean philosophy within the UK higher education setting. Drawing from staff from the two universities, Taylor (2012) highlights the benefits of Lean and the practical challenges of implementing Lean within this setting. The study also highlights the uncertainty surrounding the long-term prospects and sustainability of Lean efforts in these institutions. The need for culture change as well as the need to transfer the belief in Lean principles from one management to the next in times of management change were highlighted, as respondents generally felt that gains were fragile and would need to be sustained through a concerted effort.

2.7.3.3 *Thirkell and Ashman (2014) – A study of Lean thinking in HRM at an old and a new (UK) University*

Thirkell and Ashman (2014) conducted two in-depth case studies into Lean thinking at two anonymous UK higher education institutions. One of these was a traditional University

(Old University) and the other was a post-1992 University (New University). The two Universities had been involved with Lean for more than 3 years. The research process started with a preliminary document analysis reviewing internal reports, minutes from meetings, training materials and feedback sheets. This allowed the researchers to build a context which supported the development of interview questions. The researchers employed open ended questions which allowed them to gather data on unanticipated issues as they emerged. The data was analysed using a thematic approach. The thirty-four (34) interviewees from both Universities included senior managers, Lean facilitators, line managers and other employees impacted by Lean thinking. The first observation is the fact that at the Old University Lean was confined to administration function as it was perceived to be non-sellable to the academic function. Here, Lean training was compulsory and structured. In the New University, Lean was adopted University-wide and training events including company visits were voluntary but encouraged. In the two Universities, however, the focus was on soft elements of Lean implementation. The researchers summarised their findings under key themes including; communicating and understanding Lean, Lean implementation in the human resource function, and the limits to Lean in UK higher education.

For Thirkell and Ashman (2014), the adoption of Lean thinking was to allow the Universities to establish both a system and a culture change. That is, this involved both the adoption of policies and procedures that would allow for the elimination of bureaucracy and the adoption of efficient administration but also a change in individual attitudes and behaviours of staff. This was captured in interviewee responses, with some interviewees in senior management positions noting that the goal of Lean adoption was to focus on customer service, efficiency and quality. Other senior managers noted that the intention was to embed the Lean philosophy in the way things were done on a day to day basis, making it everyone's job to improve everything and for staff to take responsibility for efficiency and quality improvement in their different domains.

There appears to have been a divide between the perspectives of the implementers and those who were the recipients of Lean implementation (i.e., employees within the organisation). Thirkell and Ashman (2014) notes that these employees, whilst acknowledging that Lean raised people issues including empowerment and respect for employees (people), tended to overlook the broader people perspective of Lean. These interviewees saw Lean as the introduction of processes, tools and techniques aimed at reducing waste and improving operational efficiency. Interestingly, Thirkell and Ashman (2014) found that academics within

these institutions understood the theory of Lean but felt that it was irrelevant to the work they did – it encroached on their autonomy and stifled their creativity. In contrast, non-academic staff struggled with defining Lean but were clear on the contribution it could make. This suggests, perhaps, that the implementation of Lean in University administration departments is more straight-forward than its implementation in academic departments. The current study will therefore focus on Lean in HEI administration processes. Thirkell and Ashman (2014), however, attribute these differences in perception to problems in communicating Lean Thinking to staff involved. The researchers noted that much of the communication was done by different senior managers who had different understanding and perception of Lean. Use of standard terminology is seen to potentially generate resistance (Thirkell and Ashman 2014). Indeed, one interviewee in a management position noted that his/her subordinates were cynical and would resist Lean adoption if terminology was not toned down. The researchers attribute this to the image problem of Lean in public services.

Evidence from Thirkell and Ashman (2014) suggests that the adoption of Lean substantially changes work structures and the ways in which employees carry out work within Universities. Nonetheless, the study also asserts that the HR departments of the two universities had very little or no involvement in the Lean implementation. One source of resistance is the fact that the design of contracts of Academic staff meant that they could opt out without recourse. One respondent explicitly stated that the implementation of continuous improvement was not a condition or part of his/her role and did not comply with the public-sector framework agreement. The expectation is that HR will be able to resolve such issues.

Thirkell and Ashman (2014) noted that HR was deliberately by passed during the implementation of Lean thinking for two key reasons. First, facilitators viewed HR processes (training & development, performance management, job evaluation, reward and incentive) as barriers rather than enablers of Lean thinking implementation. The respondents and facilitators felt that HR processes themselves needed changing and improvement. The second reason advanced for side-lining HR in the Lean implementation process was the argument that HR lacked the ability to implement Lean through the University. Thirkell and Ashman (2014) noted that senior managers contended that HR failed to adopt strategic roles, were unable to accommodate new ways of thinking and were incapable of applying Lean thinking. This indicates significant mistrust of HR and its abilities. One respondent from the Old University however provided an alternative argument for the exclusion of HR. The respondent noted that the inclusion of HR would have changed the perception surrounding the programme to

something about staffing. The exclusion of HR meant that the perception was then about business improvement as a whole. This approach was perhaps going to face less resistance.

Thirkell and Ashman (2014) contend that in both case studies Lean had limited breadth of application, in terms of coverage across organisational functions and activities, and also limited depth of application, in terms of demonstrating change to working practices and measurable outcomes. In terms of breadth of application, Thirkell and Ashman (2014) found that Lean thinking at the Old University was confined to the Administrative (non-academic) functions and academic functions – presumably the core of the business of higher education – was shielded or left untouched. The situation at the New University was similar as most of the Lean efforts appear to have focused on the non-academic functions within the University. Besides the issues promoting this tendency already discussed, one of the respondents in Thirkell and Ashman (2014) also noted that faults or issues at the front line of service delivery (i.e., teaching) are not immediately evident and might only later manifest through high failure rates. Even then, it is unclear whether such failure rates can be attributed to front line service delivery by lecturers or to non-engagement by students.

Another respondent in the study noted that academics are integrally attracted to the notion of autonomy and independence in their teaching and research and hence, are likely to strongly resist efforts to change their models of working. Another viewpoint put across in Thirkell and Ashman (2014) is that academics resist Lean efforts as they are by their very nature critical – and are paid to be. Other issues such as the frequent use of measurements and quantification as a way of identifying waste, measuring performance and evidencing improvements, were also raised. One respondent argued that such a measurement regime was unsuitable for the academic environment. In general, it appears the resistance of academic divisions to adopt Lean generated problems of lack of coherence and coordination across the two institutions. This was because administrative staff frequently had to deal with academic staff and become uncertain as to when and where to adopt a Lean approach.

Whether the implementation of Lean in UK universities has actually impacted working practices is still subject to further research. Thirkell and Ashman (2014) noted that respondents in their study believed that Lean efforts had actually had very little effect on working practices and on overall organisational efficiency. As an explanation for this, the respondents noted that Universities were laden with inherent public sector characteristics such as hierarchy, bureaucracy and a silo mentality, which made it difficult to successfully embed Lean within

the institutional culture. The silo mentality appears to be a real eminent issue. One of the respondents in the study details the problem noting that lecturers in one department (e.g., Marketing) never get to speak to lecturers in other departments (e.g., Finance). These lecturers do not communicate across divisions and do not communicate with support staff. This lack of communication represents a significant impediment to Lean implementation.

Overall, the study argues that the implementation of Lean in higher education is stifled by the absence of clarity and engagement especially by academic staff. The researchers also highlight the exclusion of HR from Lean efforts as detrimental to Lean success. They note that the professional identity of academics and the tendency for academics to be disengaged with the Lean process remains a significant challenge to implementation in the University environment.

2.7.3.4 Radnor and Bucci (2011) – A study of five (5) Lean adopters

The Radnor and Bucci (2011) study involved a case study of five UK universities including (St Andrews University, Portsmouth Business School, Warwick University, Nottingham Business School and Cardiff University) which had implemented Lean. The researchers interviewed 7 respondents across these five institutions. These respondents held positions including the Dean of the Business School. Heads of Lean programmes, Faculty manager, Lean team member and deputy department manager. The interviews were semi-structured and were conducted over the phone. These interviews were then transcribed and analysed for common themes. Data was also collected through a survey consisting of 10 completed questionnaires.

Cardiff University, for example, implemented Lean management to complement the work of its established Lean Enterprise Research Centre of Excellence, allowing its undergraduate and postgraduate students to directly experience Lean in practice (Radnor and Bucci, 2011). The Lean project at Cardiff University was sustained through the recruitment of a Lean manager and the creation of a dedicated Lean University Team. The team employed a myriad of Lean tools and techniques including RIWs, Process Mapping, Value Stream Mapping, 5Ys, Fishbone Diagrams, Visual Management and Team information. On the other hand, Portsmouth Business School employed a more subtle approach by focusing on improving administrative processes within its finance and undergraduate centre. The Lean facilitators used simple tools such as RIWs, Process Mapping and Flow Charts to drive through their ideas for change. Here, there was no dedicated Lean management team and no budget allocation. The

Lean programme was run by two individuals who undertook Lean as part of their contractual duties, with no support from an external Lean manager. In the case of The University of St Andrews, a full external consulting firm was hired to drive through change.

Some of the key characteristics of Lean implementation (including the tools and techniques applied) at the various institutions as summarised in Radnor and Bucci (2011) are reported in the table (Table 2.7.2) below:

Table 2.7.2: Key characteristics of Lean implementation (Radnor and Bucci, 2011)

Institution	Project summary	Tools and techniques
St Andrews University	Started 2006, programme focused on whole University with input from Business School academics. Led and run by separate dedicated university team of five permanently employed staff. No outside facilitation is employed. Programme was initiated by business school academics from the University's Lean centre and was an opportunity for the Business School to put its teachings into action.	Rapid Improvement Event (RIEs), Process Mapping, Value Stream Mapping, Six Thinking Hats, Competency Framework, Log Frame Matrix, Nominal Grouping Techniques
Portsmouth Business School	Project started in 2010. Focus was on the business school with potential extensions to some central university administrative processes. Managed by a small team as part of their existing roles. Hence no dedicated team or budget. External academic brought in to act as project consultant	Rapid Improvement Workshop (RIW), Process Mapping, Flow Charts
Warwick Business School	Project started in 2007, Business School with extensions to central university. Dedicated project steering group to oversee project and manage budget. External consultants brought in to train internal facilitators.	RIW Process Mapping
Nottingham Business School	Project started in 2008. Focus on Business School with extensions into central university processes. Project led by Dean supported by business school executives. No external consultants used.	A3s, Root Cause Analysis, Fishbone Diagrams, Visual Management, Value Stream Mapping
Cardiff University	Project started in 2006. Programme focused on whole University with input from Business School academics. Led and run by separate dedicated university team to lead and run the project.	RIWs, Process Mapping, Value Stream Mapping, 5Ys (or 5 Whys), Fishbone Diagrams, Visual

		Management, Team Information Boards

Radnor and Bucci (2011) find that factors determining the success of Lean adoption in the cases studies included: (1) staff engagement in the process e.g., through participating in improvement activities, (2) training on Lean management and the use of Lean tools (3) the use of Rapid Improvement Workshops (RIWs) to develop and implement Lean solutions to challenges faced in different departments (4) the experience, enthusiasm and personalities (human factors) of those in charge of leading the Lean programme (5) the use of a dedicated Lean team (6) the enthusiasm and commitment (human factors) of front line staff implementing Lean process, and (7) the time and resources dedicated to the Lean programme.

Lean at these UK HEIs appears to be mainly driven by Business Schools, perhaps, due to Business School academics being able to identify opportunities for improvements through Lean adoption. As discussed earlier, one of the barriers to Lean implementation remains the lack of adequate skills and knowledge on Lean implementation. The data also reveals the lack of adequate support for Lean initiatives with no dedicated team and budget put in place to oversee Lean implementation at several of the institutions. Only a few institutions bring in outside consultants to facilitate Lean projects, with the role of consultants apparently limited to providing some initial training in a number of cases. Furthermore, the remit of some of the Lean projects is limited as they only focus on the business school and to related administrative processes. Hence, Lean projects in this environment appear to focus on tackling only superficial problems. Many of the cases are only very recent with several starting around 2006/2007. Hence, Lean in this environment appears to be at its infancy.

More recently, a number of studies (e.g., Antony, 2014; Francis, 2014; Svensson et al., 2015; Balzer et al., 2015; Lu et al., 2017) have also explored Lean in the HE context. Francis (2014) and Anthony (2014) are literature reviews, synthesising the findings from prior studies on Lean in HE. Other studies such as Svensson et al. (2015) have explored adoption of Lean in HE in a complex institutional environment (Saudi Arabia). Finally, Liu et al. (2017) discuss and establish the role of Lean in addressing some of the important challenges faced by HE institutions including retention rates, completion rates and rising cost of education.

2.7.4 Summary of Lean HEI research and key takeaways

The above section has discussed cases of Lean implementation in UK HEIs. Besides these studies, a few other studies have explored Lean in HEIs. Some of these studies (including those discussed above) and their findings (ordered by year of publication) are briefly outline in the table (Table 2.7.3) below.

Table 2.7.3: Summary of Lean HE research findings

Study	Focus	Key findings	Soft issues explored
Comm and Mathaisel (2003)	Developing a framework for sustaining Lean in universities (US context).	Distance (online) learning is akin to a "pull" strategy. Reduces cost and increases information flow. Lean has negative connotations to staff and students– budget cuts, retrenchment, reallocation, reform. Better coordination and integration between administration and academic is needed for Lean sustainability	No
Emiliani (2004)	Discuss the application of Lean in the design and delivery of a graduate business course	Lean leads to higher student satisfaction due to clearer expectations, less ambiguity, standard formats for assignments, spreading of assignments over the duration of the semester.	No
Hines and Lethbridge (2008)	Explore state of Lean adoption at universities	Lean adoption localised to teaching activities, and certain administrative process such as Finance, data processing and building maintenance. Complexity within this environment such as the notion of customer and added-value create challenges for implementing Lean.	No
Radnor and Bucci (2011)	Exploring adoption of Lean in UK HE.	Early days of Lean adoption, several opportunities for improvement. Fragmentation in Lean uptake but signs of engagement and embedment. Limited understanding of Lean principles. Driven by administrative and support staff. Focus on projects involving process redesign. Poor post-project monitoring.	No
Taylor (2012)	Explores Lean adoption in 2 UK HEIs - structural fit with University	Lean adoption spurred by competition amongst HEI and the need to offer value-for-money. Facilitated by interest	No

		strategy, leadership requirements, the impact of culture, the benefits of Lean, critical factors for success, and how Lean behaviour can be sustained within this setting	from top executives. Focused on key administrative processes. Bureaucracy and top-down structure of universities act as impediments to Lean success.	
Thirkell and Ashman (2014)	The role of HRM in facilitating Lean introduction in HEIs.	Several problems in understanding, communication and transferring Lean to the HE context. HR (function) professionals are generally excluded from Lean initiatives, limiting the depth and breadth of Lean initiatives.	No	
Francis (2014)	A literature survey of Lean adoption.	Recommendations for HE based on Lean in public sector. Lean links with the concept of a learning organisation. Key pillars are involvement, standardisation and stability. Important factors for successful implementation include; executive leadership, training and development of staff, knowledge management, information technology, project governance and the use of consultants.	No	
Antony (2014)	Explore readiness factors required for successful implementation of Lean six sigma in HE (literature review).	RFs include; leadership and vision, management commitment and resources, link to strategy, customer focus, selecting the right people.	No	
Svensson et al. (2015)	Explore Lean six sigma implementation in a complex environment (KAUST, Saudi Arabia)	Lean implementation led to improvements in business processes and efficiency. Success ensured through extensive training programmes with staff awarded yellow, green and black belts in Lean six sigma.	No	
Balzer et al. (2015)	Synthesis or review of prior research on Lean HE.	Evidence of Lean leading to improvements in academic and administrative processes. More need for longer term orientation in Lean implementation in this context.	No	
Balzer et al. 2016	Review literature on Lean adoption in HEI.	Lean has significant and measurable value when used to improve academic and administrative operations in HE. Leads to improvement at department and institutional level	No	
Lu et al., 2017	Explore role of Lean in addressing challenges	Results suggest that Lean has advantages and can potentially resolve issues relating to rising costs, quality of	No	

	faced in HEIs (literature review).	education, completion rates and retention rates frequently encountered in HEIs.	
Sunder and Antony (2018)	The study develops a conceptual framework for Lean implementation in HE.	The study confirms the applicability of Lean in HE, suggesting that the responsibility for deployment should be that of managers.	No
Kazanconglu and Ozkan-Ozen (2019)	Investigate and define the eight wastes of Lean philosophy in HEI	Sources of waste in business schools include; repeated tasks, unnecessary bureaucracy, errors because of misunderstanding/communication problems, excessive number of academic units and creation of an excessive amount of information.	No
Balzer (2020)	A book exploring Lean HE with a focus on how the value and performance of University process can be improved through Lean.	A practitioner's manual on Lean in HE. Extensive discussions of the case for Lean in HE, process of Lean implementation in HE, case studies (mainly from the US) of successful Lean deployment in HE, readiness factors for Lean implementation, guidance on the RIE, Lean in academics, gaining support from senior leaders, and challenges and opportunities for broader or university-wide adoption of Lean.	No
Cudney et al. (2020)	A systematic literature review conducted to identify the relevant opportunities for successful introduction and development of Lean in HE.	The introduction and implementation of Lean in HEIs may improve the quality of HE and add value that continuously enhances the customer (student) satisfaction. The systematic review also highlighted that extensive research was required for a comprehensive understanding of the applications, challenges, and benefits of Lean and Six Sigma in higher education.	No

The table summarises the focus and key findings from prior studies exploring Lean HE. From the review and case studies, it is evident that the impact of Lean implementation within these institutions and the level of Lean maturity achieved by these institutions is subject to debate and further research. Lean appears to be at infancy within most of these institutions, with a majority of them focusing on applying established Lean tools within their administrative departments (Fearn, 2010; Radnor and Bucci, 2011). Lean does not appear to be a strategic priority, judging from the resources (e.g., personnel) allocated to Lean initiatives. Most of Lean implementation in UK HE is fashioned through staff (as in the case of Nottingham Business

School) and management (as in the case of Cardiff University) training (Radnor and Bucci, 2011).

Arguably, all the implementing institutions face the HE customer dilemma and the unique feature of an unusually long service-long cycle. Interestingly, these institutions have different historical backgrounds and orientations which possibly shape their motivation for and the process of Lean adoption and implementation. For example, Portsmouth Business School is within a post-1992 university while St Andrews University is considered an ancient university. It is unclear how this heritage as well as other culture-related issues shapes Lean adoption and success in this context.

Clearly, the soft-side of Lean has been largely ignored in this context. That is, while this is still a new setting for Lean adoption, it is unclear how Lean impacts on employee outcomes or how softer issues shape Lean success within this environment. As seen on Table 2.7.3, none of the studies reviewed have explored the impact of Lean on employees in HEI. Further, most of the studies are based on systematic reviews of the literature. The most detailed write-up on Lean in HEI—a recent book by Balzer(2020)—also ignores the soft-side of Lean but provides a detailed guidance for practitioners seeking to deploy Lean with HEIs. The recent study by Cudney et al., (2020) highlighted the need for extensive research to facilitate a comprehensive understanding of the applications, challenges, and benefits of Lean in HE. The current research aims to address these gaps in the literature.

2.8 Research questions, related theory and framework

2.8.1 Relationships in the Lean environment: Lean and soft-issues

2.8.1.1 Overview of the Holden (2011) Framework

As discussed below, two of the four research questions underlying this study focus on the impact of Lean adoption on employee outcomes. The Holden (2011) framework (Figure 2.8.1) which is adapted in this study explains the channels through which Lean potentially impacts on employees and customers. As will be subsequently discussed in detail, the Holden (2011) framework is relevant to this research as it is directly linked to the third and fourth research questions. It is therefore preferred over several other frameworks that have been proposed in the literature (Schiele and McCue, 2010; Rose et al., 2013; Anand and Kodali, 2009; Achanga et al., 2012). Given that this framework is adapted for the current study, a brief review of the Holden (2011) study and a critical analysis of the framework is presented below while the framework is presented in Figure 2.8.1.

Holden (2011) arrives at his framework through a critical review of Lean implementation in emergency departments in the healthcare sector, with a focus on how Lean impacts healthcare employees (employee outcomes) and patients (customer outcomes). Overall, the Holden (2011) study analysed 18 articles (published between January 2005 and January 2010) exploring Lean initiatives in 15 emergency departments across the US, Canada and Australia.

The Holden framework (Figure 2.8.1) suggests that Lean can have both direct and indirect effects on employees and customers. From a review of the literature, Holden (2011) finds that Lean directly leads to improved patient outcomes including increased patient satisfaction, decreased rates of re-visits after discharge, increase patience tolerance of waiting and decrease patient frustration, amongst others.

Figure 2.8-1: Holden (2011) Framework
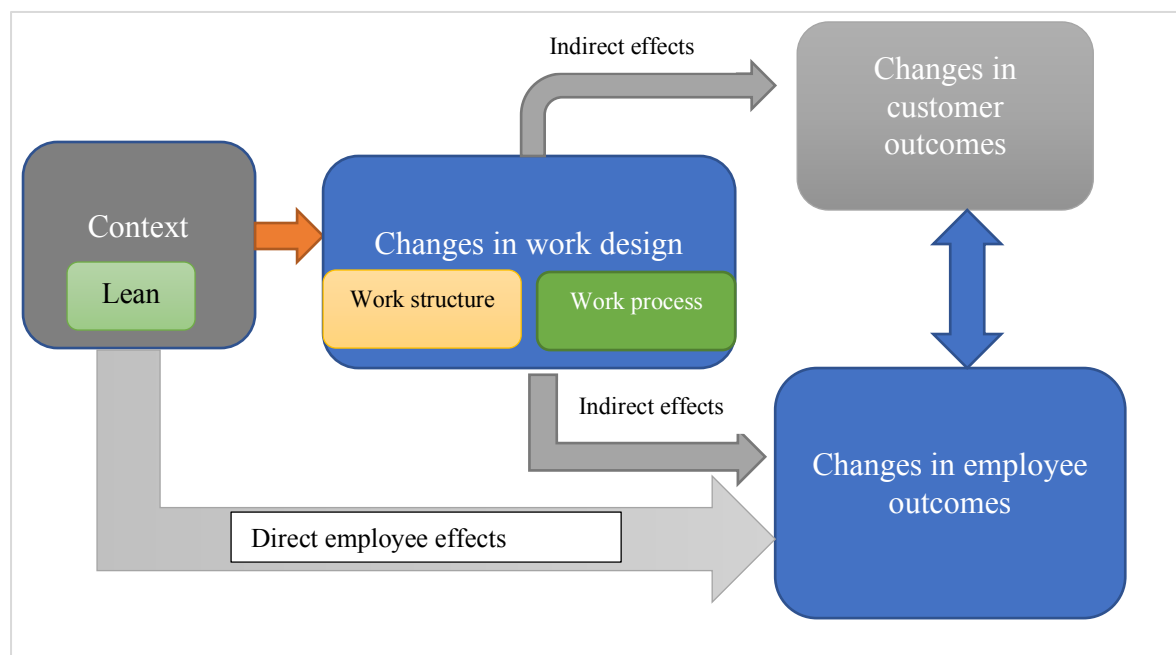
The indirect effects of Lean on patients (including decrease waiting times, increased rates of patient discharge and decrease length of stay in the emergency department, amongst others) occur through changes in work structure. Changes in work structure can come about as a result of process redesign (or changes) or system changes. For example, in the 15 emergency departments explored in the Holden (2011) study, process changes as a result of Lean included separate streaming of likely-admitted versus likely-discharged patients, script for calling ambulances, eliminating outdated policies, eliminating or combining steps in processes, new processes for "pulling" patients into inpatient wards, fast track process for low-complexity

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patients, amongst several others. System changes included data collection and monitoring (e.g., weekly review and public posting of outcome metrics), education and training (e.g., posting of process maps in public areas), new tools and technologies (e.g., Communication centre and dedicated nurse coordinator for communication about patient arrival and care) and staffing reassignment including new roles and responsibilities (e.g., new positions created for screening nurse and communication lead).

The Holden review also documents the direct and indirect impact of Lean on employees in emergency departments, but much of this was limited primarily because studies overwhelmingly focus on how Lean impacts customers(patients). That is, employees are generally ignored by studies exploring the impact of Lean on people (see, for example, Al Darrab et al., 2006; Kulkarni 2007, Parks et al., 2008; Stephens-Lee 2006, Woodward et al., 2007, amongst others). As will be discussed, the current study aims to address this gap. Indeed, in the Holden review only one out of 18 studies consistently cited the improvement of employee working conditions as an aim of Lean. This suggests a systematic tendency to underestimate the impact of Lean on employees.

While the Holden (2011) framework presents a systematic way of thinking about how Lean impacts on employees and customers, their framework is not supported by evidence on how Lean impacts on employees. Holden (2011) argues that the employee aspect is often neglected, impacts on employees are often not measured, and because undesirable effects can emerge, research exploring employee effects do not generally show up in the literature. This creates opportunities to further explore this issue using data from other settings like HEIs. Hence, this study complements Holden (2011) in this area.

Another issue with the Holden (2011) framework is the identification of direct and indirect effects. Holden (2011) argues that Lean can either influence employee outcomes directly (e.g., by influencing satisfaction) or indirectly (by changing work structures which in turn influence employee outcomes). The study does not provide sufficient support for the distinction between direct and indirect effects. Indeed, some of the effects (such as staff empowerment) identified as direct effects by Holden (2011) can also be seen as a by-product of changes in work design or process.

Finally, Holden's work focuses on emergency departments which can be considered as fast-paced, high turnover environments with the customer constantly changing (short customer lifecycle). Further, the service is solely produced and distributed by the emergency department.

By contrast, HEIs are characterised by a long customer lifecycle (e.g., students who may take several years to complete their degree programmes) and some of the main services (research, teaching and learning) are co-produced from the interaction between different groups of employees, students and other stakeholders. The framework's applicability beyond the context of emergency departments is therefore subject to further research.

2.8.1.2 Applying the Holden (2011) framework to explore Lean in HEIs

The Holden (2011) framework, perhaps, provides a simple way to think about how Lean impacts on key stakeholders, notably customers and employees. The current study however, only focuses on one key stakeholder—the employees, which had limited attention in Holden's study. The Holden's framework was adapted as the focus of this study in mostly on HEIs implementing Lean, the benefits realised and particularly, its impact on employees (i.e. linked to RQ3 and RQ4). The researcher therefore adapts this framework (see Figure 2.8.2) to guide the exploration of the impact of Lean on employees (with a focus on soft issues). The adaption (Figure 2.8.2) explicitly ignores the impact of lean on customers as specified in the Holden (2011) framework (Figure 2.8.1). As per the framework, Lean, when applied to the HEI context, leads to changes in work structure and process, for example, new streamlined processes which minimise waste. These changes in work process will have effects on employee outcomes. For example, changes in work process can influence; employee autonomy (e.g., through increased monitoring, continuous performance measurement, work scheduling), job stress and workload, which may in turn impact on employee motivation, job satisfaction and retention. Changes in work process will impact both external and internal customers (i.e. students and employees), presumably positively, through, for example, an improved and more efficient HEI administration service. Clearly, employee outcomes can impact on customer outcomes (this issue is however not explored in this study as it is not within the focus of this research).

Figure 2.8-2: Framework showing Lean relationships in HEIs
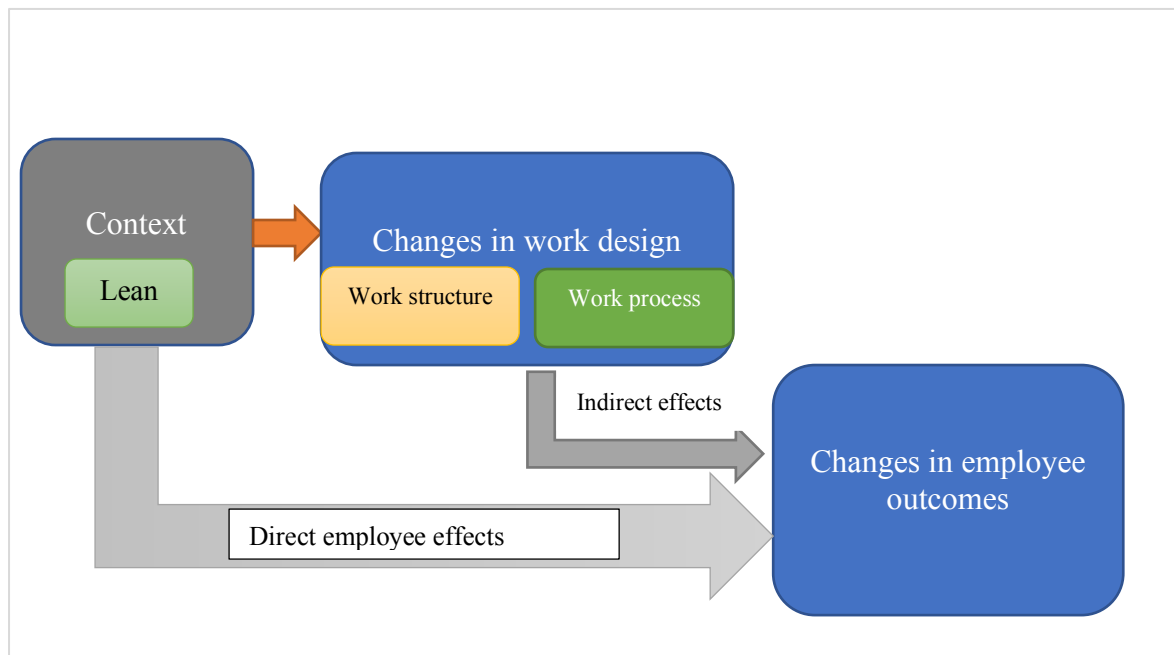
Adapted from Holden (2011)

2.8.2 Research gaps and statement of research questions

2.8.2.1 Research Question 1

While some research has been done on the subject of Lean in HEIs, several unanswered questions remain. Prior research suggests that several UK universities (HEIs) have adopted and implemented Lean programs. First, there is a need to explore the perceptions of implementers in regard to what Lean entails in this environment, the experience of current implementers, the motivations for adopting Lean, critical success factors of Lean implementation in the setting, and the process of Lean implementation. As part of this investigation, it would be worthwhile to explore the strategies that have been adopted by implementers or the adjustments that have been made to traditional Lean notions, to facilitate successful Lean adoption in this context. The first research question in this study addresses this issue. The question is stated as follows;

<u>To what extent have higher educational institutions in the UK adopted Lean management practices?</u>

2.8.2.2 Research Question 2

Secondly, and in relation to the first research question, there is need to explore whether the challenges facing implementers, as well as, the benefits derived from Lean implementation in the UK HEI sector mirror those faced and enjoyed by implementers in other settings such as manufacturing, services and public services (e.g., healthcare sectors). In this respect, the second research question is stated as follows;

<u>What are the benefits and challenges of adopting Lean in a higher education context?</u>

2.8.2.3 Research Question 3

Thirdly, several studies show that Lean fails due to people aspects (see section 2.4). There is limited research on employee-related issues generated from Lean adoption, particularly in the public sector. To the researcher's knowledge, no study has explored these issues in the context of higher education.

Holden (2011) suggests that Lean impacts on workers directly (e.g., motivation, satisfaction, retention) and indirectly through the redesign of work (structures and processes). Considering the indirect route as a starting point, the application of Lean tools or philosophy brings about change. The need to reduce waste or increase efficiency warrants a redesign of work systems. Generally, this redesign of work is likely to impact on employees and customers through improvements in quality and efficiency (Holden, 2011). The nature of the impact may vary from one setting to another and may depending on strategies adopted. Holden (2011) contends that most studies on Lean (in Healthcare) focus on how Lean impacts on customers, while ignoring Lean's impact on employees. Put differently, despite the apparent importance of employee issues, the soft-side of Lean is largely ignored in the Lean literature. To the researcher's knowledge, no study looking at Lean in HEI has touched on this issue. As discussed, the HE context is full peculiarities, particularly in terms of its organisational culture. The prior studies discussed here highlight some of the challenges facing Lean implementers in this context, particularly, the resistance from academic staff.

The third research question focuses on exploring how Lean changes work structures and in turn, how the resulting work structures impact on employee outcomes (soft-issues). The third research question is therefore stated as follows;

How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?

2.8.2.4 Research Question 4

Holden (2011) also notes that Lean adoption may have a direct impact on employees irrespective of its impact on work design. For example, the adoption of Lean may create uncertainty in the work place if employees perceive Lean as a strategy adopted by managers to create redundancies. Also, the adoption of Lean may lead to staff empowerment, participation in decision-making, training and employee development, amongst others, even before the initiation of changes in work structures. Therefore, in relation to the third research question, it is interesting to explore how Lean as a concept or management philosophy impacts on employees (beyond its impact through changes in work design). Given the nature of Lean in HEI's, the focus will be on employees working in non-academic roles. The fourth research question is therefore stated as follows;

How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?

The operationalisation of these research questions and data collection strategies are discussed in chapter 3. The theoretical lens for exploring these research questions is discussed in the next section.

2.8.3 Theoretical lens; Socio-technical systems theory (STS)

2.8.3.1 Theoretical lenses in Lean research

From reviewing a number of Lean studies, the popular theoretical lenses for studying Lean include; organisational learning theory (de Geus, 1997; Alves et al., 2012; Bhamu and Sangwan, 2014), institutional theory (Punnakitikashem et al., 2009), actor network theory (Latour, 2005; Law and Hassard, 1999 and Papadopoulos et al., 2011) and, the socio-technical systems (STS) theory (Hadid et al., 2016 and Soliman et al., 2018). Indeed, a number of studies including Huber and Brown (1991), Shah and Ward (2003, 2007), Malmbrandt and Ahlstrom (2013), Hadid and Mansouri (2014), Bortolotti et al. (2015), Hadid et al. (2016) and Soliman et al. (2018) have explored Lean through the lens of the STS approach or theory. This section discusses why and how STS is particularly suited for exploring the research questions.

2.8.3.2 Overview of the socio-technical systems theory

The STS theory hails from the work of Trist and Bamforth (1951). The STS theory first posits that organisations, as a system, are typically made up of two main sub-systems; technical and social systems (Trist, 1981). Technical systems – hardware, software systems, devises tools and techniques that are needed in order for an organisation to transform its inputs to outputs. Technical systems lack self-awareness (i.e., cannot operate on their own) and need human input to work effectively. The social system encompasses the human element. It constitutes employees, managers, their skills, values, attitudes, work culture, reward systems etc. within the work system (Shah and Ward 2003, 2007; Malmbrandt and Ahlstrom 2013; Hadid and Mansouri 2014). Interaction of components within each system leads to complexity. STS therefore encompasses the technical and social systems within the workplace. It comprises of operational processes and the people or actors who interact with the system to give it purpose and make it useful. The STS also accounts for broader networks of stakeholders including customers, suppliers, laws, regulations, rules, norms that govern an organisations interaction with the broader society (Hadid and Mansouri 2014). In the context of Lean implementation with the administrative arm of universities, the sociotechnical system constitutes of working practices, hardware and software systems used to support organisational activities by range of employees: employees who are leading Lean initiative, employees who have been trained on Lean tools and techniques, and remaining other employees (not trained on Lean). Importantly, the STS argues that the objectives of an organisation can best be achieved not by the optimisation of the technical system and the adoption of a social system to it, but by the joint optimisation of the technical and social system (Cherns, 1976; Hicks et al., 2015).

An STS does not operate in isolation but is subject to the characteristics and attributes (e.g., culture, norms) of the environment or society in which it exists or operates. STS theory therefore can be seen as a systems-based approach to unpacking the relationship between technology (hardware, software), tools, processes, people, organisations and society in workplace design.

Complexity, is perhaps, an emergent characteristic of STS (Cilliers, 2002; Soliman et al., 2018) and hence, complexity science can enhance our understanding of STS. Manson (2001), for example, notes that complexity science promotes a paradigm shift from reductionism to holism. Reductionism assumes that a system can be explained as a sum of its different components or parts while holism stresses the need to understand interactions between parts (i.e., how employees, tools, process, rules work together to generate desired outcomes)

as new phenomena can arise from such interactions (Soliman et al., 2018). A holism approach to understanding STS will therefore take into consideration elements in the STS such as number of parts and their interconnections or interactions, as well as, aspects of change and dynamism within the system (Azadegan et al., 2013).

2.8.3.3 Lean and socio-technical systems theory

As earlier noted, a few studies have explored Lean through the STS lens. Indeed, Bortolotti et al. (2015) describe Lean as a managerial approach for improving organisational processes based on a complex system of interrelated socio-technical practices. Hence, the authors see Lean as playing an integral role in continuous improvement with complex systems. In their early study, Huber and Brown (1991) argued that the implementation of the cellular manufacturing (technological) system could be enhanced if it is complemented with HRM practices such as employee relations, reward structure, training and development). Consistent with Trist and Bamforth (1951) and Trist (1981), Huber and Brown (1991), in essence, recognise the importance of the social subsystem to the effectiveness of the entire Lean manufacturing system. Cua et al. (2001) also find evidence that an STS approach to the implementation of Lean bundles such as JIT, TQM and TPM leads to improved manufacturing performance. Their study found that manufacturing plants which implemented social (HRM), as well as, technical (JIT, TQM and TPM) outperformed their counterparts which focused on technical aspects.

Hadid and Mansouri (2014) and Hadid et al. (2016) are more recent examples of Lean studies drawing on an STS perspective. Hadid and Mansouri (2014) report 54 Lean practices which are subdivided into 37 technical practices (including; automation, 5Ss, group technology, amongst others) and 17 social practices (including; employee involvement, training, amongst others). Hadid et al. (2016) explore the relationship between the two sides of Lean (technical and social) and the performance (operational and financial) of organisations. The authors find that three technical factors included in 'process'[10], 'customer value'[11] and 'error prevention'[12] led to better operating performance (captured by process time, internal customer satisfaction and external customer satisfaction). Their study shows that the technical side of Lean does not explicitly impact on financial outcomes. In contrast, the social side of

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[10] This includes; automation, JIT, Pull system, Quick setup time, Small lots and Workload rebalancing.
[11] This includes; Kaizen blitz, policy deployment, quality function deployment and value stream mapping.
[12] This includes; Root cause analysis and total preventive maintenance.

Lean (consisting of a human factor[13] and a motivation factor[14]) has the capacity to directly improve both operating and financial performance. In Table 2.8.1, other studies drawing from an STS perspective are briefly reviewed by focusing on the research questions, rationale for STS adoption, key findings and relation to STS.

Table 2.8.1: Socio-technical systems theory in prior Lean research

Study	Research questions or objectives	Rationale for STS adoption	Findings and relation to STS
Shah and Ward, 2007	To clarify the semantic confusion surrounding Lean production through and extensive review of prior literature on the evolution of Lean.	A Lean system if formally defined as a socio-technical system in this study – a system with important social and technical features interacting together to influence the output. The researchers, however, also employ configuration theory to explain relationships amongst underlying components.	The researchers identify 48 elements corresponding to 10 components that constitute Lean manufacturing. Nonetheless, most of the soft issues identified are in relation to customers not employees (see Appendix B). STS, while mentioned, is therefore not the main theory underlying this study.
Cua et al. (2001)	To explore the extent to which high performant plants have higher levels of implementation of socially-oriented and technically-oriented practices.	Study explores social and technical practices (amongst others) and how this shapes performance. This study draws on STS directly in the identification of practices for analysis.	Plants with higher performance were found to implement both common (social) and unique (technical) practices of JIT (Lean), TQM and TPM bundles. That is, social and technical practices implemented explain the differences in performance between plants.
Hadid and Mansouri, 2014	To explore the impact of a number of Lean constructs (classified under hard and soft practices) operational performance.	Systematic review exploring Lean service constructs identified a number of constructs which could be classified under soft (people-oriented) and hard (technical) practices. Notice that the study also draws from universal theory and contingency theory.	Study identifies Lean technical practices, supportive practices, inhibitors and their expected outcome on Lean service. Importantly, the study documents the positive effect of technical practices on performance, the positive effect of supportive (soft) practices on performance, the role of

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[13] This includes; employee empowerment, employee commitment, employee involvement and leadership.
[14] This includes; reward system, communication system, management support, performance measurement system and training.

			technical (supportive) practices in enhancing the translation of supportive (technical) practices into improved performance.
Bortolotti et al. 2015	To investigate whether, when compared to their unsuccessful counterparts, Lean plants that successfully implement Lean have specific organisational culture and adopt soft Lean practices.	STS is not singularly adopted but referred to amongst other theories such organisational theory. It supports the selection of soft Lean management practices for empirical analysis.	Study finds that successful Lean plants use soft practices more extensively than their counterparts. On the contrary, these plants do not differ significantly in terms of hard (technical) Lean practices. The findings suggest that soft practices are acutely important (perhaps, more relevant than Lean technical practices) in the successful implementation of Lean.
Hadid et al., 2016	To explore the impact of a set of Lean social, as well as, technical practices on operating performance.	Study explores the interaction between social and technical Lean practices and whether this shapes performance – as suggested by STS.	Findings highlight the importance of implementing Lean as an STS in service firms. The social side (motivation factor) and technical side (customer value factor) improve performance and profitability, both independently and together.
Soliman et al. 2018	Explore Lean impacts on attributes of complex STS.	Study explores relation between Lean and complexity – where complexity is explored through nature of subsystems within each organisation. In this study, Lean is considered as given and its impact on adopters with different levels of complexity in their STS is explored.	Study results suggest that Lean balances complexity within organisations. That is, it reduces complexity (reduces number of employees, diversity of behaviours and disruptions) as well as increases complexity (increases frequency of interactions, functional diversity and resilience).

2.8.3.4 *Socio-technical systems theory and the soft-side of Lean HE*

STS approaches take into account the "soft" aspects of systems, as such aspects are integral to the functioning of the system. A university, as an institution, bares the characteristics of an STS. It has a large number of employees working on different processes using various

tools (technology, equipment) on a day-to-day basis. These processes feed from and feed into one another (i.e., interaction) creating a complex system. Organisational procedures, goals and objectives and a vision govern the nature of work processes. Universities (in the UK) are embedded within the society, which is governed by rules and laws – with a general expectation that they adhere to norms. Individuals and units within the (university) system face resource constraints (finance, time, labour, equipment etc.), hence, there is need to choose from various alternatives and design efficient low-cost but high output (service quality) processes. Lean, as a philosophy, holds a promise to make the STS (university) work more efficiently in its goal to deliver a high-quality service to its customers.

The current study focuses on the soft side (social subsystem; see RQ3 and RQ4) of Lean drawing on the case of Universities. It explores the issues of Lean adoption and the impact of Lean on employee outcomes. Research Question 3 explores Lean through the changes it brings into technical subsystems (work structures and work design) and how these changes impact on employee outcomes. Research Question 4 explores Lean by looking at how it directly impacts on the social subsystem (employee working conditions and outcomes), independent of changes to work structures and work design. Presumably, if Lean weakens the social subsystem, its overall impact on the University STS will be negative, irrespective of its potential positive impact on the technical subsystem. This presumption is supported by research (e.g., Worley and Doolen 2015; Canning and Found, 2015; Bortolotti et al. 2015; Worley and Doolen, 2015; Netland, 2016; Hirzel et al., 2017) attributing Lean failure to human factors (social subsystem). It is worth acknowledging that the exploration of technical subsystems in Research Question 3 (i.e., the technical side of Lean encompassing tools, techniques, which gets captured through work structure and processes in figure 2.8.2) in this study is not exhaustive or comprehensive as the primary focus of this study is on the frequently neglected soft-side of Lean in a peculiar context. However, the use of STS acknowledges the importance of both hard (technical) and soft (social) issues in shaping Lean outcomes.

2.9 Chapter summary

This chapter has reviewed the literature on Lean, starting with the emergence of the Lean concept. It has presented definitions of Lean, viewing Lean firstly as a portfolio of management tools (Lean bundle) and secondly, as management philosophy. Drawing on the latter perspective, the review has emphasized the importance of human factors (softer elements) in successful Lean implementation. The chapter goes on to discuss critical success

factors in Lean implementation and the reasons why Lean implementation programmes are sometimes unsuccessful in different settings. To set the scene for discussing the context of this research (i.e., HEIs), prior Lean research across three key sectors (manufacturing, service and public) is explored. The focus is then turned to Lean in the HEI context. Prior research on Lean implementation is reviewed, the peculiar nature of the context is highlighted, the background of UK HEI is discussed and a few case studies of Lean implementation within this context are explored. This allows for the identification of research gaps and the statement of four research questions; the first explores the state of Lean in UK HEIs, the second investigates the challenges and benefits of Lean adoption in the HEI context, while the latter two explore the softer side of Lean in UK HEI. Finally, a theoretical lens (socio-technical systems theory) is identified and its suitability for addressing the research questions is discussed.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction & Overview

3.1.1 Introduction

The previous chapters have discussed the current state of Lean management as applied to higher education, with a particular focus on the UK context. This review led to the identification of gaps in prior literature - some of which the current research aims to fill. Subsequently, four main research questions were developed:

(1) To what extent have higher educational institutions in the UK adopted Lean management practices?
(2) What are the benefits and challenges of adopting Lean in a higher education context?
(3) How does Lean affect employee working conditions (e.g., autonomy, workload) and employee outcomes (e.g., motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?
(4) How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?

This chapter discusses the approaches adopted, their validity and explains why it is more suitable compared to other approaches that may be deemed ill-suited for the research. It further delves into discussing the research design, participants' selection, the design of questionnaires and interview, data collection and the data analysis processes. However, it is imperative that the underpinning methodological theoretical constructs be explored first.

3.1.2 Overview of Ontology, Epistemology and Methodology

An ongoing debate still ensues pertaining to what the constituting factors of valid research and valid knowledge are across different scholastic realms. Research can generally be classified into two broad groups; "*quantitative and qualitative research*" based on the adopted underlying method of enquiry. Quantitative studies typically use statistics and document analysis involving counting and frequency analysis to provide evidence that supports an assertion. On the other hand, Qualitative studies, explore context and use discourse as a way of evidencing a phenomenon. This dichotomy is however disappearing with many researchers opting for a mix of both (mixed research methods).

However, the choice of a research method is shaped by the belief and set of assumptions held by a researcher about how things work both independently and collectively. This is more formally known as a "*research paradigm*" and is defined by Kuhn (1962) as the "*set of common beliefs and agreements shared by researchers about how problems or research questions should be understood and addressed*". Meanwhile, the Merriam Webster Dictionary (2016) defines a paradigm as a philosophical and theoretical framework of a scientific school or discipline within which theories, laws, generalisations and the experiments performed in support of them are formulated. Research has traditionally been classified into two knowledge paradigms; positivist and interpretivist. Creswell and Poth (2016), however, notes that these two knowledge paradigms are polar ends with a continuum of paradigms (including post-positivist and critical realist, amongst others) between them. Hinged on the reality as per Creswell and Poth (2016) notes that through research, researchers make philosophical or knowledge claims about what knowledge constitutes (*ontology*), how we know it (*epistemology*), what values go into it (axiology), how we write about it (*rhetoric*) and the process for studying it (*methodology*).

Lastly, Guba and Lincoln (1994) add that a research paradigm encompasses three highly interconnected concepts; ontology, epistemology and methodology. While ontology can be seen as the different ways of constructing reality (i.e., how we see the world), epistemology refers to the different forms of knowledge about reality; the nature of the relationship between the researcher and the subject being researched, and methodology outlines the tools used to research or know the reality, approach adopted. As such, different *paradigms* such as positivism, constructivist, critical postmodernism, pragmatism have been mentioned in the literature to date, and are delineated in the following table (Table 3.1.1).

Table 3.1.1: Paradigms in social science research

	Positivist	Post-positivist	Critical Realist	Interpretivist
Ontology **(How we see the world).**	Only one reality exists (realism)	Reality exists but cannot be fully understood due to human intellectual mechanisms.	Historical realism. Realism exists but is shaped by political, economic, ethnic and gender factors	Relativist - multiple realities exist. These are shaped by social and experiential knowledge. These realities can also change as the researcher becomes more informed and aware.

Epitemology				

	Dualist - The researcher and research are seen as independent of each other; the researcher can objectively investigate the researched without influencing it.	Here, the idea of dualism (independence or researcher and researched) is abandoned but it is assumed the research can still be objective (i.e., the ideal)	Transactional and subjectivist. The researcher and researched are linked; influence and are influenced by one another.	Transactional and subjectivist. The result (findings) of the research (are obtained or created) is the output of the interaction between the parties involved.
Epistemology **(Different forms of knowledge about reality, the nature of the relationship between the researcher and the subject being researched).**	Dualist - The researcher and research are seen as independent of each other; the researcher can objectively investigate the researched without influencing it.	Here, the idea of dualism (independence or researcher and researched) is abandoned but it is assumed the research can still be objective (i.e., the ideal)	Transactional and subjectivist. The researcher and researched are linked; influence and are influenced by one another.	Transactional and subjectivist. The result (findings) of the research (are obtained or created) is the output of the interaction between the parties involved.
Methodology **(The tools used to research or know the reality, approach adopted).**	Experimental and manipulative. Hypothesis are developed and can be tested empirically through the collection and analysis of appropriate data. Typically quantitative methods (statistics & document analysis) and an deductive approach is used.	Modified Experimental and manipulative: Recognising the potential influence of the researcher, inquiries are conducted without disturbing the natural environment of the researched.	Dialogue and dialectical. The researcher aims to transform the researched through action.	Dialectical. Individual constructions are elicited and refined through researcher-researched interactions. Typically qualitative methods and an inductive approach is used.

(Source: Adapted from Guba and Lincoln, 1998)

Not only this, but also the two extremes (Positivist – Interpretivist) are also frequently associated with quantitative (positivist) and qualitative (interpretivist) methods of enquiry (Bryman and Bell, 2007). These two extremes (positivist and interpretivist) are further delineated as a deductive approach (positivist) or an inductive approach (interpretivist) to research. The differences between these two approaches as discussed in Saunders et al. (2009) are summarised in the table (Table 3.1.2) below.

Table 3.1.2: Deductive and Inductive Approaches

Aspect / Approach	Deductive approach *(Positivist)*	Inductive approach *(Interpretivist)*
Focus	Pursues scientific principles when conducting research. Builds hypothesis from theory, collects and analyses data and evidence to support or reject the hypothesis. Focuses on explaining causal relationships between variables and phenomena.	Focuses on understanding meanings and how these are made and understood by individuals. Qualitative data such as discourse is gathered and this is used to build theory.

Structure	Structure is rigid and controls are put in place to ensure valid data is collected and this is analysed in a systematic way. Results are replicable. The researcher is fully independent of the researcher, and does not influence the results	Structure is flexible, permitting changes in the research emphasis as the study develops and the researcher gains more knowledge of the phenomena and the research progresses. No importance is attributed to replicability. The researcher interacts with the research and the findings are his/her interpretation of what was observed.
Relevance & approach	Generalisation is key to validity of the research findings. Hence, there is need to use sufficiently large, random and representative samples. The use of such samples allows for application of the central limit theorem to make informed statements about the phenomena in the entire population.	The research findings are relevant to the research setting and context and there is less concern with the need to generalise findings out of specific context. Hence, sampling is informed by the research question. Selective sampling and the use of case studies is valid.

(*Adapted from Saunders et al., 2009, p. 127*)

Ritchie and Lewis (2003) note that ontology involves the study and nature of the social world, with three possible dimensions including; realism, materialism and idealism. Realism assumes the existence of an external reality independent of our beliefs or knowledge of this reality (Alvesson and Skoldberg, 2009), such that the researcher is independent from the research; with an assumption of an objective view and the researcher's duty is to find it. Alternatively, idealism suggests that our view of the world is socially constructed and based on individual experiences and perceptions (Ritchie and Lewis, 2003). Here, the researcher is not independent of the research. He/she interacts with, influences and is influenced by the researched. If the world is considered as socially constructed, then this is valid knowledge as it aims to explore the perceptions of individuals within such a world. The third dimension, materiality, acknowledges the existence of a real world but only ascribes reality to material objects (Ritchie and Lewis, 2003). Thus, the question that presents itself is which of these will this research adopt?

Clearly, the approach to researching any research question is an important decision for any researcher. Some of the characteristics, strengths and weakness of the different approaches have been noted above and are detailed in frequently cited texts such as Bryman and Bell (2007). Increasingly, social science researchers are opting for a middle ground (mixed methods) which

leverages the benefits of both positivist (deductive) and interpretivist (inductive) approaches while avoiding the common weaknesses. The research philosophical stance and approach adopted in this study are discussed below.

3.1.3 Overview of adopted research philosophical stance and approach

This research adopts an interpretivist philosophical stance. In terms of ontology, it takes a relativist stance, believing that multiple realities exist. These realities could be in respect of institutions or people/actors. These realities are shaped by social and experiential knowledge. The realities are also fluid and can change as the researcher becomes more informed and aware. In terms of epistemology, the research assumes a transactional and subjectivist perspective as opposed to an objective perspective. Specifically, the researcher acknowledges that the findings of the research is the output of the interaction between the researcher and the respondents involved. In terms of methodology, a dialectical perspective is assumed. Here, individual constructions will be elicited through semi-structured interview questions and these constructions will be refined through researcher-researched discussions and interactions. The method of data collection will therefore be qualitative, and the approach will be inductive.

The inductive approach adopted in this study will focus on understanding meanings of Lean and its impact in this context and how these are made and understood by individuals. Qualitative data such as discourse will be gathered through semi-structured interviews with practitioners working on Lean projects with selected UK HEIs. The structure of the research is flexible. The study will be organised in two phases; a pilot & initial phase and a main phase. Given the limited research looking at Lean in HEIs, the first phase will give the researcher an opportunity to gain some insight on the nature of Lean within the HEI context. This knowledge will then be integral to the development of the research instrument. The research instrument will also be flexible to accommodate changes in the research emphasis as the study develops and the researcher gains more knowledge of the phenomena and the research progresses. There is no emphasis on generalisability and replicability, as the research is interested in context-specific knowledge, meanings of Lean, and experiences when adopting Lean approaches. Specifically, the research findings that will be arrived at, are relevant to the research setting and context (specific UK HEIs) and there is less concern with the need to generalise findings out of specific context. Hence,

sampling will be informed by the research question and the researcher's ability to gain access to the respondents. Under the inductive approach, therefore, selective/convenience sampling and the use of case studies is valid. This will therefore be adopted. Importantly, the researcher will interact with the research and respondents and the findings from the research will integrally be the researcher's interpretation of what was observed.

3.2 Research process, design and strategy

3.2.1 Overview of case study approach

This research aims to explore Lean implementation in the context of HE. Particularly, it seeks to explore the impact of Lean on employee working conditions and outcomes (including autonomy, workload, motivation, work related stress, job satisfaction and retention). The absence of validated knowledge on Lean in HE, supports the use of a qualitative approach to explore complexities in this environment. Specifically, a case study research approach is adopted to yield in-depth insights on Lean practice in this context.

It is worth noting that case study approaches are popular in the Lean literature (Narayanamurthy et al., 2018; Hicks et al., 2015; Piercy and Rich, 2015; Staats et al., 2011; Abdumalek et al., 2007). Narayanamurthy et al. (2018) provides a review of 9 research papers applying case study research approaches to study Lean implementation in the healthcare context. Narayanamurthy et al. (2018) then apply a case study research approach (which involved interviews with physicians, nurses, and other medical staff of the healthcare unit) to explore Lean readiness in a primary care clinic based in the US.

Voss et al. (2002) discuss three main advantages or key strengths of case study research approaches. Firstly, Voss et al. (2002) notes that the case study approach allows a phenomenon to be studied in its natural setting. Hence, relevant and meaningful theory can be generated by observing actual practice. Second, Voss et al. (2002) contends that the method allows key research questions of "what", "why" and "how" to be explored with a fuller understanding of the nature and complexity of the phenomena in question. Finally, Voss et al. (2002) argues that this method is suitable for early exploratory research, particular important when parameters are unknown (or have not been fully documented in prior research). Following the arguments of Voss et al. (2002), a case study approach is adopted here because Lean in higher education is a relatively new phenomena and there are very few prior studies to draw from. The approach therefore allows for

inductive theory building where data is collected without disturbing the natural setting of the phenomena (i.e., the researcher enquires about but does not interfere in the Lean management process).

From preliminary informal discussions with Lean practitioners, there are indications that Lean teams (or the number of people involved in Lean projects) within HEIs are (is) very small. Following Yin (2017), there is scope to alleviate this problem by adopting a multiple case study approach. This will involve collecting data from multiple cases (HEIs). Also, the multiple case study approach broadens the scope of the research as it involves several institutions each with unique institutional characteristics. This can add richness to the data and make for stronger analysis (Yin, 2017). The focus on a few cases means that in-depth data can be collected and rigorously analysed while underlying themes and concepts could be more easily identified and correlated with barriers, drivers and factors identified.

It is worth noting that there are three categories of case study approaches; exploratory, descriptive and explanatory case studies. Exploratory case studies are relevant when the outcomes are unclear or differ across different units of analysis while descriptive case studies focus on describing a phenomenon and the real-life context in which it occurred (Yin, 2017). The first and second research questions are exploratory in nature as they seek to document perceptions of Lean, as well as, the experiences of implementers while implementing Lean across different institutions.

Explanatory case studies address questions around "how" and "why", e.g., how a phenomenon impacts on actors and why this happens. Here, the researcher seeks to understand a phenomenon within its natural environment and to explain observed occurrences (Yin, 2017). Research questions 3 and 4 fall under this kind of case study analysis. Specifically, the objectives of research questions 3 and 4 are to understand how Lean impacts on employees and why it impacts employees in a particular way.

Different authors have suggested different steps to follow when conducting case study research. For the purpose of this study, the methodology put forward in Voss et al. (2002) is adopted. Voss et al. (2002) provide guidance on the use of case studies as a research tool in social sciences, in a framework that identifies six (6) stages of case study research including; (1) defining the research question, (2) selecting a suitable case, (3) developing a research or measurement instrument, (4) collecting data, (5) analysing the data, and (6) disseminating results. This

framework has been used in Lean research (see, for example, Piercy and Rich, 2015). This framework, as applied to the current study, is discussed further throughout this chapter.

3.2.2 Step 1: Defining the research questions

The research questions have been identified and discussed in the previous chapter. The first research question seeks to explore the extent to which higher educational institutions in the UK have adopted Lean management practices. To address this question, data on perceptions around what Lean is and its role in HEIs will be collected. Also, narratives on the HEI's experience of adopting Lean including strategies used to ensure successful Lean implementation will be collated. The second research question explores the benefits and challenges of adopting Lean in a higher education context. Finally, the third and fourth research questions explores the impact of Lean on employee working conditions and outcomes, respectively. The objective is to collate narratives on the soft side of Lean including its impact on employee autonomy, workload, motivation, work related stress, job satisfaction and retention.

3.2.3 Step 2: Selecting a suitable case(s)

A suitable case study is that which can allow the researcher to obtain sufficient data to address the research question satisfactorily (Eisenhardt, 1989; Bryman and Bell, 2015; Voss et al., 2002; Yin, 2017). A pilot study is seen as essential for the current study given the researchers limited knowledge of the underlying context. Pilot studies allow the researcher to test their research tools, ascertain their validity and reliability and accumulate objective feedback on them ahead of the main study to be conducted (Bryman and Bell, 2015). This grants the research a chance to improve/develop the instruments, realign them, address any issues or concerns that arise and further structure the approach adopted. The general consensus within the literature is that a pilot study is conducted with an individual or organisation that is similar to the target organisation and operating within a similar premise/environment. This is to ensure that the feedback accumulated is in itself valid and reliable.

As will be discussed in more detail in Chapter 4, the UK HEI selected for the pilot study (referred to as University X, for anonymity) had explicitly implemented Lean techniques across several projects in different business functions since 2006. Since (2006), University X has completed more than 100 small Lean projects across several different units, making it a suitable institution to explore the research questions Eisenhardt, 1989; Bryman and Bell, 2015).

Importantly, this institution has pioneered several initiatives around Lean HEI and hence, an overview of the state of Lean in UK HEI, as well as, information about other suitable case studies, could be obtained from piloting the study at this institution.

Indeed, as will be discussed further below, the researcher obtained significant support from this institution in terms of identifying and making contact with other suitable cases. It is worth reiterating that Lean HEI is a new phenomenon within the UK, so only a few HEIs are involved in Lean and can be included in the sample. The access to University X was gained through research contacts at University X. To identify other HEIs actively engaged in Lean, the researcher attended the Lean Higher Education Conference that took place at the University of Stirling, Stirling, UK in 2016. Several of the Lean leaders in UK HE regularly attend the conference and hence this was a good opportunity to create contacts. Following the conference, the researcher contacted the attendees to seek access and consent to obtain interview data. In addition to the initial pilot case (University X), Lean leaders in 7 other UK HEIs contacted agreed to take part in the research. Lean leaders within these institutions were resourceful in identifying and extending the invitation to suitable interviewees or respondents within their institutions i.e., employees that have been involved in Lean projects. The use of this snowball sampling technique ensured that all the interviewees had extensive experience, exposure and involvement in multiple Lean projects across their respective organisation(s).

The researcher also sent additional invitations to operations management and Lean leaders in other UK universities which might have been involved in Lean projects at their respective institutions. The identification of this other possible cases of Lean HEIs was based on University websites and other secondary sources. Particularly, the Universities listed on Table 2.7.1 were contacted. The researcher was, however, unsuccessful in securing further cases.

Overall, the sample selection is based on convenience sampling aided by a snowballing technique for identifying suitable/knowledgeable respondents. A convenience sampling technique has been deployed by other studies exploring Lean in different contexts (see, for example, Ogunbiyi et al., 2014). As will be seen subsequently, most of the institutions that were involved in the study are Scottish Universities. While there is a concern in terms of differences in funding models across England and Scotland (discussed in section 1.2), the research focuses on employees rather than students with emphasis on operations (administration) within HEI—an area in which

HEIs across the different states within the UK face similar challenges. The funding pressure on HEIs have forced Universities to look for mechanisms to improve efficiency with Lean being seen as a management practice that can help address the cost and efficiency issues in the HEI sector. To the extent to which funding models are important, it is also worth noting that Scottish Universities also accept Welsh, English and Northern Ireland students who are fee paying.

3.2.4 Step 3: Developing a research or measurement instrument

As noted by Bryman (2016), interviews can be categorised into three main categories; unstructured, semi-structured and structured, depending on the nature of the questions asked. Structured interviews generally use a strict interview protocol with set questions and, sometimes, require specific guided responses from the respondents. This could, for example, be through providing them alternatives to choose from (Bryman, 2016). Unstructured and semi-structured generally use open-ended question which allow respondents to discuss their perceptions and feelings around some general topic. This allows the interviewer to probe deeper into the subject of interest and collect relevant data which can be used for inductive theory building (Collis and Hussy, 2009). Inherently, the analysis and interpretation of the data is guided by the researcher's perception and interpretation of his/her interaction with the respondents.

The interview protocol is developed and discussed with experience researchers (research supervisors) and Lean practitioners to assess its suitability for addressing the research questions. Following these discussions, two versions of the protocol are developed; a longer version for experienced Lean practitioners (e.g., Lean leaders and team managers) and an abbreviated version for individuals with limited Lean experience (notably Lean team members). The protocol is then piloted using one case study. Through the pilot study, the protocol is continuously enhanced as the researcher moves from one interviewee to the next. At the end of the pilot study, the final interview protocol is produced (i.e., both long and abbreviated versions) and this update version of the protocol is then used in the main study. To enhance validity and reliability, the interview protocol is consistently applied across all respondents.

The pilot and initial study (long version) interview protocol (see Appendices C and D) consists of 7 sections;

Table 3.2.1: Interview protocol and research questions– pilot and initial study

Section	Content	Purpose	RQ
A	Opening/Introduction	Introduce research and seek informed consent. Obtain background information about interviewee's Lean experience.	
B	Background and Motivation for adopting Lean	Background and Motivation for Lean adoption.	1
C	Objectives and challenges of Lean adoption	Perception of Lean and its applicability to HEI. Objectives for Lean adoption. Lean to resolve challenges facing HEI.	1
D	Lean adoption strategy and scope	Project selection. Challenges of implementing Lean. Inappropriate areas/limitations for Lean. Lean in teaching and research.	2
E	Experience on individual Lean projects	Benefits from Lean deployment. Challenges faced by employees in Lean projects. Employee resistance and Lean. HEI culture and Lean.	2
F	Soft elements relating to Lean	How Lean impacts employees; Retention, job-related stress, satisfaction, working environment, absence, sickness, paid and unpaid leave, motivation, autonomy, workload.	3 & 4
G	Closing interview	The future of Lean HEI. Culture shift from Lean. Evaluation of decision to adopt Lean.	

This protocol is then modified after feedback and experience from the pilot study, in order to arrive at the final protocol used in the main study. The full protocol is provided in appendix E.

Table 3.2.2: Interview protocol and research questions– main study

Section	Content	Purpose	RQ
A	Opening/Introduction	Introduce research and seek informed consent. Obtain background information about interviewee's Lean experience. Number of Lean projects completed at the institution. Interviewee's assessment of Lean success at HEI	1
B	Background and Motivation for adopting Lean	Background and Motivation for Lean adoption. Lean versus or quality improvement methods.	1

C	Objectives and challenges of Lean adoption	Perception (definition) of Lean and its applicability to HEI. Objectives for Lean adoption. HEI organisational structure and its impact on Lean. HEI culture and impact on Lean. Lean to resolve challenges facing HEI.	1 & 2
D	Lean adoption strategy and scope	Project selection. Lean team selection. Organisational learning from prior Lean projects, Lean institutionalisation.	2
E	Experience on individual Lean projects	Benefits from Lean deployment. Challenges faced by employees in Lean projects. Strategies for dealing with challenges.	2
F	Soft elements relating to Lean	How Lean impacts employees; Motivation, job satisfaction, retention, autonomy, work-related stress, workload (working environment, organisational commitment, communication).	3 & 4
G	Learning from Lean	The future of Lean at HEI. Sustaining and institutionalising Lean Information sharing post Lean Collecting and disseminating feedback. Assessment of the impact of Lean on employees.	2, 3 and 4.
G	Closing interview	Thanks and collection of archival data.	

3.2.5 Step 4: Collecting data

Potential participants were sent an initial invitation to participate in the research. The invitation letter detailed (1) the background of the research, (2) the purpose of the research, (3) the reasons why the potential candidate was selected, (4) how the research will be conducted (i.e., interviews), (5) how long the contact period will last (approximately one hour maximum), (6) that the interview will be recorded with the permission of the participant, (7) that the participant has the right to pull out of the interview at any stage or decline to answer any question without giving any reason to the interviewer, (8) that the interview (if completed) will be transcribed and a copy sent back to the participant for confirmation, (9) that all data will be stored securely and only made available to other researchers involved in the project, (10) that the data will only be held for the duration of the project, (11) that the data on participants and their institutions will be anonymised, (12) that direct quotes from the interview will be cited in the final project, (13) that a copy of the final project write-up will be sent to the participant to review and amend, amongst others. Participants were given all this information in written form and were asked to sign an informed

concern form (see Appendix A) to confirm that they understood and were happy to proceed with the interview. This was a requirement for Ethical Approval from the Ethics board.

To improve response rates and participation in interviews and questionnaire surveys, it is important to keep the questionnaires and interviews very concise (i.e., keeping the number of questions to a minimum) as suggested by Collis and Hussy (2009). The problem with reducing the number of questions is that the required data might not be collected. To circumvent this problem, the research uses some archival data from Lean project documents at each HEI (when available) to gather key information relating to the case study prior to and after the interviews. The data is in the form of project reports and in some cases are readily available online. The data gleaned from this medium is also key to understanding the underlying context in which Lean operates. Hence, the interview information set were supplemented with data from archival sources which allowed the researcher to develop a more holistic understanding of the underlying context and further develop an extensive list of questions (interview/questionnaire) to facilitate a deeper analysis and understanding of the organisation and its implementation of Lean.

3.2.6 Step 5: Analysing the data

The unit of analysis is organisations or HEIs selected for case study—not individuals, teams or projects. Specifically, as per the four research questions (RQ1-RQ4) discussed in section 2.8, the focus is to explore the experiences of different institutions during the process of Lean adoption. The unit of observation are the individuals within these institutions and the Lean projects that individuals are involved in. Specifically, data is collected from different individuals across different Lean teams, projects, roles and departments. These individuals provide information about their experiences during Lean implementation and their perceptions about different Lean projects. The data was collected through semi-structured interviews which gave respondents some latitude to discuss peripheral issues.

All interviews conducted lasted between 50-80 minutes and were all tape recorded. The audio recordings from the interviews were transcribed and the transcripts constituted the main data for analyses. Qualitative data collection, particularly case study interviews, yields a large volume of text that requires contextualization and linkage with various theoretical concepts, themes and constructs. The approach adopted to analyse the collected data is discursive, following Braun and

Clarke (2006), where a thematic analytical framework is deployed to identify and extract recurring themes within the data, as well as, their interrelationships.

The starting point for identifying themes is the interview protocol. Given that the interview protocol is consistently deployed across different interviews, the analysis kicks off by comparing responses from different respondents when each question from the protocol is asked. For example, when respondents are asked the following question; "In your view, what is Lean and what are its key objectives as applied in your institution?" responses varying from an explanation of the theory of Lean, its key principles to a discussion around the adoption of traditional Lean concepts to suit the HEI context. Hence, besides picking up on the definition and principles of Lean as perceived by Lean practitioners in HE, the researcher also picks up on issues around the peculiarity of the HE context and how traditional Lean notions can be tailored to suit this context.

The starting point for analyses of responses in relation to soft issues is based on the interview protocol. Specifically, respondents are asked about their views of how Lean has influenced 6 soft issues; Motivation, Satisfaction, Retention, Autonomy, Stress, and Workload. As discussed in section 2.5, these issues were identified from the prior literature in the area. In discussions, respondents generally provide greater detail than required (for each specific question) and sometimes their responses are relevant to other subsequent or previous interview questions. For example, some respondents are quick to highlight some of the key benefits of Lean HEI early on in the discussions. Also, when respondents are asked about their view of Lean's impact on employee motivation, they raise issues such as workload increases which may adversely impact on motivation. Interestingly, across the discussions a number of issues (soft-issues) outside the main 6 soft issues being explored are identified. This implies that some important data may be lost if the data analyses strictly follows the interview protocol.

Given the volume of data (interview transcripts) and fact that relevant evidence was scattered across the interview transcripts, the researcher used Nvivo software (version 12) as a tool to organise the data under relevant themes. This is further discussed in detail in chapters 4 and 5 (see for example, Figure 5.5.1 and Table 5.5.2). Specifically, the researcher carefully reads through interview transcripts (uploaded onto Nvivo), and in the process, groups similar or related ideas, perceptions and views together under subheadings (or themes) that capture the underlying

ideas. Some of the main themes across phase I (pilot and initial study) and phase II(main study) of the research are shown in Table 3.2.3.

Table 3.2.3 Example themes from thematic analysis

Key issues explored	Themes (Examples)	Notes
Motivation for Lean adoption	✓ Leadership interest ✓ Fit and need for efficiency ✓ Emergent & unclear ✓ Lean champions ✓ Funding challenges ✓ Students as customers (value for money) ✓ Service quality issues ✓ Bureaucracy ✓ Change tool ✓ Success story ✓ Empower staff	These are further discussed in section 5.4.2 and presented in Table 5.4.2.
Perception of Lean	✓ Respect for people ✓ Continuous improvement ✓ Reduction of waste ✓ Beyond reduction of waste ✓ Right (people, things, time, place, quality, cost) ✓ Effective teams ✓ Simple/Smooth processes ✓ Improved communication ✓ Culture and philosophy	These themes emerged from the interviews. See section 4.4, Figure 4.4.1, section 5.4.1 and Table 5.4.1.
Benefits of Lean implementation	✓ Time savings ✓ Manageable workloads ✓ Customer orientation ✓ More control over the nature of work ✓ Staff & student experience ✓ Employee engagement ✓ Problem solving ✓ Team working ✓ Communication ✓ Working environments ✓ Automation ✓ Reduce duplication ✓ Streamline tasks	These themes emerged from the interviews. They are further discussed in Table 5.5.1.
Challenges and barriers of Lean adoption	✓ Negative perceptions and preconceptions ✓ Suitability for teaching & research activities ✓ Structure-autonomous units ✓ Time required ✓ Technology requirements	These themes emerged from the interviews. See Table 5.5.2 and Figure 5.5.1 for further discussions.

Impact of Soft practices on implementation and sustainability of Lean.	✓ Motivation ✓ Satisfaction ✓ Retention ✓ Autonomy ✓ Stress ✓ Workload ✓ Psychological safety ✓ Working environment ✓ Communication ✓ Organisational commitment	The first six themes were decided a priori based on the prior literature in the area. The last four themes emerged from the initial (phase I) and main (phase II) analyses.

The identification of themes follows a two-step process. Firstly, the researcher uses *a priori* or pre-determined themes. These are identified in advance based on their prominence in prior research and, to a lesser extent, the researcher's assumptions from engaging with practitioners and information from secondary data on Lean at each HEI. These themes are generally the basis of the interview questions. Secondly, the researcher identifies data which does not neatly fall under any existing theme. If this data is recurrent across respondents within the same institution, then a new theme is created to summarise the main idea. An example that exemplifies this process is the identification of themes on the impact of Soft practices on implementation and sustainability of Lean—the last row of Table 3.2.3. Here, the first six themes were identified *a priori* based on their prominence in prior research. These themes were fully discussed in section 2.5. The last four themes emerged from the data, particularly in response to open-ended questions about some of the benefits, demerits and challenges of implementing Lean in HEI. This is further discussed in chapters 4 and 5.

As noted in Table 3.2.3, new themes on the soft-side of Lean (including Psychological safety, Working environment, Communication and Organisational commitment) emerged as part of the data analysis process. The a priori themes have been discussed in section 2.5. Given the importance of the new themes to addressing the research questions, a definition for these themes is provided in the following table;

Table 3.2.4 Conceptualisation of emergent themes

Theme	Conceptualisation	Literature

Psychological safety	Employees feeling accepted and respected by team members, supporting interpersonal risk taking. General awareness, certainty about the direction of the institution. Perception of job security. Employees feeling that they are an essential part of the organisation.	This conceptualisation is consistent with Singh et al.(2013) who capture psychological safety through employee's perception about freedom of expression and being part of the team. Other authors, including Edmondson (1999), perceptions around security and freedom for interpersonal risk taking.
Working environment	Encompasses both physical and social environment (i.e., relationships at work). Evidence from co-operative, team-working, trusting, friendly, supportive and developmental (growth) opportunities for staff.	Several studies have followed Borman (2004) to ascertain the quality of the work environment by exploring employee perspectives around job security, the physical working environment, relationships with co-workers, support from supervisors and working hours.
Communication	Evidence relating to the exchange of information (verbal, written) or information sharing due to Lean implementation (updates, notices, emails, meetings etc.). Focus on three types of communication; Team member to team member, Team member to Lean manager (bottom-up), and Lean manager to team member communications (top-down).	The importance of different forms of communications in the work place is emphasized by social exchange theory (Cropanzano and Mitchell, 2005). Different studies recognise the different methods of/types of communication in contemporary workplaces (see, for example, Karanges et al., 2015).
Organisational commitment	Physical and emotional attachment to the organisation. Perception of shared goals and vision. Satisfaction/fulfillment from work, with intention (and perceived opportunities) to develop self and growth within organisation.	Organisational commitment is a psychological state that characterises an employee-organisation relationship with implications for the employee's membership within the organization (Meyer and Allen, 1997). Prior research has established links between commitment and performance, turnover and pro-social behavior (Rashid et al., 2003). Prior studies use attributes such as loyalty (intention to stay and develop oneself within the organisation), identification and involvement to capture commitment (Rashid et al., 2003).

3.2.7 Step 6: Disseminating results.

The final step in the Voss et al. (2002) framework involves the dissemination of results. The current research is ongoing and the intention is to disseminate the findings through journal publications, conference papers and through direct discussions with some of the institutions that were involved in the research. The preliminary results from this study have been presented at two specialist conferences. The conference papers are appended to this thesis.

3.3 *A note on reliability and validity of research*

Research quality measures including validity (internal, external, construct) and reliability are typically used to assess the quality of quantitative research. Riege (2003) contend that issues of reliability and validity also plague case study research (interviews). Despite the need to ensure that qualitative data collected is reliable and valid, there is no single, coherent set of validity and reliability tests for case study research (Riege, 2003). Indeed, some researchers such as Lincoln and Guba (1985) have argued against using standard measures of validity and reliability, instead advocating that qualitative research be judged in terms of credibility, transferability, and trustworthiness. Lincoln and Guba's (1985) concept of trustworthiness captures both validity and reliability, with the authors arguing that the two must co-exist. These issues have been debated in the extant research and hence, the research simply adopts a generalist view that reliability, validity, trustworthiness are essential for qualitative research, without engaging in this debate.

Validity in qualitative research is a broad concept which is not universal (Winter, 2000). It generally captures issues around the appropriateness of tools, research processes and data collected. So, it touches on the validity of the research questions, methodological choices, sampling, research design, strategies for analysing data and the appropriateness of the results and conclusions. Reliability (or rigor) in qualitative research, meanwhile, focuses on consistency across research processes leading to the results and conclusions. It assesses whether the research is exact, thorough, careful and conducted with strict precision.

Following Riege (2003) and Yin (2017), this research uses a number of strategies to ensure validity and reliability. The strategies adopted are consistent with suggestions from Lincoln and Guba (1985) and Noble and Smith (2015). These strategies include;

- ✓ Meticulous record keeping. All correspondences with institutions and interviewees are archived for verification. Further, all data collected (audio recordings) together with transcriptions and the development of themes are saved, to allow these to be revisited if required.

- ✓ Audio recorded interviews to allow for repeated revisiting of data. This allows for themes to be cross-checked, ensuring that the analysis/results are consistent with the views of the interviewees.

- ✓ Interviews are transcribed very quickly after the interviews. Additionally, the research compiles handwritten notes during each interview to capture interviewee non-verbal gestures which may be useful in contextualising/analysing the interview transcripts at a later date.

- ✓ The analysis and discussion of results uses rich and thick verbatim descriptions of interviewees' responses to support conclusions. This provides evidence to justify some of the inferences drawn from the data.

- ✓ Triangulation; the findings from each interviewee and institution (case study) are triangulated by seeking out similarities and differences across different interviewee accounts.

- ✓ The interview protocol is developed sequentially with inputs from experienced Lean researchers and practitioners. The protocol is also piloted, and the results and experience gained from the pilot are used to revise the protocol. The final protocol is applied consistently across interviewees.

3.4 Surprises from the pilot study and subsequent adjustments: a narrative

At the start of this research, the goal was to use university X as a pilot to finetune the protocol and gain some additional insights prior to engaging in a larger main study. Prior to the pilot, the researcher read through several documents (secondary) discussing Lean at the pilot institution and also attended a Lean event organised specific to Lean in HEIs. The information obtained from these sources was key to developing the protocol and also giving the researcher background knowledge about the institution. Upon visiting the pilot institution, the researcher first had

conversations with some of the key individuals involved in Lean at the institution, and it became quickly apparent that the protocol would be useful for collecting useful data.

As will be subsequently discussed, the researcher was given substantial access to the pilot institution and had the opportunity to interview several individuals involved in Lean. The researcher was also given the opportunity to revisit the institution and to seek further clarification via email. There were a few tweaks in the protocol along the way, but broadly, very rich data was collected from this institution. Given the richness of this data, the quality of the access to very experienced Lean personnel and the subsequent challenges in getting access to other institutions, the researcher resolved to fully analyse the findings from the pilot. The initial pilot then became a major part of the study – the first phase of the study.

A second surprise from the pilot study was the possibility that new themes could emerge. The respondents were asked general questions about the benefits, demerits and challenges of implementing Lean. This allowed some respondents to talk broadly about the 6 soft issues explored (Motivation, Satisfaction, Retention, Autonomy, Stress and Workload), but also other soft issues which were have not been well documented in prior research. Specifically, as will be subsequently discussed besides the 6 soft issues, during the pilot (first phase of the study), additional evidence was found to suggest that Lean has an impact on HEI employees' psychological safety and the working environment. During the second phase of the study (main study) when respondents were responding to questions around the benefits of Lean in HEI, communication and organisational commitment (soft issues) also emerged as two further themes.

3.5 Ethical Issues

The study involves interaction with human participants. Hence, issues of ethics and ethical considerations arise. The research involves a study of several UK higher education institutions (Universities) adopting Lean management philosophies as an operation improvement methodology. It focuses on individuals who have been directly involved with Lean projects or have been impacted by Lean projects, including managers and front-line employees. The research follows the 10 principles for ethical consideration in social science research set out by Bryman and Bell (2007), which are presented in Figure 3.5.1 below. The figure also briefly indicates how each principle is adhered to.

Figure 3.5-1 Ten principles for ethical consideration. Source: (Bryman & Bell, 2007)

No Harm	Research participants will not be subjected to harm in any ways whatsoever
Respect for dignity	Respect for the dignity of research participants will be prioritized
Informed Consent	Full consent will be obtained from the participants prior to the study
Privacy and protection	The protection of the privacy of research participants will be ensured
Confidentiality	• Adequate level of confidentiality of the research data will be ensured
Anonymity	• Anonymity of individuals and organisations participating in the research will be ensured
Avoid deception	• Any deception or exaggeration about the aims and objectives of the research will be avoided
Declaration of conflicts of interests	• Affiliations in any forms, sources of funding, as well as any possible conflicts of interests will be declared
Honest and transparent communication	• Any type of communication in relation to the research will be done with honesty and transparency
Avoid bias and misleading	• Any type of misleading information, as well as representation of primary data findings in a biased way will be avoided

In terms of criteria for inclusion, all individuals participating in the study must be adults (able to provide informed consent) of working age. Gender is not an issue or factor in sample selection. All participants in the study must have been involved in Lean projects (at least one) in HE environment. Anonymity of all individuals and organisations participating in the research is guaranteed. Participants are informed of their rights and conditions for participation at various stages of the research; participant invitation and at the interview.

Ethical approval is sought and obtained prior to conducting the study. To ensure informed consent, when sending out the invitations, participants are sent an Informed Consent Declaration and a Consent Form (see Appendix) to sign.

3.6 Chapter summary

This section has discussed the methodology underlying this study, focusing on the ontological and epistemological philosophical stance, the research process, design and strategy (including the use of a case study approach), issues of validity and reliability of the research, and finally issues around ethics. The research questions lend themselves to an interpretivist philosophical stance and

an inductive research approach—which are adopted for this study. The research process builds on Voss et al.'s (2002) 7 steps for conducting case study research, starting with the design of research questions and ending with the dissemination of research findings. A number of strategies are employed throughout this study to ensure validity and reliability. Some of these include the use of rich and thick verbatim descriptions in discussions when providing empirical support to arguments, and the triangulation of results across different case institutions and different respondents drawn from the unit or department. Issues relating to data and sample selection are discussed in chapters 4 and 5. Overall, the figure below summarises the steps or research method underlying this research.

Figure 3.6-1: Steps followed to conduct this research

The next two chapters (chapters 4 and 5) builds on this chapter by reporting the results from the data analyses. Chapter 4 presents the results from the initial study while chapter 5 presents the results from the main study. In chapter 6, the results from chapters 4 and 5 are discussed in the context of existing literature.

CHAPTER 4:   PHASE I—PILOT & INITIAL STUDY

4.1 Introduction

4.1.1 Background and research gaps

Universities are fundamentally organised for teaching and research (services) and this service must, perhaps, be provided in a way that guarantees optimal "customer" experience. As would be discussed later, consistent with Radnor et al. (2012), the concept of "customer" in the Higher Education (HE) context, like in the Health sector, remains ambiguous. In the UK, HE has been the responsibility of devolved governments. Nonetheless, the funding allocated to HE by each government has been broadly reduced, perhaps, as a consequence of the global financial crises. Universities in England and Wales, in particularly, have sought to plug the funding gap by instituting higher tuition fees which are borne by the students - a key stakeholder and, perhaps, the main "customers" of HE. Given the link between student numbers and funding or revenue, there is growing competition between institutions to attract students. There is now more impetus than ever to pursue efficiency in HE to minimise resource use (e.g., time, human resources, finances and materials) on processes which do not add value to the end customer.

One way to achieve this is through the adoption of Lean management strategies, at the heart of which is the reduction of waste or elimination of non-value-adding processes. The challenge, however, lies in the fact that the "end-customer" in the context of HE, is unclear and hence, what constitutes value to the end-customer is difficult to identify. This, perhaps, poses a challenge in the development of Lean adoption strategies in this context. As will be discussed later in this chapter, perhaps, because of the ambiguous nature of the HE customer, the focus of Lean in this context had been on improving the level of efficiency and effectiveness in support and administrative processes. The customers of these processes constitute various university stakeholders including students, university staff members, university departments, suppliers, funders and the public, amongst others.

There is consensus amongst researchers that most organisations adopting Lean practices have enjoyed a significant decline in inefficiency and waste, evidenced by improved performance, greater productivity, improved product and service quality, greater throughput, reduced costs of

operations, smoother operations, lower waiting times and less fire-fighting, amongst others (Womack and Jones, 1996; Bhamu and Sangwan, 2014). Notwithstanding, as discussed in the literature review (Chapter 2) prior research exploring Lean implementation and the benefits of Lean adoption focus on private sector, profit-making, and, to a large extent, manufacturing companies (Chavez et al., 2013).

The relatively small number of studies exploring the adoption, implementation and success of Lean in the non-manufacturing, service and public sector setting (e.g., Staats et al. 2011; Hadid and Mansouri, 2014; and Radnor et al., 2012) have generally corroborated the argument for Lean implementation in such organisations. A few surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005 and Fearn, 2010) have explored the recent adoption of Lean management in higher education institutions (HEIs). Evidence from these surveys suggest that the process of Lean implementation and the experience across different UK institutions has been vastly different (Fearn, 2010; Radnor and Bucci, 2011). Clearly, several unanswered questions remain. Mainly, the researcher identified the need to explore the experience of current UK HEI Lean implementers, the motivations for adopting Lean, the process of Lean implementation, the challenges and benefits of Lean adoption and the impact of implementing Lean in this context. In this regard, the impact of Lean on soft practices (including organisational culture, employee working conditions and outcomes, amongst others) appears to be under-researched, particularly in the HE context (see Table 2.7.3). Indeed, a review study by Hasle et al., (2012) concluded that the relationship (positive or negative) between Lean and the working environment (even beyond the context of HE) is still unclear. The researcher aims to address some of these timely and important issues in this thesis.

4.1.2 Purpose and objectives of the initial study (phase I)

The initial study broadly explores Lean in UK HE context by focusing on two main research questions. These two questions are outlined below.

Research Question 1 (RQ1): What is the current state of Lean implementation in UK HE?

The first research question (RQ1) is subdivided into four sub-questions which will allow for the state of Lean to be extensively explored by looking at the background to Lean adoption, the perception of stakeholders, the benefits of implementing Lean and the challenges facing Lean implementers in this peculiar environment. These sub-research questions are outlined below.

1. What is the background (& motivation) for Lean adoption at University X?
2. What are perceptions of Lean from the point of view of UK HEI stakeholders?
3. What are the benefits of Lean in UK HEIs?
4. What are the challenges facing Lean implementers in UK HEIs?

Research Question 2 (RQ2): How does Lean adoption impact on employee working conditions and outcomes?

The second research question allows the researcher to explore the impact of Lean on soft practices including employee autonomy, workload, motivation, work related stress, job satisfaction and retention. This broad list of potential soft issues will lay the groundwork for a more detailed study of emergent issues of interest. The soft issues, identified from literature and included in the initial study, are fully discussed in Chapter 2.

The overall objective of the pilot and initial study is to validate that the right research questions for the thesis have been posed. The researcher expects to generate new insights from this phase of the research which will then be used to reshape the study and explore any new interesting issues that arise. The researcher will also be able further fine tune the main research questions based on the findings from the first phase of the study and in line with the literature review.

The methodology applied here has been fully discussed in the methodology chapter. Nonetheless it is worth reiterating that limited research has been conducted on Lean implementation in HE. Hence, following Percy and Rich (2015), the researcher adopts an exploratory research approach. As discussed in Chapter 3, the absence of validated knowledge on Lean in HE, supports the use of a qualitative approach to explore complexities in this environment. Case studies have been extensively used as a method of enquiry in social science research (Yin, 2017) and in prior research on Lean (Piercy and Rich, 2015). Voss et al. (2002) provide guidance on the use of case studies as a research tool in social sciences. Their framework identifies six (6) stages of case study research including; (1) defining the research question, (2) selecting a suitable case, (3) developing a research or measurement instrument, (4) collecting data, (5) analysing the data, and (6) disseminating results. This framework has been used in Lean research (see, for example, Piercy and Rich, 2015). The researcher uses Voss et al. (2002) framework to inform the research process in the first phase of the study. In the this phase, the researcher adopts a single case study approach focusing on one of the UK higher education institution (HEI), which has

considerable experience in implementing Lean. More information about the selected HEI is provided below in section 5.1.3.

In this chapter, the researcher only presents results and supporting evidence drawn from the initial study. The researcher will then link these with results and evidence drawn from the main study (chapter 6) which is discussed in the next chapter. The results from the two studies (i.e., the initial and main study) will then be integrated with the prior literature in the discussion chapter (chapter 7) that will follow.

4.1.3 The case-study – Some background information

The UK HEI selected for the pilot and initial study (referred to as University X, for anonymity) had explicitly implemented Lean techniques across several projects in different business functions for around a decade (i.e., since 2006). As of the 2014/2015 academic year, the university had a student population of more than 10,000. It employed more than 2,500 staff with over 60 percent working in administrative roles and 40 percent in academic roles. Additionally, while the University had a long history, it only implemented Lean around decade ago, but had since (2006) completed more than 100 small Lean projects across several different units. Hence, consistent with Eisenhardt (1989) the selection of the case study was not random, but driven by the research questions. In particular, the University had implemented Lean and had time to evaluate the benefits of Lean by being able to compare the pre-Lean and post-Lean experience. The University had a large staff body with, perhaps, enough respondents who were able to detail their experiences in the pre-Lean and post-Lean periods.

Further, consistent with Yin (2017), the selection of respondents was not random. The interviewees were selected based on their extensive experience and involvement in multiple Lean projects. Access to the University X was managed by first approaching the Head of Change (i.e., the individual who managed Lean projects within the University- Lean Champion) and explaining the context of the research. To identify other respondents, the researcher adopted a snowballing technique in which the Head of Change suggested other individuals who were well placed and knowledgeable enough to provide information that was useful in addressing the two research questions. It was also important to interview individuals who had been with the institution for over a long period, preferably, before Lean was introduced. This allowed for a comprehensive picture to be painted, particularly, about how Lean had benefited and challenged the institution, and how

Lean had developed over time. Further analysis could also explore the perceptions of respondents who were employed prior to Lean implementation with those who were employed after implementation.

In total, 12 individuals were interviewed during the initial study. Their roles varied from Head of Change to managers of different divisions/service units which had implemented Lean. All interviewees were directly involved in Lean projects (sometimes several projects). Their capacity of involvement varied from change manager to team member.

The table (Table 4.1.1) below summarises the position, tenure and capacity of involvement in Lean of the individuals interviewed during this initial study.

Table 4.1.1: Demographic details of individual involved in the Pilot Study

Interviewees (anonymized)	Position	Length of service	Capacity of Lean involvement
Respondent 1	Senior Consultant	10 years	Consultant
Respondent 2	Head of Change	13 years	Change manager
Respondent 3	Library Manager	20 years	Lean team member
Respondent 4	Finance Manager	5 years	Manager
Respondent 5	Library Manager	6 years	Project Leader
Respondent 6	Administrative Manager	26 years	Lean team member
Respondent 7	Business services Manager	6 years	Lean team member
Respondent 8	Finance Manager	32 years	Project manager
Respondent 9	Procurement Manager	2 years	Manager
Respondent 10	Safety Manager	26 years	Lean team member
Respondent 11	Change Manager	9 years	Lean team member
Respondent 12	Portfolio manager	5 years	Facilitation of Lean events

Due to the nature of the study, consistent with Papadopoulos et al. (2011), the researcher resorted to using semi-structured interviews with Lean managers and Lean project team members to obtain information required to answer the research questions. The questions were designed to allow the Respondent free reign to explore issues that they felt were pertinent. The reason for this

was to allow the researcher to pick up on new themes which might not have been thought of prior to the study. These new emerging themes are then further explored in the main study.

4.1.4 The interview protocol

The interviews started with a general introduction during which the interviewer introduced herself to the interviewee, reiterating the purpose of the study, seeking permission to record the conversation, providing assurances of full anonymity and requesting the interviewee to sign the informed consent form. In line with the research question the researcher sought to address, the interview protocol focused on five main areas: (1) background and motivation for Lean adoption in HEI, (2) perception, benefits and challenges of Lean adoption, (3) Lean adoption strategy and scope, (4) experience on individual Lean projects, and (5) soft elements relating to Lean. In the methodology chapter, the researcher has discussed the development of the questionnaire and procedure for ensuring validity. Below, the researcher outlines some general objectives of each of these areas explored in the interviews.

Background and motivation for Lean adoption: Besides getting to know the Respondent, the goal in this part was to understand why Lean was adopted as opposed to other improvement frameworks such as TQM or Six Sigma. Here, the researcher also explored whether the adoption of Lean was necessitated by a specific critical incident.

Perception of Lean: The objective here was to understand the view of the Respondent on what constitutes Lean (i.e., a definition) and what its grounding principles and objectives are, in the context of their institution. Follow up questions also explored whether Universities, as a unique type of institution, are suited to Lean and how Lean fitted within the institution's (University X) long term strategy or other initiatives.

Benefits of Lean adoption: The goal in this section was to explore the benefits of Lean in HE from the perspective of the Respondent. Respondents are encouraged to reflect on specific Lean projects and to discuss how the project benefited their unit or customers.

Challenges of Lean adoption: This section explored the challenges facing Lean implementers in the context of UK HEIs. The questions explored managing change in the context of UK higher education. It also explored some strategies used by Lean implementers to facilitate the introduction of Lean change program. Some of the issues discussed here were high-level and hence the

expectation was that these would be well articulated mainly by individuals in a more senior or managerial role.

Lean adoption strategy and scope: The objective of this section was to explore the approach to Lean adoption by the institution. Questions in this section looked at how projects were selected, what projects had been selected in the past and what the scope of Lean implementation was. Also key here was to explore some of the general challenges faced when implementing Lean in the context of HE – across different areas including operations as well as teaching & research.

Experience on individual Lean projects: This section delved deeper by looking at the experience in individual projects. The Respondents were asked to discuss their experiences on a particular project particularly, the benefits that Lean brought to particular areas from the perspective of staff working in these areas. Here, the researcher also explored issues such as resistance to change in the Lean context, strategies for improving Lean acceptance, and culture and Lean adoption.

Soft elements relating to Lean: In this section, the researcher focused on understanding how Lean adoption directly or indirectly impacted (facilitated or inhibited) on several soft elements in the workplace and the channels through which this occurred. Questions here solicited responses on how Lean affected staff retention, employee job-related stress, job satisfaction, motivation, autonomy and workload.

In closing the interviews, the respondents were asked to reflect on the direction Lean at University X might take in the future, whether there had been a cultural shift since Lean implementation, whether Lean was in fact the right decision for the institution and what, if anything, could they have changed to improve the outcome of Lean implementation on their projects.

Consistent with Piercy and Rich (2015), all interviews were tape recorded and transcribed immediately after the meeting. All interviews lasted between 50 minutes and 80 minutes. The longest interviews were those involving key Lean implementation agents such as the Head of Change and the Senior consultant. The interviews with these individuals covered all sections of the protocol. The interviews with team members were shorter as the focus of these interviews were on experiences on individual Lean projects and the impact of Lean on employees. Prior to the interview, by looking at the profile of respondents, the researcher identifies respondents who

would be best placed to provide information on certain issues. A summary of this is provided in Table 4.1.1.

The researcher supplements the interview information set with data from archival sources (such as Lean project documents and project case studies) which allows the researcher to build a fully comprehensive picture of the underlying context. The institution documents its Lean projects and produces case studies with information freely available to the public. The respondents also made other internal documentations available to the researcher.

Table 4.1.2: Respondents best placed to address specific issues

Section	Key issues	Suitable Respondents	Capacity of Lean involvement
5.2	Background and motivation for adopting Lean	1 and 2	Emphasis on Head of Change and Consultants
5.3	Lean adoption strategy and scope	1, 2, 4, 5, 8, 9 and 12	All roles, emphasis on Lean managers
5.4	Perception of Lean	1, 2, 4, 5, 8, 9 and 12	All roles, emphasis on Lean managers
5.5	Challenges of Lean adoption	1, 2, 4, 5, 8, 9 and 12	All roles, emphasis on Lean managers
5.6	Experience on individual Lean projects.	3, 4, 5, 6, 7, 8, 9, 10, 11 and 12	All roles, emphasis on Lean project managers and team members
5.7	Impact of Lean on employees (soft side of Lean).	3, 6, 7, 10, and 11	All roles, with emphasis on team members

4.1.5 Strategy for qualitative data analysis

The strategy for data analysis has been fully discussed in the methods chapter. Here, the researcher provides an overview of the strategy adopted to analyse the qualitative data collected from interviews. The approach to analysing the data is largely discursive. Here, following Braun and Clarke (2006), the researcher deploys a thematic analytical framework based on the interview protocol to explore recurring themes within the data. This method has the key benefit of being theoretically flexible, hence, it can be used to address a broad range of research questions (Braun and Clarke, 2006). The method has been deployed in several studies employing semi-structured interviews including Papadopoulos et al. (2011). Braun and Clarke (2006) contend that the purpose of thematic analysis is to identify patterns of meanings across a dataset with the aim using these patterns to address the research questions. The researchers emphasize that patterns can only be

identified through a rigorous process of data familiarization (i.e., reading and rereading through the data), data coding (categorizing data into identifiable groups), and theme development and revision. Braun and Clarke (2006) propose the following six (6) steps procedure to thematic analysis; (1) familiarization with the data, (2) coding, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) writing up.

The first step in the process as suggested by Braun and Clarke (2006), is familiarization with the data. This is a time-consuming process during which the researcher listens to the tape-recordings a few times and transcribes them verbatim. Secondly, the researcher re-listens to the tapes but this time tries to pick up cues and underlying meanings based on changes in tone and other mannerisms. These are appended to the interview transcripts to give the researcher a deeper insight of the Respondent's own experience.

The second step of the analysis (coding) focuses on identifying broad codes under which discussions could be organized. This step is facilitated by using semi-structured interviews in which specific issues such as perceptions of Lean, the benefits of Lean, the challenges of Lean implementation, etc. are discussed. Nonetheless, the researcher found that Respondents tended to go beyond the remit of questions, providing important information, which also needed to be analysed. These are therefore recoded under the relevant areas. For example, when Respondent 1 is asked about the background of Lean adoption at University X, besides providing an in-depth discussion and historical perspective on how Lean was introduced, also contended that *"[Lean is] ...a non-zero sum game..., a win win win for everybody involved...staff are advantaged as they no longer have to undertake the burden of waste activity, customers get what they want and the university achieves this by using fewer resources"*. Within the same question, the respondent also noted that *"Staff report they feel more motivated, they feel that their work is more manageable and they feel that they are better aligned to their customers and they enjoy doing that... Staff enjoy their work more, they feel more under control of that work and more able to do the right thing for the customer"*. The researcher recategorizes or recodes these under the broad codes including "Benefits of Lean adoption", "Impact on employees" and "challenges of Lean implementation". After attributing these statements to broad codes, the statements are then further classified under themes that summarise the meanings or interpretation of the statements. This process allows the researcher to identify some emerging themes (e.g., "Efficiency savings", "Time requirement",

"Motivation", "Satisfaction") which are then further explored for corroboration from other respondents. An example of this is shown in Table 4.1.3. Further details are provided in Table 3.2.3. Because of the nature of the questions, most the themes that emerged during this stage of the study were a priori from the literature.

Table 4.1.3: Coding the data and identifying themes

Codes	Themes	Examples
Benefits of Lean in HEI	Efficiency savings	*"…a non-zero sum game…, a win win win for everybody involved…staff are advantaged as they no longer have to undertake the burden of waste activity, customers get what they want and the university achieves this by using fewer resources".*
Challenges of Lean implementation	Time requirement	*"Lean might not be suitable for some areas such as academic. Implementation through rapid improvement events take time, typically 5 days. Academics are hardly available for the full five days".*
Impact on employees	Motivation	*"Staff report they feel more motivated, they feel that their work is more manageable and they feel that they are better aligned to their customers and they enjoy doing that... Staff enjoy their work more, they feel more under control of that work and more able to do the right thing for the customer".*
Impact on employees	Satisfaction	*"…it makes me happy…I feel like I have a voice…doing something good within that role, and actually I have more ownership of the work I was doing. It means making changes for which you can see the benefits".*

Braun and Clarke (2006) contend that, while the steps are sequential, the analysis will usually follow a recursive process where the researcher revisits prior steps to get a clearer view of the current steps. At each stage, the researcher focuses on picking up themes and the evidence to back their existence. In the initial study, the objective is to gather these emergent themes and build a broad picture of the nature of Lean in this context. As the research progresses to the main study, the researcher will review and streamline the themes, focusing on the most pertinent. In this chapter, therefore, the researcher only reports these emergent themes together with the evidence to support their existence.

4.2 Background and motivation of Lean in University X

Like most UK HEI, University X faced challenges due to dwindling government funding for HEIs and competition within the sector. University X established itself as one of the UKs leading

HEIs in terms of teaching quality and research output. Despite this success, internal processes and administration lagged behind and, hence, there was a general drive for improvement. The desire to seek alternative ways of working at University X is also attributed to emergent challenges, which came with the rapid growth in technology post-2000 and the increasing demand by stakeholders for technological solutions that could improve operational efficiency. Respondent 1 recalls being bombarded with requests for technological solutions from staff and departments. Some of these problems included dealing with piling backlogs. Rushing to technological solutions without getting to the root cause of the problem meant that new problems were likely to emerge down the line.

Lean was initiated in 2006 at University X after one of its managers attended a Lean conference and became aware of the benefits of Lean and its potential contributions to organisations. The idea gained significant traction due to support from top management after it was put forward to them. Respondent 1 recalls initial scepticism on whether Lean would work within a University environment despite its purported benefits. This scepticism was partly because institutions such as University X had been known to be lackluster towards the implementation of legislations such as The Freedom of Information legislation. The Respondent 1 noted, *"So there was legislation behind freedom of information and there were penalties, but people still choose not to follow it. So, when along comes Lean which I thought was going to be optional, I'm thinking, I can't get people to do it even if the law says so, why is Lean going to be any easier".* As suggested by Respondent 1, the challenge with Lean was that it was optional – Freedom of Information which was a legal requirement had struggled to gain any traction.

When compared to other organisations, the adoption of Lean in Universities has been slow to achieve, perhaps, because the key performance indicators (KPIs) in the sector are very particular. Many University stakeholders focus on KPIs such as Research and Teaching quality (captured in the Research Excellence Framework rankings), Student Satisfaction ratings (from the National Students Survey, NSS) and general University Rankings. There were no existing metrics to measure performance amongst universities in terms of their ability to manage cost or deliver effective and efficient value-for-money service. Respondent 2 noted that:

"We were ranked quite highly…so we were doing well, teaching and research, student experience was all fabulous. So, nobody never really looked at the back office to think about how we make our administration processes better."

Further, there were very few existing cases of Lean adoption in Universities (which were all mainly based in the United States) to refer to or to learn from, which made the adoption of Lean at University X (a UK university) in the early days much more difficult.

Noteworthy is the contention (Respondent 1) that no specific critical incident led to the decision to adopt Lean at University X. It was borne from the search for more effective ways of working and the desire to continuously improve what was being achieved at University X at the time. Lean provided an approach to identifying root cause of problems before finding a suitable solution to fix them. The strategy at University X had been to use a Lean approach to redesign different processes within the institution. This was operationalized by empowering staff to find innovative ways to improve work process by allowing for more flexibility in decision making. For example, allowing for decisions to be taken at a sub-management level without necessarily bringing them forth to a board (senior management).

4.3 Lean adoption strategy and scope at University X

The objectives of Lean at University X are in part driven by internal and external challenges being faced particularly the reduction in government funding for higher education and the need to deliver value for money services to its stakeholders. Nonetheless, the strategy for implementation had be organic and less than comprehensive. Lean implementation at University X is supported by a Change Unit – a department whose key remit is to support and facilitate change programs – without a mandate to "forcibly" implement Lean. As noted by one Respondent, the Change Unit had focused on implementing Lean in departments or service units who volunteer to adopt Lean. The approach had been to focus on small projects for which visible gains can be made. These visible gains serve as evidence allowing Lean to be sold as solution to other service units.

The backdrop of this approach as documented in archival sources is a failure of a previous approach which required (compulsory) staff involvement in the Lean movement. The main reason put forward for this previous failure was that the approach lacked "respect for people" and hence, staff engagement in Lean was low. Given this experience, Lean leaders focused on ensuring that

staff were engaged in the new process. The new softer approach to sell Lean based on evidence of value-added appears to have improved engagement in the process. Respondent 2, for example, recalls one of the earlier projects the team was involved in – Accounts payable. The initial process was overly complex requiring a significant number of hours to complete. This meant that suppliers were not getting paid quickly enough leading to a high volume of backlog, enquiries and complaints. The Respondent recalls, that the key objective of Lean on this project was to "*reduce the time it took to log invoices on the system*". The impact of Lean intervention is that the team "*saved the equivalence of one staff member's time*" but more importantly, the process became more efficient leading to happier suppliers.

The benefit of this evidence-based approach coupled with the voluntary nature of adoption, at least to the Lean team, is the opportunity to work across several different units at the University. This means that Lean had more quickly spread through the University as different service units have become more aware of how Lean can improve what they do. In support of this argument, Respondent 2 contends that "*...what this means is, we've not had a clear strategy on the way we worked but what that also means is, we've worked across the entire university...and now, a lot of people understand what Lean is about*".

Lean requires empowerment of employees to take control of their work and make continuous changes that will lead to improvement. Nonetheless, as noted by Respondent 1, the hierarchical nature of HEI means that "*…employees are not always willing or comfortable to challenge their bosses*".

Frequent changes in management (heads of academic departments) mean building and sustaining relationships need for Lean remains a challenge. As noted by Respondent 2, the solution had been for Lean leaders to "*...build relationships with office secretaries as they turn to know more about what is going on within the school*".

In terms of scope, Lean at University X has focused mainly on improving support and administrative processes. Hence, Lean implementation has not focused on the University as a whole. The main beneficiaries of these process are a vast array of "customers" including staff (teaching and non-teaching), suppliers and students. While students can be considered as the primary end-customer, the core service they receive from the University is in terms of teaching and learning. Support and administrative services are therefore only complementary. This will

suggest that the scope of Lean in context is limited as it does not address the main interests of the end-customer. The researcher will revisit the issue of Lean implementation in teaching and research later in the chapter.

4.4 Perception of Lean

This section discusses the perception of respondents with respect to what Lean is, and what some of its key characteristics (in the context of HEIs) are. Two Respondents with senior positions were directly asked about what they thought Lean was as applied to their context. Respondent 1 noted that Lean involves "…*expressing the fundamental respect for people in order to drive (not only to enable) the idea of always improving or constant betterment*". The Respondent added that "*respect for people*" is pertinent to Lean as Lean "*is about getting people together to genuinely engage with each other and to improve the way the organisation works*". The Respondent was also quick to criticize the idea of Lean as merely a "*reduction of waste*".

Another Respondent (Respondent 2) noted that Lean involves "…*the right people continuously searching for the simplest and smoothest process in order to meet the customer's needs perfectly*". The Respondent added that Lean in his/her mind involves doing "…*right thing, (at the) right time, (at the) right place, (at the) right quality, (at the) right cost, that is, just doing the right thing all the time*". The Respondent noted that two fundamental principles of Lean as applied to Lean in HE are "*continuous improvement and respect for people*". The argument put forward is that for Lean to be sustainable and to achieve its promise in the HE context, it must be grounded, driven and guided by these principles.

Figure 4.4-1: Summary of themes on perceptions of Lean HEI

Fundamental respect for people	Drive continuous improvement	Not as reduction of waste
Right people	Simplest and smoothest processes	Meeting customer needs perfectly
Right -things, time, place, quality, cost	Building effective teams	Improving communication
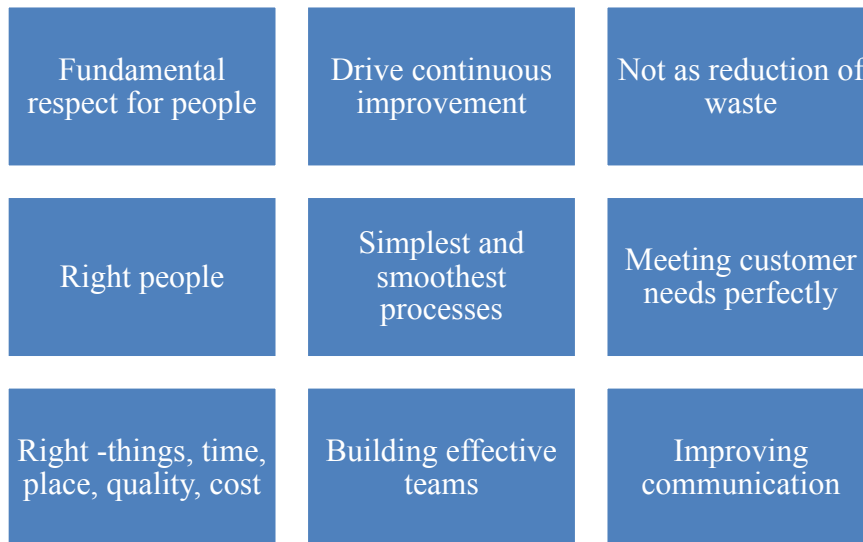
These perceptions (as captured by the above themes), perhaps, shaped the strategies employed for Lean implementation at University X. On reflection, it would have been interesting to also explore the perceptions of Lean team managers and team members in order to identify any emerging differences. It would also have been interesting to capture whether there was a change in perception, particularly for team members, during Lean implementation. This was however not addressed in the initial study but will be explored further in the main study.

4.5 Benefits of Lean in University X

Apparently, some of the key benefits of Lean services (Piercy and Rich, 2015) and Lean health (Burgess and Radnor, 2012) are also shared by Lean HEIs. This section explores some of the benefits of Lean in HEI as suggested by the respondents. One of the key benefits of Lean recurrently cited by respondents is the fact that it improves cross-functional communication and promotes transparency within HEI. Respondent 1, for example, noted that, prior to Lean "…*the University had, for whatever reason, a series of very strong organisational structures which were irregularly communicating with each other*". The respondent added that, Lean called for a process or systems thinking approach which was a way of "…*breaking barriers across those functions*" and enabling more fluid cross-functional communication. The importance of communication in building effective work in any context teams cannot be overemphasized. This is even more

pertinent to successful Lean implementation. For example, Womack et al (1990) and Lamming (1993) argue that clear communications and transparency are fundamental to Lean operations.

Universities traditionally have strong independent or autonomous organisational structures (departments, faculties, units) which are all involved in the delivery of the service but which may fail to communicate with each other. As suggested by respondents 1 and 2 (Lean managers), Lean allowed for a holistic process thinking approach in the delivery of the service (teaching and research) by breaking down barriers between different functions, departments, units etc. This is achieved through the development of cross-functional teams which are put together to embark on specific Lean projects. As noted by the respondents, cross-functional project teams allow staff to build an internal network which they can then leverage to improve their ability to work effectively and achieve much more within the organisation. On cross-functional teams and building of internal networks, Respondent 2, for example noted that *"...people are going get to know you. Because you are stuck with them in a room for five days [Rapid Improvement Events] you kind of get to know something about them. You are going to form those relationships [internal networks] ...you don't know X from accounts, you might have head of him but you spend four days in a room with him you get to know him".*

This contention is also shared by respondents who participated in Lean projects as team members. Nonetheless, these Respondents were not directly asked about the benefits of Lean but about the impact of Lean based on their experiences in specific projects. This is explored in greater detail the soft-side of Lean in HEIs. Overall, there was a consensus that Lean had contributed positively to the university, with Respondent 1 describing their experience of adopting Lean as *"...a non-zero sum game..., a win win win for everybody involved...staff are advantaged as they no longer have to undertake the burden of waste activity, customers get what they want and the university achieves this by using fewer resources".*

The findings on benefits of adopting Lean in this context largely mirror those reported from other contexts. Nonetheless, the challenges faced in the context are unique, and hence, allows us to contribute to this literature.

4.6 Challenges of implementing Lean in HEI

The challenges of implementing Lean in organisations had been documented in prior studies, hence, this initial study focused on the unique challenges which face HEIs implementing Lean. Prior to interviews, the researcher reviewed documents compiled by Lean project managers at University X. Some of these documents discussed the unique challenges that faced the implementation of Lean at this institution. Lean implementers at this institution contend that the negative perceptions (e.g., that Lean adoption leads to employee layoffs and increase in workloads) about Lean and its potential impact of Lean initiatives on employees posed a major challenge in their efforts to sell Lean to process owners. They also note that implementation of Lean takes time (a scarce resource) hence, convincing process managers to invest in Lean initiatives in order to reduce or eliminate waste appears to be counter intuitive at first sight.

As in other sectors, developing the culture of continuous improvement remains a challenge to Lean implementation. Further, the lack of sufficient information to inform and support process redesign as well as the lack of adequate technology to support new initiatives and new processes posed another challenge. Finally, as with other initiatives, Lean introduces change, which is usually met with some resistance in most contexts. The researcher had these documented issues in mind prior to interviews. Hence, the interviews focused on exploring other challenges which Lean implementers in University X might have faced.

In discussions, Respondents 1 and 2 suggested that the structure of Universities and how they have traditionally been managed (i.e., autonomously run academic departments/schools and administrative areas), posed a major challenge to Lean implementation. While autonomously run, the customers (students) are serviced by these different units which might not be communicating with each other. The service can therefore be fragmented. Lean in HEIs aims to address this by promoting a systems-view of the entire organisation.

While Lean holds great promise, Respondents suggest that it is challenging to implement Lean approaches in the area of teaching and research. Respondent 4 noted that performance at University X was traditionally assessed in terms of teaching & research rankings and student satisfaction ratings. University X had historically ranked highly across these metrics so the need for Lean, particularly in the area of teaching and research, was not immediately clear and difficult to justify. Respondent 1 suggested that the output of research is different each time, hence it is challenging

to standardize the underlying processes. In terms of teaching, there is the need to identify what processes can be standardized. On the issue of academic staff resistance to adopt Lean approaches (discussed in Radnor and Bucci, 2011) Respondent 1 contend that academics are overly focus on their subjects without much appreciation or time to explore much else beyond. Nonetheless, they can be engaged, if they are made to understand that the purpose of Lean is to streamline their work so they can focus their efforts on teaching and research. The Respondent noted that *"...creativity (in research) requires chaos, Lean can create the space to allow chaos to happen"*.

Consistent with this view another respondent (Respondent 8) noted that it is important to send the message across that the institution is there for teaching and research and to achieve high student satisfaction. As part of this, it is important that time and resources are not spent on clunky work processes and practices which do not work for the benefit of stakeholders but take away resources which could be better used delivering high quality teaching and funding world class research.

Lean can eliminate wasteful process, potentially freeing up time for academic staff to engage in more value-adding activities. While useful in this area, it is difficult to implement. Respondent 2 noted that, *"Lean might not be suitable for some areas such as academic. Implementation through rapid improvement events take time, typically 5 days. Academics are hardly available for the full five days"*.

Nonetheless, a number of respondents acknowledge that Lean had a place in higher education. Respondent 2, for example, contends that "…*Universities are a kind of soft organisation with no rigid system of control, …, man management, hence, is kind of soft and flexible, making the system a great fit for Lean*".

The research reveals that the objectives of Lean higher education are aligned to those of Lean service and Lean manufacturing. A key objective is to enable process improvement in the short run, and to build a sustainable framework for continuous improvement. Respondent 2 contends that a key objective is to get people to think "Lean" and prevent them from creating clunky processes and hence, problems. The Respondent emphasized that *"people need to be thinking about the best way of doing things"* and hence, the Lean team focuses on the idea of enabling a "*culture change*".

4.7 How Lean projects were managed

It was earlier noted that the Lean team had adopted a project-by-project or organic approach to Lean implementation in which it focused on improving small individual processes across different service units in the institution. In this section, the researcher discusses the model for Lean implementation at University X. This draws on data collected from interviews and is supplemented by archival data. The model used for Lean implementation is discussed below.

Figure 4.7-1: Model for Lean implementation at University X
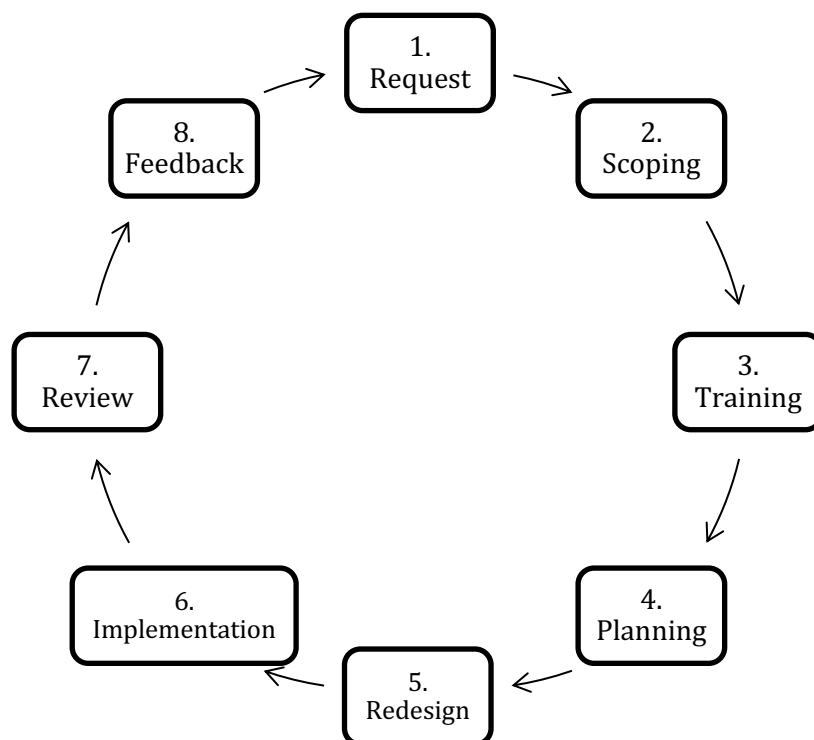
Table 4.7.1: Purpose, Timing and Key outcomes of the different phases of Lean implementation

Phase	Purpose	Timing	Key Outcome	Who is leading, who is involved
Request	Discussion on whether an idea for	1 to 2 hours	✓ Identification of issues ✓ Statement of vision ✓ Identification of deliverables ✓ Knowledge transfer on 8-step process	Consultants & Managers

	improvement should be pursued.			
Scoping	Discussion on whether an idea for improvement should be pursued.	2 to 4 hours	✓ Definition of issues, identification of project aims and project vision. ✓ Identification of data requirements and deliverables ✓ Identification of Lean team members	Consultants & Managers
Training	Education and familiarization with Lean	3 to 4 hours	✓ Understanding the basics of Lean ✓ Understanding what is involved in the Rapid Improvement Process	Consultants & Project team
Planning	To seek and obtain buy-in from Lean team members	2 to 4 hours	✓ Team members comprehend need for Lean project ✓ Dates, times, venues set and agreed. ✓ Deliverables and data requirements set and agreed ✓ Manager's commitment to process obtained	Consultants & Project team
Redesign	Focal point of Lean in this context. Delivery of new process	1 to 5 days	✓ Understand current process ✓ Generate and analyse new ideas for improvement. ✓ Develop new process ✓ Learning Lean tools and techniques	Consultants, Managers & Project team
IImple-mentation	Instating the new process	As required	✓ New process goes live.	Consultants & Project team
Review	Build Lean momentum and staff motivation	2 to 3 hours every fort night	✓ Meet deliverables ✓ Complete actions ✓ Barriers identified and removed ✓ Resolve unanticipated and pending issues	Consultants, Managers & Project team
Feedback	Assess success of project Review and discuss improvements Identify areas for development	1 to 3 hours, 3 to 12 months after last review.	✓ Identify and record benefits ✓ Review the 8-step process ✓ Identify further work	Consultants, Managers & Project team

The change process is led by the consultants who act as Lean champions. Unit managers (internal sponsors) own the process and lead the Lean project team which they put together with the aid of the Lean champions (facilitator, consultants or experts). The Lean champions remain active providing guidance and support across all 8 steps in the process. In the process, the unit manager plays several key roles; providing specialist knowledge of the area, commissioning and launching the project, removing barriers to project implementation and providing feedback on the Lean process. Lean team members (project team) play several roles including; participating in the training (step 3), committing to agreed and to gather data (step 4), committing to the implementation plan (step 5), implementing the process and data gathering (step 6), identify issues and contribute to problem solving (step 7) and proving feedback on the process (step 8).

The request phase requires the identification of a process to be improved. This is usually in the form of a voluntary submission (by a manager) from a service unit within the university. At the scoping phase, the goals of the project are identified, together with the resources required and the personnel (project team members) to be involved. Project team members usually constitute those directly involved in the underlying process. The next phase involves introducing members of the project team to core Lean concepts. This is led by the consultants or Lean champions. This stage is then followed by a development of a project plan which details goals, approaches, and timeline. At this phase, the project's data requirements are also reviewed and agreed with all team members. The redesign phase involves the development of a new process (by the project team) which is distinct and different from the old process and adheres to the initial goals set. This new process is then fully documented to facilitate implementation. Implementation involves the replacement of the old process with the new. This new process is then continuously monitored to ensure success. During the review phase, any barriers to implementation such as the need for training or additional resources (e.g., equipment, space, personnel, materials etc.), are identified and addressed. This review concludes the project, at which time feedback on performance and experience of staff is collected. This feedback can then be used as evidence of the benefits of Lean. This model for Lean implementation allows for sustainability with successful Lean implementation acting as a catalyst for Lean adoption.

The Lean team had applied this model to improve several processes such as the management of accounts payables, the recruitment of new staff, the issuing of student certification letters, the re-shelving of library items and the cataloguing of new library items amongst others.

Looking at the re-shelving of library items project, for example, archival evidence suggests significant benefits of adopting Lean methods in this context. The library at University X holds close to a million books, print and electronic journals, DVDs and several academic databases. Most of these items are physical implying facilitating access is central to the quality of service provided by the unit. Pre-Lean, the unit faced issues including lack of sufficient bookshelves (hence, crowded bookshelves) which made access difficult and increased the risk of damage to these items. During the Lean project a number of aims were identified including (1) To enable all items to be re-shelved in at most 4 hours (2) to develop a consistent process for re-shelving items (3) to ensure resource adequacy to support the process at all times (4) to generate weekly reports on activity in the unit. The Library Re-shelving Team formed the Lean project team. This team undertook a three-day rapid improvement event (RIE) during which several issues to be improved upon were identified. The pre-Lean data suggested that in the current re-shelving process, each item was handled 10 times and sorted 4 times and it took anywhere between 2 and 7 hours for items to be returned to shelf. It was clear from the use of standard process mappings that several points of over-processing and unnecessary handling existed. The objectives of the process redesign were therefore to reduce waste from transportation and stockholding (batches). To achieve a new Leaner process, the unit therefore invested in new ergonomic trolleys and a larger sorting space located closer to the returns desk. The new process means that books are now handled only 6 times (from an initial 10 times) but still sorted 4 times. The return-to-shelf time has now been reduced from a maximum of 7 hours to a maximum of 4 hours. Further, the unit has adopted recommendations to enable continuous data collection which allows it to better forecast demand for its services and hence improve its allocation of resources (staff-hours). This is one of several successful Lean projects that have been completed at University X.

Noteworthy is the absence of a framework for sustaining and institutionalizing Lean in this context. For example, per the model, the projects are facilitated by the senior consultant or Lean champions who play a pivotal role in the entire process. Based on the researcher's review, there are no systems in place, at the end of each project, to build capacity so that Lean can be self-

sustaining and institutionalized in the long run. It is probably that this is being achieved by independent initiatives, but it is unclear how other teams learn from the experience in successful projects. This will be further explored in the main study. Also noteworthy is the fact that the process appears to be a top-down process initiated by service managers and supported by Lean champions/consultants, who together then get team members involved once a decision to proceed is reached (i.e., after feasibility studies have been completed). Further, it is not known whether the decision to proceed with one project is contingent on other projects being completed, hence, there is no explicit requirement to sequence projects.

4.8 Impact of Lean implementation on employees

4.8.1 Overview

One of the key contributions of this thesis, is to explore the soft side of Lean by looking at its impact on employee working conditions and outcomes, focusing particularly at employee motivation, satisfaction, retention, autonomy, work-related stress and workload. In the initial study, these different dimensions of working conditions and outcomes are explored by asking Lean managers and Lean team members about their perceptions of the impact of Lean on employees. In the initial study, the researcher focuses on all of these dimensions in order to gain a preliminary insight of the impact of Lean on soft elements in the workplace. These issues will again be explored in more depth in the main study. As discussed in the literature review (Chapter 2), these dimensions are not necessarily independent of each other. For example, less work-related stress can result in higher job satisfaction which may in turn result in higher employee motivation.

The results from the 12 interviews with professionals involved in the implementation of Lean in one HEI are summarised in Table 4.8.1 below. Six (6) of the themes (employee motivation, employee satisfaction, employee retention, employee autonomy, employee job-related stress and employee workload) were a priori determined. Two (2) themes (i.e., psychological safety and working environment) emerged from discussions with respondents and were then explored for corroboration in subsequent interviews.

In Table 4.8.1, results are presented in the order in which the interviews were carried out. In Tables 4.8.2 and 4.8.3, the results presented in Table 4.8.1 is re-ranked first by the role of the employee i.e., whether a Lean project manager or a Lean project team member (as in Table 4.8.3)

and next, by the tenure of the employee, i.e., number of years employed at University X. The objective of Table 4.8.2 is to explore whether the perception of the respondents is shaped by their role (manager or team member) in the project. Given the nature of the data, the researcher can further explore whether length of service potentially explains differences in employee perceptions. Recall that Lean was implemented in University X in 2006, about 10 years ago (from the date of interviews). This may suggest that respondents who have a length of service of above 10 years were working at University X prior to introduction of Lean, or otherwise. Whether these employees were involved in Lean projects or not, was not ascertain during the data collection for the initial study. Hence, the objective here is simply to see whether there are any observable trends when respondents are ranked by their length of service.

Table 4.8.1: The soft-side of Lean: Summary results from interviews

Working conditions and outcomes	Responses from respondents												Total		
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R 10	R 11	R 12	#Y	#U	#N
Improves employee motivation	Y	Y	N	Y	U	N	N	Y	N	N	Y	U	42%	17%	42%
Improves job satisfaction	Y	Y	N	Y	U	N	N	Y	N	N	Y	U	42%	17%	42%
Improves employee retention	Y	U	N	Y	U	N	N	Y	N	N	N	N	25%	17%	58%
Increases employee autonomy	Y	Y	N	Y	N	U	N	Y	N	N	Y	Y	50%	8%	42%
Reduces work-related stress	Y	U	N	Y	U	Y	N	Y	N	Y	N	Y	50%	17%	33%
Reduces workload	N	N	N	N	N	Y	N	N	N	N	N	N	8%	0%	92%
Improves empl. psychological safety	Y	Y	N	Y	U	N	Y	Y	N	U	Y	U	50%	25%	25%
Improves working environment	Y	Y	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	92%	8%	0%

Notes: R1 to R12 indicates Respondents 1 to 12. Y indicates "YES", N indicates "NO", U indicates "UNCERTAIN". %Y, %U and %N provide a percentage of Y, U and N, respectively, for each working condition/outcome.

Table 4.8.2: Summary results from interviews: Perceptions of managers versus team members

Working conditions and outcomes	R 1	R 4	R 2	R 5	R 8	Summary Percentages			R 3	R 6	R 7	R 9	R 10	R 11	R 12	Summary Percentages		
Role	M	M	M	M	M	%Y	%U	%N	T	T	T	T	T	T	T	%Y	%U	%N
Improves employee motivation	Y	Y	Y	U	Y	80%	20%	0%	N	N	N	N	N	Y	U	14%	14%	71%
Improves job satisfaction	Y	Y	Y	U	Y	80%	20%	0%	N	N	N	N	N	Y	U	14%	14%	71%
Improves employee retention	Y	Y	Y	U	Y	80%	20%	0%	N	N	N	N	N	N	N	0%	0%	100%
Increases employee autonomy	Y	Y	Y	N	Y	80%	0%	20%	N	U	N	N	N	Y	Y	29%	14%	57%
Reduces work-related stress	Y	U	Y	U	Y	60%	40%	0%	N	Y	N	N	Y	N	Y	43%	0%	57%
Reduces workload	N	N	N	N	N	0%	0%	100%	N	Y	N	N	N	N	N	14%	0%	86%
Improves psychological safety	Y	Y	Y	U	Y	80%	20%	0%	N	N	Y	N	U	Y	U	29%	29%	43%
Improves working environment	Y	Y	Y	Y	Y	100%	0%	0%	U	Y	Y	Y	Y	Y	Y	86%	14%	0%

Notes to table 2: R1 to R12 indicates Respondents 1 to 12. Y indicates "YES", N indicates "NO", U indicates "UNCERTAIN", M indicates "MANAGER", T indicates "TEAM MEMBER". %Y, %U and %N provide a percentage of Y, U and N, respectively, for each working condition/outcome.

Table 4.8.3: The Soft side of Lean: Results ranked by length of service

Length of service (years)	2	5	5	6	6	9	10	13	20	26	26	32
Respondent	R9	R12	R4	R7	R5	R11	R1	R2	R3	R10	R6	R8
Improves employee motivation	N	U	Y	N	U	Y	Y	Y	N	N	N	Y
Improves job satisfaction	N	U	Y	N	U	Y	Y	Y	N	N	N	Y
Improves employee retention	N	N	Y	N	U	N	Y	U	N	N	N	Y
Increases employee autonomy	N	Y	Y	N	N	Y	Y	Y	N	N	U	Y
Reduces work related stress	N	Y	Y	N	U	N	Y	U	N	Y	Y	Y
Reduces workload	N	N	N	N	N	N	N	N	N	N	Y	N
Improves empl. psychological safety	N	U	Y	Y	U	Y	Y	Y	N	U	N	Y
Improves working environment	Y	Y	Y	Y	Y	Y	Y	Y	U	Y	Y	Y

Notes: R1 to R12 indicates Respondents 1 to 12. Y indicates "YES", N indicates "NO", U indicates "UNCERTAIN". Respondents with length of service below 10 years were not employed at University X prior to the introduction of Lean.

In general, the results suggest differences in perceptions between different parties involved in Lean projects. Particularly, as shown in Table 4.8.2, the researcher finds that respondents with managerial positions (e.g., Lean project managers and consultants) are more likely to perceive Lean as having a positive effect on employee working conditions and outcomes compared to Lean project team members. As in Table 4.8.3, there appear to be no discernable differences in perceptions between respondents with a length of service of 10 years and below versus those with a length of service of greater than 10 years. Respondents' perceptions of the individual soft issues are discussed in more detail below.

4.8.2 Effect on employee motivation

As discussed in Chapter 2, motivation generally refers to internal drive, effort, commitment and desire for high level performance that employees bring to the workplace. Respondents were asked about the perception of the effect of Lean programmes on the level of employee motivation. The researcher found that 42 per cent of the respondents agreed that Lean had improved employee motivation, but an equal proportion of respondents disagreed. The remaining 17 per cent of respondents were unsure about Lean's impact on employee motivation in the projects they were involved in. The respondents (Lean project managers, in particular) noted that despite some

resistance to Lean adoption, in the long-term employees are generally more motivated because of Lean implementation.

The perceptions of managers and team members appear to be different. For example, Respondent 1 noted that *"Staff report they feel more motivated, they feel that their work is more manageable and they feel that they are better aligned to their customers and they enjoy doing that... Staff enjoy their work more, they feel more under control of that work and more able to do the right thing for the customer"*. Lean team members on the other hand, contend that employee motivation is sometimes quelled when staff are empowered in principle but not in action. Respondent 1 also noted that *"Staff are empowered to come up with solutions which when put forward are sometimes undermined by senior managers. This becomes very challenging for those staff, very demotivating and disengages them with the institution"*. This view was shared by other respondents (Respondents 2, 4, 8 and 11). Other respondents (Team members, in particular) did not fully share this contention. For example, Respondent 5 stated that *"... it's been a few of the things that we haven't been able to complete that have led to frustrations... we spent that time, we invested that time...and senior management are meant to have bought into it and accept it but sometimes that didn't happen..."*. Clearly, there are some differences in the perception of respondents about the impact of Lean on staff motivation and these differences appear to be dependent on the Respondent's role in the Lean team.

4.8.3 Effect on employee satisfaction

Employee satisfaction can be regarded as the extent to which employees within an organisation are content with their roles. The respondents were directly asked about their perception of the impact of Lean on staff satisfaction. Similar to the case of employee motivation, researcher found that 42 per cent of the respondents agreed that Lean had improved employee satisfaction, an equal proportion of respondents disagreed and the remaining 17 per cent of respondents were unsure about Lean's impact on employee satisfaction. Again, they appear to be some marked differences and the responses provided by team leaders (management) versus those provided by team members. Respondents at management level suggest that Lean implementation had led to higher levels of staff satisfaction with the work they do. One of the respondents (Respondent 2) noted that *"...they [staff] are going to have the input, it is going to be their ideas, they themselves are going to be valued, respected. They are going to be something out of the*

ordinary day job, I think it is great for people." Another manager (Respondent 12) contends that staff are more likely to be satisfied as the Lean projects are put forward or requested by them. The Respondent noted that *"I think, that [job satisfaction] is one of the key things about Lean. Team members will get job satisfaction if they come up with the idea to say, why don't we do this and it gets implemented and they can see the benefits. Then, you know, I think there is definite personal satisfaction for members of staff"*. This perception is not entirely shared by team members. A few team members did not feel that Lean implementation had changed their job satisfaction or that of members of their team. They acknowledge that they now have more responsibility and voice in what happens at the workplace. Respondent 11 at a team member level noted that *"…it [Lean projects] makes me happy…I feel like I have a voice…doing something good within that role, and actually I have more ownership of the work I was doing. It means making changes for which you can see the benefits"*.

4.8.4 Effect on employee Retention

Employee retention captures an organisation's ability to retain the services of its employees over a long period. Hiring, training and development of employees is an expensive process and hence, staff retention is critical for efficiency. Presumably, for Lean to driving efficiency within an institution, it should not lead to low retention. It is worth acknowledging that some level of staff turnover is healthy i.e., if the turnover pertains to staff who do not fit within the organisation then this is positive for the organisation. Lean introduces change which may lead to some staff who are resistant to change deciding to leave the institution. The question on employee retention directly explores the perceptions of respondents about the impact of Lean on staff retention. Particularly, the researcher seeks to explore whether Lean project team members perceive that some staff might have left the organisation as a direct consequence of the introduction of Lean. From discussions with respondents, the researcher finds no evidence that Lean might have directly led to a higher level of staff turnover. From the responses, 25 per cent of respondents agreed that Lean improved retention, 17 per cent were unsure about Lean's impact on employee retention while 58 per cent disagreed that Lean improved retention. Whilst there is no hard evidence that employee retention had increased, Respondent 2 noted: *"I don't think people have taken to their heels to escape the university because of Lean. It may have been a contributing factor to some people staying rather than leaving because it suddenly made life more interesting for them and they may have felt more valued just a consequence"*.

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The issue of "resistance to change" was picked up by a few of the respondents with some suggesting that this might have been a contributing factor to staff turnover. On the issue of resistance to change, Respondent 6 admits that, *"… you still get the odd person who is not willing to change and not willing to get involved"*. The lack of willingness to accept change had different impacts on different staff with some leaving their role, not as a directly result but, perhaps, an indirect consequence of Lean implementation. One manager (Respondent 8) noted that *"…probably some staff who I will class as rocks, left. Not specifically because of Lean but because we have moved into a changing environment, and people who may have been certain about their ways have found that quite difficult"*. The suggestion therefore is that while there has been some staff turnover since the inception of Lean, this cannot be fully attributed to Lean adoption.

4.8.5 Effect on employee autonomy

Prior research suggests that micro-management can lead to employee demotivation. Autonomy refers to a state where employees feel they have a choice and [some] control over the work they do. Autonomy is, perhaps, critical in creating and maintaining employee intrinsic motivation in the workplace. The researcher finds that 50 per cent of respondents agree that Lean improves employee autonomy, 42 per cent disagree, while 8 per cent were uncertain. Responses from the respondents suggest that, due to Lean, staff at University X are empowered to take more ownership of the work they do by implementing Lean techniques at the local level. Hence, Lean adoption had potentially, increased the level of employee autonomy within participating departments. Respondent 2 noted that there are still issues with building employee confidence to a level that will allow and support full autonomous working. The Respondent noted that *"So if I looked at the training I ran this morning, people provide feedback sheets and I looked at them all. One of the areas for feedback was about how confident they were in terms of actually making changes in their area, you know, using some of those Lean tools. Many of the people had indicated somewhere in the middle reasonably confident or lower."* A few respondents were uncertain about Lean's impact on employee autonomy. Overall, the responses suggest that Lean managers believe that Lean improves employee autonomy, but team members believe that Lean decreases employee autonomy.

4.8.6 Effect on employee job-related stress

The effect on job-related stress is mixed. The results show that 55 per cent of respondents agree that Lean reduces job-related stress, 33 percent disagree and 17 per cent were uncertain. Amongst managers, 60 per cent agreed while 40 per cent were uncertain about Lean's impact on employee job-related stress. The spread was more even for team members with 43 per cent agreeing and 57 per cent disagreeing. Some of the respondents' contentions are highlighted below. Respondent 2, for example, contends that *"...Lean make things easier but it may raise stress in other areas because they [staff] might be thinking I have got to be thinking about something else, that is another process, we can improve. They might be a lot of stress around actually putting a new process in to place"*. Respondent 2 further suggests that *"Rapid improvement phase brings stress and anxiety as staff try to figure out how things should be done…Once the process is sorted. Stress levels go down as things improve"*. A few respondents contend that Lean had brought with it a culture of continuous performance measurement through the setting of targets, and this raises employee stress levels. For example, Respondent 3 noted that *"… previously it was stressful to see the number of books that were waiting to be done. And now it might feel stressful to have certain targets to meet. So, I think probably the kind of stress levels are about the same but for different reasons"*.

4.8.7 Effect on employee workload

Almost all interviewees agree that Lean does not decrease workload. Workload either increases or stays about the same. Ninety-two (92) per cent of respondents contended that Lean does not increase employee workload. In the sub-sample of managers, all managers (100 per cent) agreed that Lean does not increase workload. Just 14 per cent of team members thought workloads increased because of Lean. The argument put forward by several respondents (managers, in particular) is that, even though workload increases, staff now do more interesting work, using more efficient methods. The time saved by avoiding waste is generally redeployed in other useful areas. This is clearly captured in the following statement made by Respondent 2 who stated that *"...if we stopped doing some of the things that we don't need to do because we stripped the waste out of the process, then the workload might go down. But what we are looking for is not to make the workload go down, we are looking to make sure we are doing the right thing…the workload of whoever is doing the wrong thing should go down. The actual workload itself would stay the same because in*

the time that they have saved...they can get on and do some other things." A majority of team members agreed with this view, noting that their work became more interesting, and provided more effective ways of working, even if they were required to achieve more.

4.8.8 Effect on employee psychological safety

The culture of measuring success in HEI via positions in league tables and accreditations makes it difficult to convince stakeholders of the need for further efficiency in operations. Respondent 2 recalls sustained efforts (including guarantees that Lean will not result in job losses) to dispel fear, suspicion and mistrust from employees when the Lean programme was initiated. *"...we have made Lean work quite successfully in University [X] by providing an environment that is free from fear. People understand we are here primarily for process, we are here to give you tools and techniques, we are here to change culture but not about cutting costs, not about saving money, not about your job. It is about how can we make this university better than it is? And you know we need your help to go on that journey."*

Other respondents (1, 2, 4, 8 and 11) agreed that Lean improves employee psychological safety through better team building and strengthened personal relationships across functions. To support this, Respondent 2 added that *"...people are going get to know you. Because you are stuck with them in a room for five days [rapid improvement events] you kind of get to know something about them. You are going to form those relationships...you don't know X from accounts, you might have head of him but you spend four days in a room with him you get to know him. You get to know a bit about how he thinks, what he does, what motivates him, he becomes a person to you".*

Employees become more aware of the role they play within the institution and how their contribution leads to overall success. They get to work with one another and begin to feel like an essential part of the whole institution.

4.8.9 Effect on working environment

Respondents note that there had been little change in physical working environment in most cases. Nonetheless, there have been substantial improvements in working relationships and communication since the implementation of Lean. Working relationships have improved as people now work together on projects, communicate cross-departments and see upstream and downstream links with work done in other units. For example, Respondent 6 noted that *"...for the majority it*

[working environment] has improved greatly. We are all working better together, speaking to each other, which we weren't before and we are working closer as a team". This is further corroborated by another Respondent (Respondent 7) who noted that *"…[Lean] has led to better team working. Our project involved three or four different departments. The Lean approach brought everyone together and helped people communicate more effectively"*. Similarly, Respondent 8 noted that *"…it [Lean] has not affected it [working environment] in any way but I think staff are more engaged and feel a bit more responsible for the work they do"*. Respondent 2 added that the adoption of Lean had led to a substantial reduction in silo mentality and blame culture which had improved the overall working environment.

Overall, many of the respondents had nothing negative to say about Lean implementation. One of the respondents (Respondent 8) noting that *"I can't honestly think of anything negative to say about Lean. Yes, you might have some projects that don't go as well as others…you might have processes that fail because of a lack of engagement from key stakeholders. [Nonetheless], if you get the right people of the table then, I think Lean can only be positive"*

4.9 Conclusion

4.9.1 Summary of findings

Lean in HEI is a relatively new concept with few implementers to date. The results from this analysis shed light on the contextual benefits, challenges and impact of Lean implementation within this unique context. The fact that implementers do not have a point of reference remains a significant challenge, amongst others discussed in the paper. In the case study, it is found that Lean leaders spend a lot of time educating stakeholders so that Lean can be self-driven. Other approaches of implementing Lean (e.g., by obligation) appear to have been met with much more resistance in this setting. One reason for this is general liberal culture (termed "academic freedom") in this context. Training events are used to share ideas on Lean tools and techniques. These events also bring together management and staff, allowing management to concede that staff have brilliant ideas, leading to empowerment down the line. Staff who are knowledgeable about Lean become more comfortable at constructively challenging management, ever seeking new ways to improve processes.

Some of the main benefits of Lean (e.g., improving customer satisfaction, increased efficiency etc.) in the manufacturing, service and other public sector organisations (such as the NHS) documented in prior research are also shared by Lean HEIs. Nonetheless some of the challenges faced by Lean HEIs are, seemingly, unique to HEIs (and other public organisations). These include the difficulty of implementing Lean techniques in the areas of research and teaching and, perhaps, the challenge of bringing together previously (or culturally) autonomous units, departments and faculties.

Incidentally, while the evidence suggests Lean had led to efficiency in HE service provision, its impact on working conditions and outcomes of frontline staff is, perhaps, not fully understood even by deployment managers. There are peculiar differences in perceptions of Lean managers and Lean team members in terms of the benefits of Lean with HEI and its impacts on employee working conditions and outcomes. HEI Lean managers seem to believe that Lean had a positive impact on their employees in terms of job satisfaction, motivation, and work-related stress. This is however not fully supported by the views of the Lean team members. There is broad consensus that Lean improves the working environment and the psychological safety of employees but does not decrease employee workload.

It is worth reiterating that as found in this case, when mapped against the sustainable Lean iceberg (Figure 2.4.2) and the milestones of Lean maturity models (Figure 2.4.3), Lean HEI is still at its infancy. The emphasis is not a University-wide Lean adoption but the use of Lean methods to improve efficiency and effectiveness in the delivery of support and administrative services.

4.9.2 Contributions and relevance of the study

While some studies have been done on Lean in the third sector, limited attention had been paid to the soft-side of Lean - its impact on employee outcomes and working conditions. The results of this study are central to our understanding of how Lean impacts on employee working conditions and outcomes including autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention. This is vital as many UK HEIs are now turning to Lean in response to government funding cuts to HEIs.

4.9.3 Areas for further research – main study

The pilot and initial study focused on two main research questions. The first question was "What is the current state of Lean implementation in UK HE? (i.e., motivation for Lean adoption, stakeholders' perception of Lean, benefits of Lean and challenges of Lean deployment in the HE setting)". The second question was "How does Lean adoption impact on employee working conditions and outcomes?" The second research question allows the researcher to begin to explore the impact of Lean on soft practices including employee autonomy, workload, motivation, work related stress, job satisfaction and retention (further discussed in section 2.5).

The main study is much more extensive and addresses the four research questions discussed in section 2.8.2. RQ1: To what extent have higher educational institutions in the UK adopted Lean management practices? RQ2: What are the benefits and challenges of adopting Lean in a higher education context? RQ3: How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes? RQ4: How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes? Therefore, the initial study allows the researcher to develop a broad insight on Lean in UK HE with a focus on challenges of implementation and soft issues (particularly, employee working conditions and outcomes). The initial study focuses on one institution and therefore does not provide enough insight on the first research question (RQ1). From discussions with respondents, the researcher finds that Lean implementation in HE is largely emergent and unstructured when compared to its implementation in traditional manufacturing and service sectors. To establish its emergent and unstructured nature, there is need to explore experiences across different institutions. The main study therefore extends the initial study by first exploring Lean adoption across several UK HEIs.

One of the key findings in this chapter is that significant differences exist between employees and managers/leaders in terms of their perception of Lean and its impact on employees. These conclusion was drawn from in-depth interviews with two Lean deployment managers, ten Lean project managers and Lean project team members/front-line staff from one HEI. It is therefore interesting to explore whether these differences exist and persist across HEIs. Hence, as will be

discuss in the next chapter, the main study explores this emergent issue through in-depth interviews with 32 respondents (Lean practitioners) across seven further HEIs.

The initial study also failed to explore Lean adoption in depth by exploring Lean deployment across different projects and functions. Such an exploration will provide deeper insights into why Lean projects in this context succeed or fail, or why employees have different perceptions from managers about the impact of Lean on softer issues. The main study therefore explores staff experiences across different Lean projects in greater depth. Questions/discussions in the main study are therefore designed to collate staff narratives of how they have been impacted by individual Lean projects (before and after implementation) and their roles in such projects. In other words, the main phase of the study includes questions about respondents experiences around specific projects and captures narratives around how different projects were deployed. The initial study also did not explore failures in Lean implementation i.e., areas where Lean had not worked as well. A key contribution of the thesis is on the soft side of Lean. Hence, it might be important to also explore employee perceptions on the dimensions of working conditions and outcomes prior to exploring how particular Lean projects have impacted these dimensions. Here, the main study is designed to   collect employee narratives of the events surrounding Lean deployment, the inception of Lean projects and how the particular projects and decisions or events around such projects impacted on employees. This greater depth of discussions are essential in allowing the researcher to address research questions 3 and 4.

CHAPTER 5:   PHASE II—MAIN STUDY

5.1 Introduction

The literature review (chapter 2) discussed the concept of Lean, explored employees' related issues to Lean implementation, discussed the experience of Lean implementers across different sectors and industries (including HE) and derived the research questions. These research questions are restated as follows;

- RQ1: To what extent have higher educational institutions in the UK adopted Lean management practices?

- RQ2: What are the benefits and challenges of adopting Lean in a higher education context?

- RQ3: How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., psychological safety, motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?

- RQ4: How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?

Chapter 4 is based on a pilot and initial study conducted with a case organisation. It examined various strategies (mainly through interviews with Lean experts and Lean users) that had been adopted by the selected case thus presenting an initial exploration of the aforementioned research questions. The initial study chapter helped to gain an insight on Lean application in one of the Universities in the UK that can be considered as a leading Lean application in the HE setting. Hence, chapter 4 explored the benefits, challenges and impact of Lean in HE through discussions with some key Lean leaders in the UK HE sector. This was instrumental to partly addressing RQ4 while also giving the researcher an insight on how Lean operates in the HE context.

The current chapter—chapter 5—builds on the previous chapters by discussing the results from in-depth interviews conducted with various managers and employees (i.e., Lean practitioners) across a number of UK HEIs. Specifically, these interviews explored the background of the case and respondents (sections 5.2 and 5.3), the respondents' perception of

Lean, background and motivation for adopting Lean at each institution (section 5.4), the objectives and challenges of Lean adoption (section 5.5), Lean adoption strategy and scope (section 5.6), employees' experiences on individual Lean projects (section 5.7) and respondents' views on soft elements relating to Lean (section 5.8).

The objective of discussions in section 5.2 to 5.6 is to address the first research question (RQ1) on the *extent* of Lean adoption in UK HE. Additionally, Sections 5.5 to 5.7, discusses the benefits of Lean and challenges of Lean implementation (RQ2), strategies for Lean implementation (RQ1) and the experience of employees across different Lean projects (RQ3 and RQ4). Finally, section 5.7, discussing respondents' views on how Lean impacts on the soft elements within the workplace, addresses research question 3 (RQ3 and RQ4). To complement the findings from chapter 4, this section also explores differences in perceptions of team leaders and team members. The rest of the chapter discusses the interview results in further detail.

5.2 Background of respondents- Role and Lean experience

This section starts off by providing some background and basic demographic information of the interviewees, focusing on their role or involvement in Lean projects as well as their knowledge or experience of Lean. The responses, summarised in the table, were obtained by asking the following semi-structured interview questions:

- Can you briefly tell me about yourself, your current job and your working experience?

- How long have you been involved in Lean projects?

- Can you give me an estimate of the number of Lean projects you have completed at your current university?

- Would you say you have been involved in Lean projects as (1) leader/manager, (2) a team member, (3) both a leader and a team member?

The table below (Table 5.2.1) summarises demographic details of the 32 respondents who were interviewed as part of this study.

Table 5.2.1: Demographic data for respondents

Inter.	Position	Involvement			Knowledge/Experience of Lean	
		Manager	*Leader*	*Member*	*Years*	*Projects*
A1	BI Team Lead		X		>5	>40
A2	University Professor	X	X		>10	7

ID	Role				Years	Projects
B1	HR Advisor			X		
B2	HR Advisor	X			<1	1
B3	Operations	X	X			
B4	HR Assistant			X		
B5	Head of SA	X	X	X		
B6	SSE lead		X	X		
C1	Operations	X			<4	2
C2	HR Advisor			X	4	3
C3	PI Facilitator		X		4	
C4	SI team member			X	2	
C5	Director BS	X	X	X	4	
C6	Admin manager	X				
C7	Head PE	X		X	7	
C8	Head of PI	X		X	7	40
D1	IT manager			X	7	
D2	Managing Director	X	X	X	12	150
D3	Chief Lean officer			X	10	
E1	OD partner	X		X	4	
E2	Deputy HR director	X		X	11	80
E3	Deputy HR director	X	X	X	11	100
F1	Faculty Manager	X		X	5	
F2	Operations			X	10	
F3	Operations			X	>5	
F4	BI team member		X		3	4
F5	Department Manager	X		X	3	
F6	Professional services			X		
G1	Head of CI	X	X		6	
G2	Operations	X		X		15
G3	Funding manager	X			8	4
G4	Senior lecturer	X		X		5

Table notes: For conciseness, the following abbreviations have been used in the table; Continuous improvement (CI), Student Administration (SA), Business Services (BS), Business improvement (BI), Payroll and Expenses (PE), School Support Enhancement (SSE) and Organisational Development (OD).

The table shows that the respondents from the 7 institutions have varied involvement (roles) and experience (years working with Lean and number of Lean projects completed) in Lean projects within UK HEIs. In part response to RQ1, the evidence from here suggests that several UK HE institutions have adopted Lean, possibly to different extents and for different purposes. Importantly, the data also shows that the respondents are suitable for the purpose of this research as they have the knowledge and experience of dealing with Lean in the UK HE environment. In the next section, the background of these institutions is *briefly* highlighted bearing in mind the need to maintain anonymity and confidentiality of the respondents and their institutions.

5.3 Lean background of case HEIs

5.3.1 Profile of the HEIs

The table (Table 5.3.1) below provides a basic profile of the HEIs involved in the study. The rationale for selecting these institutions is explained in the research methodology chapter (chapter 3). The 7 institutions are of varied characteristics. All of the 7 institutions are public universities, with 4 of the 7 described as public research universities (Universities UK, 2019). Further, 3 of the 7 universities are ancient (red brick) universities, 2 of the 7 are plate glass universities and 2 of the 7 are post 1992 or new universities. Further discussions of these institutional characteristics is provided in chapter 2. The institutions are mainly located in England (2 of 7 or 30%) and Scotland (5 of 7 or 70%). The number of students at each institution (an indication of size of the institution) ranges from about 8,000 to over 30,000 students. Similarly, the number of staff (both academic and administrative) employed at these institutions ranges from about 1,000 to over 9,000. Finally, these institutions have varied levels of planned spending (budget) each year, which ranges from £80 million to over £700 million.

Table 5.3.1: Profile of the case institutions

Org	Type	Location	Students	Staff	Budget
A	Public research, Ancient (red brick) university	Scotland	Approx. 15,000	Approx. 2,000	Approx. £200 million
B	Public, Post 1992, new university	Scotland	Approx. 20,000 off and online	Approx. 1,500	Approx. £150 million
C	Public research, Ancient (red brick) university	England	Approx. 30,000	Approx. 9,000	Approx. £700 million
D	Public, Ancient (red brick) university	Scotland	Approx. 10,000	Approx. 3,000	Approx. £300 million
E	Public, plate glass university	Scotland	Approx. 15,000	Approx. 1,500	Approx. £100 million
F	Public research, plate glass university	Scotland	Approx. 25,000	Approx. 3000 (admin)	Approx. £300 million

G	Public research, Post 1992, new university	England	Approx. 8,000	Approx. 1,000	Approx. £80 million

Table notes: Staff refers to approximate number of academic and administrative staff employed at the institution.

5.3.2 Brief Lean history in the selected case HEIs

Lean history at the various institutions is not clearly documented as Lean has sometimes been an emergent phenomenon where different staff have engaged with Lean workshops and later introduced Lean techniques in their work, while in some institutions there has been a formal process which is documented. For example, Lean adoption at institution A was motivated by the need to improve administrative services to a level that matched its academic success. There were also calls for the institution to become more efficient in its use of financial resources. The chief operating officer recognised the potential of Lean to make a difference in the bid to become more efficient. The institution hired external consultants charged with training a small number of staff and building an internal consulting Lean team that would help to drive Lean through the entire organisation. At University A, there is no documented story to explain the history of Lean adoption. Nonetheless, Lean is established. Specifically, Lean is currently managed by a specialist team responsible for facilitating, catalysing, removing barriers, and helping teams to work better together. The overall goal of Lean here is to improve the services offered by the university to its students, staff and partners. Similarly, the story (even though not fully documented) is different across all 7 institutions and this will be evident in later discussions on the motivation, objectives and challenges surrounding Lean adoption at these different institutions.

5.4 Perception of Lean and motivation for adopting Lean

5.4.1 Defining Lean

As discussed in chapter 2, several definitions of Lean have been provided in the extant literature. Indeed, prior studies have seen Lean as 'a way, process, set of principles, approach, concept, philosophy, system, program and paradigm' (Bhamu and Sangwan 2014, p. 925). The interviews explored respondents' perception of Lean at their institution, specifically what Lean constituted, why it was adopted and how successful their institution had been at adopting Lean. Through the interviews, the term "Lean" was mentioned a total number of 1,799 of times by respondents, using various synonyms. The following table (Table 5.4.1) provides details of different definitions of Lean.

Table 5.4.1: Definitions of Lean

Theme	Evidence (phrases)	
	Lean Leaders (and managers)	**Lean team members**
Lean as Eliminating Waste	"is about eliminating waste and adding value by focusing on what the process we will need to do rather than what we may have been doing before or how it had been managed before" (A2) "identifying value for customers and eliminating waste" (E3) "kind of continual review and changes in continual review […] and focusing on the voice of the customer then maintain value" (B2) "[Our role in Lean is to]… support colleagues who need to make changes to then effect student experience, teaching, learning, and research" (A1).	"…cutting out all the waste and all the duplication and all the time wasting and the objective is to make things more efficient" (C7).
Lean as a philosophy and culture	"[…] is kind of philosophy, a way of thinking" (F3, G2). "culture of embracing change and constantly looking at the efficiency of what [we] do" (A2) "a change in culture to see that change and improvement is part of your day job" (B3)	
Lean as a process	"a way of looking at your processes and breaking them down into an actual process that has a start, middle and end point" (F3) "very harmless scientific discipline of improvement, […] fully understanding the problem, planning of what we're going to do and how we're going to measure it and then improving it" (C3). "Lean is a methodology that you would use if you have a repetitive process. So, a lot of our events are very repetitive because the academic year runs on a cycle- an academic cycle, so you start always with welcome and induction, then … matriculation,… examinations and so on and so forth." (B5) "…I think Lean just cuts out unnecessary steps." (C1)	"..review process reduce wastage, to reduce touch points, to reduce bureaucracy, to simplify forms and other things that may get used in a process...it may involve automation…, but it's providing the same business needs in a more effective delivery. (B6)

Lean as a system		"I kind of understand conceptually but probably can't articulate very well… it's mainly a way of thinking and thinking about approaching things in terms of doing it the best way trying to be efficient and trying to think of the whole picture when you're making individual decisions rather than just doing it in small chunks" (C4)
Lean and people; "respect-for-people"	"Whether you are a head of department or one of our lower grade members of staff, it doesn't matter; your contribution is equally valuable" (B5). "building capability within the institution" (C8) "[Lean empowerment is] about saying we know that we need to make things more effective to survive in the current climate, but that you know you can make things more effective in a number of different ways" (E3). … "and they [people] have to be absolutely at the heart of everything we do" (F4)	"very much based on the two fundamentals of respect for people and continuous improvement" (D1)

Lean as emergent, unstructured, done but not termed.	"it was [working with principles] looking at efficiency and effectiveness with respect for people and continuous improvement" (B3) "a tool kit of tools and techniques that we can support the University in making improvements" (B3) "we don't refer to specifically as Lean within the university but we use a lot of Lean tools and techniques and principles" (B3) "…in some of our statements, you're more likely to find the word agile. So, we're looking to be an agile university, respond quickly, …, more than Lean." (B5) "…we don't often use the terminology Lean, because I don't think it has good commendations within higher education so we use continuous improvement which sits best within our setting and predominantly we use Lean methodology for that" (G1) "I think it's more continuous improvement rather than Lean here… [we have been] focusing on the staff perspective and empowering staff and involving staff which for me I believe has origins closer to textbook Lean" (F1) "…very few people use the word Lean…in the early days, people referred to us as the Lean Team. […] we tried very hard to emphasize process improvement and continuous improvement. So, people might use those words more than Lean, explicitly." (C8)	

The understanding of Lean and what it entails varied from the belief that Lean is about waste elimination (A2, E3, C4, C5, C7, E3, F1, G1, G2, G3), improving customer voice and value to the end customer (A2, B2, E3), and generally enhancing efficiency in the work place (C7). As noted by C4, Lean enhances efficiency by forcing people to think about the entire process (value chain) rather than just the work they do. Some respondents also highlighted the philosophical and cultural angle of Lean (A2, F3, G2). Here, F3 and G2 noted that Lean was a philosophy or a way of thinking while E1 and A2 saw Lean as a process which results to or involves culture change towards a culture of seeking efficiency and continuous improvement in every task. Other respondents (e.g., F3, C3) saw Lean as a process. The two respondents noted that Lean was a process of improvement. The respondents (F3 and C3) emphasised the role of planning and measurement in Lean implementation.

Importantly, several respondents saw people as indispensable to the Lean implementation process. Respondents (including, B5, D1, D2, F4) highlighted the importance of respect-for-people with D2 out rightly noting that Lean was a people-focused continuous improvement methodology. In relation to "respect-for-people", a number of respondents (B1, C3, E1) argued that Lean involved empowering people to make improvements in the way they work. C8 contended that *"respect-for-people is not necessarily just by being polite and kind. It's absolutely about generating that sincere conversation and communication between people so that you can start actively problem-solving"* (C8). B1, for example, noted that Lean implementation involves providing better guidance to managers, as well as, giving them sufficient information to enhance their decision-making ability. C3 emphasises the importance of identifying the right people for every task but also the need to give them the right tools (e.g., training) to identify improvement opportunities but also empowering them with the ability to enact suggested changes. The need for empowering staff was also echoed by C8 who noted that employees where in the best position to make improvements in their area of work. In addition, C8 emphasised the role of Lean to empower employees and build capacity for Lean sustainability. One way in which respect-for-people is demonstrated in this context is by being flexible in terms of how Lean is implemented (E3), i.e., recognising that several alternatives exist and empowering staff to identify and select the strategies that suit their circumstances best.

It is also important to note that often people were said to do Lean without calling it Lean — a nomenclature or terminology issue. B6 raised this issue by noting that *"there are people who work here, who have a lot of experience in Lean and so they weren't maybe calling it Lean,*

but it was Lean that they were doing. It's just in this role we've realized, okay, it's Lean that they're doing" (B6). Additionally, C4 cautioned that people "*kind of understand conceptually [what Lean is] but probably can't articulate very well what it is*" (C4). In conversations with a number of respondents (B3, C8 D5, G1), it was evident that the term Lean was not always used in the University setting. Some institutions emphasised continuous improvement, process improvement, and agile, rather than Lean. Hence, while an attempt has been made to deduce respondents' knowledge of Lean, it appears Lean can be emergent, unconscious and unstructured within this environment and, to a certain extent, people can do Lean without calling it Lean.

There were some differences between employees and Lean leaders in terms of knowledge of Lean. Leaders generally provided more detailed explanations of their understanding of Lean and how Lean concepts have been tailored to suit the specific circumstances of their institutions. Team members were generally briefer in their responses. Several team members (F4, D1, C1, B6) highlighted key concepts or pillars of Lean including continuous improvement, elimination of waste and respect-for-people. Importantly, team members were able to articulate how some of their efforts amounted to continuous improvement, and hence Lean. In general, they were no major differences across institutions in terms of how Lean is perceived. As seen on Table 5.4.1, individuals from different institutions (A to G) shared similar perspectives on Lean and what it means for UK HEIs.

5.4.2 Motivations for Lean adoption in UK HEIs

The interview explored respondents' motivations for Lean adoption. The goal was to identify what contextual factors might have driven the organisation to resort to Lean, or if respondents were not privy to this information, to identify what, in their view, were some of the institutional-level benefits of adopting Lean at the institution. The researcher aimed to also understand why the institutions had adopted Lean and not other continuous improvement methodologies (six sigma, TQM etc.). The table (Table 5.4.2) below summarises some of the responses from the interviews which highlighted respondents' perceptions of the motivations for adopting Lean at the 7 institutions.

Table 5.4.2: Motivations for Lean adoption

HEI	Motivation (themes)	Evidence
A	Leadership interest Fit within HEI Need for efficiency	*"[The] Chief Operating Officer at the time was very keen on Lean. So essentially that's why the business improvement team was setup, [...] a senior manager being a champion for it."* (A1). *"…we use Lean [and not, for example, six sigma], because, although the university has a lot of data, it's quite difficult to get to all, and to get people in that, kind of, mindset of providing data to us."* (A2)
B	Emergent and unclear Fit within HEI Driven by Lean champion. Funding challenges Students as customers. Need to show value-for-money	*"I'm not sure [the motivation for Lean adoption]. I guess it's just been something that's evolved"* (B2) *"My view is that, it [motivation to adopt Lean] is a mixture of everything. Speaking with colleagues across the sector, people tend to take Lean or six Sigma, TQM and customer service improvement, any sort of methodology, and the make it work for their institution"* (B3) *"Probably because of [name of consultant] and the fact that it's been [name of consultant]'s experience in Lean that has driven this rather than us looking at other, other methodologies."* (B5) *"We've had funding challenges and really we have no option but to optimize our processes really from a time point of view- to save students time, to save academic colleagues time. But also because of the fact that we don't have the same number of staff that we used to have."* (B5) *"…students are now paying for their tuition fees, their expectations are, I think, probably higher than if they weren't paying. So, we now see the students as customers and because of that, we're trying to be very business-like with our processes and operationalize things to their optimal level."* (B5)
C	Emergent and unclear Increase service quality. Minimize cost. Increase process and service efficiency and effectiveness. Bureaucracy Fit within HEI	*"[we have adopted Lean] in order to make all our processes as efficient and effective as possible. [] to deliver great services to our students and academics and the staff [...] to look at processes, [] how things are being done and to have a look at whether things can be done more effectively to take out any waste, any duplication of work and to make sure that the resources that you're putting into that area of work are used to the maximum best ability and you're achieving the great outcomes"* (C5) *"I don't know [why Lean is preferred to other methodologies]. I think Lean is very good at stripping out unnecessary things. So, some of the other change models may be as effective as Lean and I don't quite understand the decision to go with Lean other than- - you know, other change models."* (C1) *"…central to Lean is respect for people and continuous improvement which I think is possibly lacking from Six Sigma methodology… Lean is using the people that know that process*

	(respect-for-people)	*and equipping them with making those changes and making sure they come up with them"* (C3)
D	Increase service quality. Minimize cost. Increase process and service efficiency and effectiveness.	*"...a non-zero sum game..., a win win win for everybody involved...staff are advantaged as they no longer have to undertake the burden of waste activity, customers get what they want and the university achieves this by using fewer resources".* (D1)
E	Respect-for-people Change tool Reducing workload and curbing bureaucracy by identifying and focusing on value-adding processes. Success stories from other organisations and HEIs Fit within HEI	*"The senior management team working group looked around at a number of different approaches, and they spoke to a lot of people and they invited a lot of people there and they had all of this. They did the research basically, and the one that stood out for them was the Lean methodology and that's because it was a people centered approach."* (E1) *"We restructured and went from faculties to schools, ... but what happened was we basically took the same behaviors and the same approaches and the same ways of doing things into the new structure. That didn't work, and the managers were coming to us saying we need tools of change because we're just trying to. It's like fitting a square wheel in a round hole. It's not working and we can't get it to change so they we were asking for change tools and Lean was a change tool."* (E1) *"We got three key areas that needs to be developed at the university and one of them is workload and bureaucracy. Lean is a tool that can address workload and bureaucracy."* (E1) *"[name] had seen Lean used in a number of different sectors and so [name] felt that it could be adapted to be used here"* (E2) *"...the fact that there was a university who at that point in time was very much taking the lead and that was Cardiff meant that it gave a credibility to the use of Lean in higher education"* (E2) *"[Lean preference over six sigma is] probably a reflection of the environment we work in. We don't collect data in a way which is easily attributable to that kind of approach [six sigma] not to say it couldn't be"* (E2)
F	Empowerment of staff	*"...[the focus of continuous improvement has been] empowering staff and involving staff which...has origins closer to textbook Lean than things like TQM or Six Sigma"* (F1)
G	Increase service quality. Minimize cost. Respect-for-people (no staff loss) Improve processes	*"Some of our projects are quite difficult to get actual data on a regular basis [hence, Lean is preferred to six sigma]"* (G1) *"Some of our processes could do with improving and there was also a drive for improving student satisfaction... we made a categorical decision that any of our projects will not result in any staff loss."* (G1) *"with the increase in fees came a reduction in central government funding and students and other stakeholders really*

		wanting to see universities demonstrating that they're offering value for money [...] In terms of our key objective it's about enhancing the student experience, it's about ensuring that we are delivering our use for money, it's about ensuring that staff can do their job effectively and not spend excessive amount of time on wasted activities" (G2)

One recurrent theme from the discussions, echoed by several respondents, was that Lean had the potential to lead to significant efficiency in a sector in which the need to operate efficiently had not been previously seen as a priority. A few respondents highlighted the global financial crises and the resulting austerity programmes, including the reduction in HE funding and a consequent increase in tuition fees. Students had become the number one customer and hence the quality of service to the student had increasingly come under scrutiny. Lean can allow for the delivery of this quality service at minimum cost (G2, C5). G2 highlighted reduction in government funding, increase in tuition fees and increase scrutiny from stakeholders (students) for universities to demonstrate the provision of value-for-money. There was therefore a need to improve the quality of the service being delivered and to reduce waste across all areas. These motivations are shared by other institutions including C (C5).

Other respondents put the motivation for adopting Lean to the interest of a specific leader or top manager who was knowledgeable about Lean and keen to see Lean implemented across the institution. Specifically, A1 contends that Lean adoption was facilitated by the presence of Lean champion who happened to be a member of the senior management team.

5.4.3 Lean versus other improvement methods in HEIs

As an extension on the motivation of adopting Lean (previous section), the interviews explored respondents' perceptions of the motivations for the preference of Lean over other improvement methods, particularly six sigma.

It was interesting to note that some institutions adopted a scientific approach to making the choice between Lean and other approaches. E1, for example, noted that in institution E, *"the senior management team working group looked around at a number of different approaches. They spoke to a lot of people and they invited a lot of people there and they had all of this. They did the research basically, and the one that stood out for them was the Lean methodology and that's because it was a people-centered approach. So [] it wasn't systems driven"* (E1). This preference for Lean over other methods due to its people-centered approach and its suitability for the HE context, is echoed in a number of conversations. C3, for example,

noted that "*I do like to draw from different methodologies but I would say my predominant one is Lean largely because central to Lean is the respect for people and continuous improvement, which I think is possibly lacking from the Six Sigma methodology*" (C3).

Similar to E1, E2 noted that it "*[the selection of Lean at institution E] was a highly scientific decision-making process. I think the reason why [person] brought it to the table in the first place was because [person] had seen Lean used in a number of different sectors and so [person] felt that it could be adapted to be used here*" (E2). Although this scientific approach does not take away from the reality that some institutions needed to champion it first as innovative adopters of Lean in HE (e.g., Cardiff University), before other institutions could follow suit; "*the fact that there was a university who at that point in time was very much taking the lead (Cardiff), meant that it gave a credibility to the use of Lean in higher education,*" (E2). Additionally, G3 outlined that "six sigma is more difficult in higher education because of the data element of it". G3 also notes that he/she personally uses six sigma in some of his/her projects because of his/her six sigma green belt qualification. Nonetheless, from a university cycle point of view, some of the projects are quite difficult to get actual data on a regular basis, hence restricting the usefulness of alternative methodologies (G3).

Across a number of institutions, staff were aware of, or had some experience of, using other improvement methods such as six sigma. A1, for example, noted that staff at institution A, have had some Six Sigma training as well as training on other continuous improvement techniques. A1, however, argued that Lean is easier to understand, flexible and incorporates the input of the end customer, making it more desirable for HE institutions. Specifically, A1 noted that; "*we use Lean, [] because, it [Six Sigma] is quite difficult to get—although the university has a lot of data, it is quite difficult to get to all [of this data], and to get people in that kind of mind-set of providing data to us. [] Sometimes when you're doing a project you'll have people who may not necessarily have the same view on things. So, that's why we kind of go in the view of Lean, particularly the voice of the customer.*" (A1)

Other respondents noted that they use Lean because a decision was made at the institutional level to use Lean –i.e., they had no input in the selection of the methodology. C6, for example, outlined that "*Lean is what I got exposed to first [...], the examples that we initially saw were Lean and we went with that and we've had success with that and I haven't compared the two [Lean versus six sigma]*". Reiterating the view that Lean is somewhat imposed or inherited, C7 noted that "*I don't know what TQM is but [...] I've been involved with*

Six Sigma before [at previous job], but Lean was the process that the [...] team used here". Meanwhile, B6 outlined that they are *"kind of aware of Six Sigma. In the university, there's people who do it and are trained in it but it's just not the areas that we've been trained in or that we do, and it's not that we have been trained in all these things."* Discussing the benefit of Lean over other methods, F3 outlined that *"what's really helpful about the [Lean] process is it gets us to look at our process through a different lens."*

5.4.4 Perception of Lean success at HEIs

In a bid to explore the level of Lean success across different institutions, respondents were asked to rate their institution's Lean success on a scale from 1 to 10 with 10 being the highest. Specifically, the question was framed as follows;

On scale from one to 10, with 10 being the highest. How successful would say your institution, has been at implementing Lean?

Several respondents provided usable answers together with some justification. Other respondents either declined to answer or noted that they were unsure of what rating to provide (sometimes because they had only been involved in a very small number of projects). The respondents' ratings across each institution are summarized in the table (Table 5.4.3) below;

Table 5.4.3: Perceived Lean implementation success

Interviewee	Score	Quotes – justification of rating
A1	6	Some people come to us and say that they had a [great] experience and that, you know, somebody listened to them and they now kind of get a better understanding of what other colleagues do, and how they all fit in.
A2	7	Some parts of the university are more resistant to change than others so I wouldn't put it any higher than 7. Some people end up with more job satisfaction as a result of changes because they've been involved in designing the changes.
B1	8	Probably [] like an eight because we actually did quite a lot of actions during that time away, but of course, we haven't actually finished everything yet.
B2	7	It will be like seven. Hopefully if the process is carried out a bit slicker and a bit better, the employee would be hopefully made happier than before
B3	5	I would say it's still a very early stage so we are not really that advanced. I would go four to five in terms of in rating the principles across the university and a number of different areas. Biggest benefit would be the online matriculation for students looking at the intended joining process of students prior to them arriving.
B4	5	No justification

B5	8	No justification
B6	6	I think we're maybe five and a half now to six. (No justification)
C1	7	Well, this one, it goes to number seven. (No justification)
C2	7	Probably say about seven. It's been successful in the sense that looking back to what 18 months ago people are still aware of the key principles here and the idea of continuous improvement. We've made some cost improvements and we've simplified a lot of our core process [...] we have a shared of all the information within institution" (C2).
C3	6	I'll probably say a six also, I think we're over halfway (and it) feels quite well established.
C4	-	No comment
C5	10	ten [laughter] it's been so successful
C6	7	At about 7 (No justification)
C7	9	Yes I'd say nine (No justification)
C8	5	Will probably give us a five in that. (No justification)
D1	8	One of the financial managers tried putting the financial system together and it was time saving and proved that we are here for the process and it was very successful.
D2	7	I would say 7. (No justification)
D3	8	think we are kind of 7 or 8 in terms of being successful
E1	7	Six to seven. it's still an ongoing piece of work because it's cultural change you want to get embedded in the way that people do things
E2	5	I would say five. (No justification)
E3	5	So, ten being the highest, I would say five. I think we have done some things very well and I would still say that actually giving managers the skills to do it for themselves with their teams or giving team members the ability to be able to do it for themselves is a really important step in embedding Lean as part of an organisation's culture
F1	7	I suppose maybe something like seven. (No justification)
F2	-	No comment
F3	-	No comment
F4	8	I would say around 8 out of 10, (as I) have been involved in four university-wide strategic level projects. We have contributed to around eight million pounds in direct increase to the income at the University. through our projects we've also been able to quantify that we have attributed five hundred thousand pounds worth of efficiency savings in staff time across the time that the team has been in position
F5	-	No comment

F6	8	I would like to think an eight or a nine
G1	-	No comment
G2	5	No justification
G3	5	No justification
G4	6	No justification

As can be seen above, the different interviewees have given a range of scores for their perception of organisational success in Lean implementation. This is further showcased in the following chart.

Figure 5.4-1: Bar chart showing perceived Lean implementation success scores
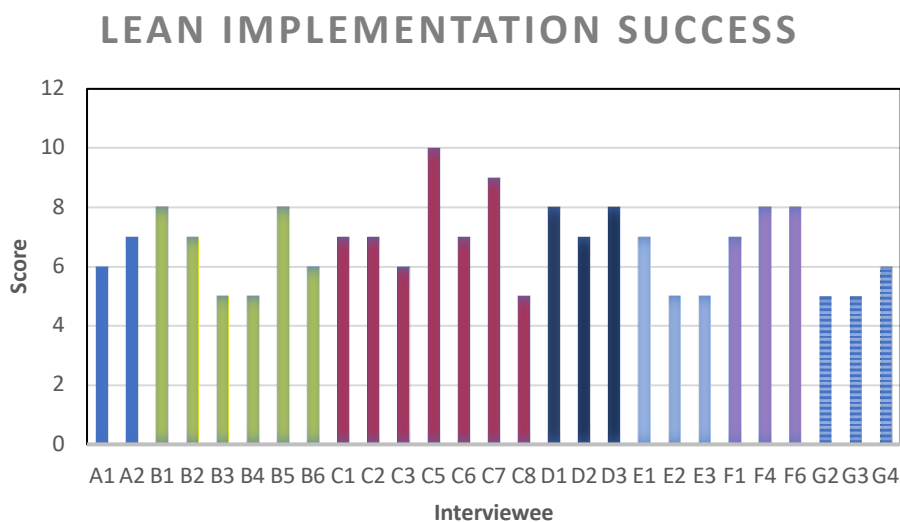
Each institution had a different number of respondents. To arrive at a score for each institution, the scores provided by respondents were first averaged. Next, the median score was also computed. The table (Table 5.4.4) below presents the summary of perceived scores across each institution (A- G), focusing on respondents who provided valid responses.

Table 5.4.4: Summary of perceived Lean success scores by institution

	A	B	C	D	E	F	G
Respondents	2	6	8	3	3	6	4
1	6	8	7	8	7	7	
2	7	7	7	7	5		5
3		5	6	8	5		5
4		5				8	6
5		8	10				
6		6	7			8	
7			9				
8			5				
Average	**6.5**	**6.5**	**7.3**	**7.7**	**5.7**	**7.7**	**5.3**
Median	**6.5**	**6.5**	**7.0**	**8.0**	**5.0**	**8.0**	**5.0**

The average and median perceived Lean Implementation per institution are shown in the figure below.

Figure 5.4-2: Average Perceived Lean Implementation Score per institution
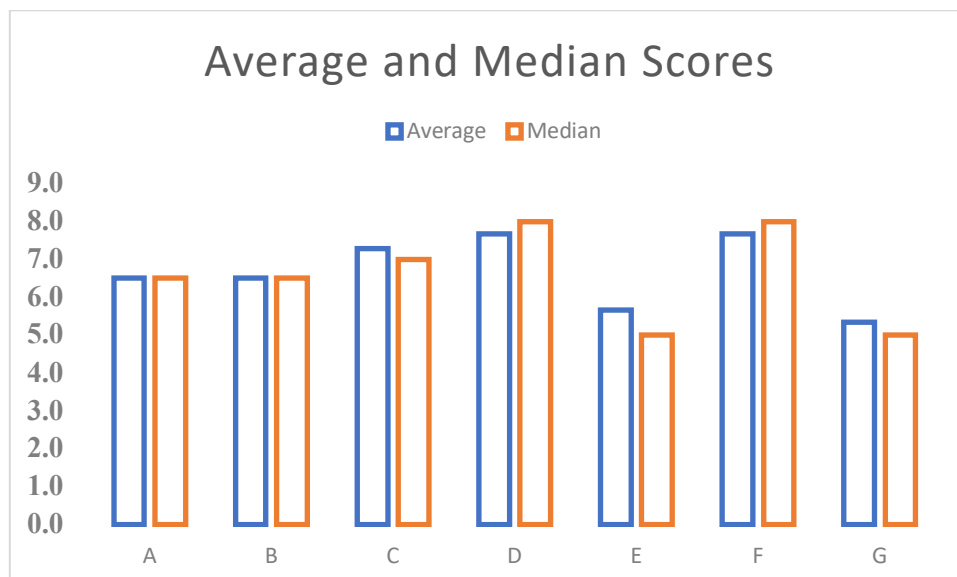
It is apparent that organisations C, D and F are within the higher average scores in the bracket of 6-8. It is interesting to note that, although the perceptions vary across each organisation, it is evident that organisations that have a perceived higher score (such as organisation C) have a larger distribution of perceived scores depending on organisational position of interviewee (Lean project manager, Lean leader, Lean team member). This is discussed later in this section. Meanwhile, organisations such as F & G, although having an above average perceived score, the perceptions seem to be aligned across the different organisational positions. This could be attributed to the greater involvement of different staff in the implementation of Lean in these organisations, while organisations such as B and C have particular Lean champions who have a higher perceived implementation success while other members of staff who are not directly related to the implementation of Lean and who might not be communicated to about the developments feel that the organisational performance is towards the lower end of the scale.

In chapter 4, it was revealed that Lean perceptions between managers/leaders and employees were sometimes very different. Here, the average and median scores of respondents across the three main Lean roles were computed and are presented in the figure (Figure 5.4.3) below.

Figure 5.4-3: Perceived Lean scores across different roles
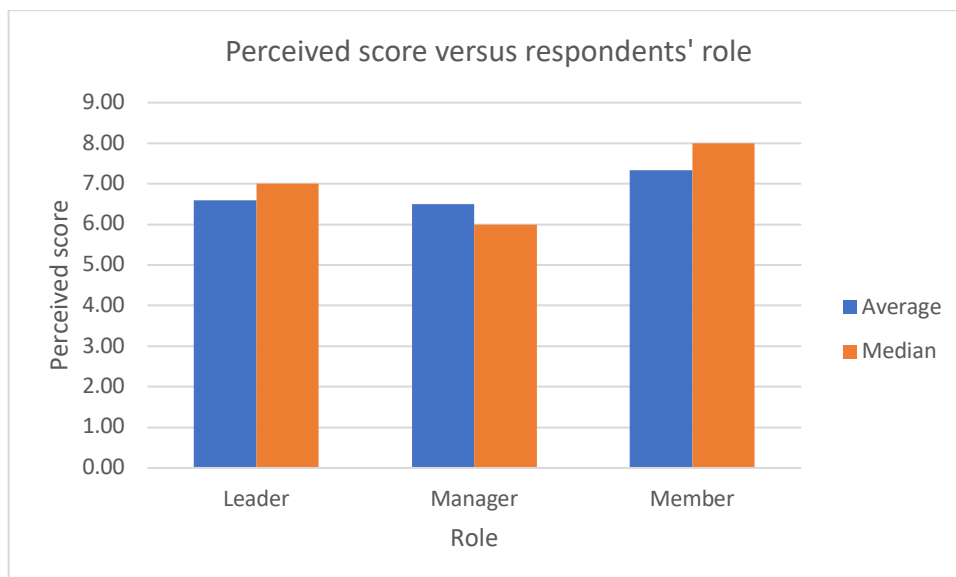
The mean (or median) score for team members is 7.33 (or 8). This is higher the mean (or median) scores for Lean leaders (mean of 6.59 or median of 7) and the mean (or median) scores for Lean project managers (mean of 6.50 and median of 6). The results suggest that team

members perceive Lean to be successful (the meaning of success may vary across members) as they rate Lean success at 80% (median), while managers believe that there is scope for improvement (median of 6 or rating of 60%).

5.5 Objectives and challenges of Lean adoption in HEIs

5.5.1 Overview

As earlier noted, Chapter 4, provided an initial insight into the soft side of Lean within the HE context (based on a single institution). This section builds on Chapter 4 by further exploring research questions 3, drawing evidence from multiple case studies. To reiterate, the research question is stated as; *"How does Lean affect employee working conditions and outcomes indirectly by transforming work structures and processes?"* (RQ3). This section (5.5) explores the benefits, challenges and barriers of Lean adoption in the HE sector. The ensuing section (5.6) then discusses strategies for Lean implementation across different institutions. In the two sections, the impact of Lean on employee working conditions, through its transformation of work structures and processes, is discussed.

5.5.2 Benefits of Lean in HEIs

The motivations of adopting Lean across several UK HEIs was discussed in section 5.4.2. It was observed that in certain cases, from the perspective of employees, there was no clear rationale for choosing Lean over several of the other continuous improvement methodologies. Some respondents noted that Lean was a better fit for their institutions given its key tenets of respect-for-people, empowerment and continuous improvement. One theme that emerged from these conversations was the fact that several institutions faced funding challenges following the financial crisis and the UK government's decision to reduce funding to higher education (austerity) and in England and Wales, institute tuition fees. Consequently, the relationship between students and institutions shifted to one akin to a customer-service provider relationship. To compete in this new market, besides pursuing new efficiency programmes, institutions are having to adopt market-based approaches to service provision.

As discussed in the literature review (chapter 2), concepts of continuous improvement are relatively new in HEIs, but several institutions, as well as researchers, have begun to extract (i.e., institutions) and document (i.e., researchers) the benefits of continuous improvement in this environment. Indeed, the potential benefits of Lean (to the institution and to customers - i.e. staff and students) in this environment were highlighted by a number of respondents. Some of the benefits identified by respondents are summarised in Table 5.5.1 below.

Table 5.5.1: Benefits of Lean in in HEIs

Stakeholders	Summary of key benefits	Respondents' narratives from interviews
Students	Time saving	Often, they saw improvements in terms of how quickly students were dealt with. (C1)
Students and academic staff	Improve the student experience. Improve the staff (research and teaching) experience.	"[] there's a huge amount of scope for Lean to make life simpler for all of us in the university environment, from students up to academics and support staff" (A2). "Delivered much better service to their students…by doing simple things like, when a student filled in a form (electronic), sending him a copy back. Simple things to implement." (C8) "We [the business improvement team] are there to try and support colleagues who need to make changes to then effect student experience, teaching, learning, and research." (A1)
Employees	Employee engagement	"The biggest benefit is that they feel listened to, that they do have an opportunity to say what's not working for them and how we could do it better." (C3)
Employees	Identifying and addressing core problems	"In those four days [Lean event], they started to conclude that actually their problems were lack of standard process [not lack of an adequate computer system], lots of over processing and unnecessary manipulation. And this led to the realization that no matter what system they got, actually, the heart of their problems were process." (C8) "I think one of the main benefits…facilitates us taking time to look at something [work processes] in-depth and if you don't have that as a kind of [Lean] project which carves a time in your diary, you don't make space for it." (F3)
Employees	Team working Improved communication. Better working environment.	"Another key benefit is often just being able to speak to people, see people face to face. We've probably worked with for years but have never actually met and seen as a real person" (C3) "I guess one of the big things that we managed to achieve with one of [the Lean projects] which was really pleasing was that people started to talk to each other more and that improved working relationships internally. One of the clogs we've always had in this area is that people like to sit at their own room and blame everyone else and so you'd get different teams not working together very well. We've managed to remove a lot of that and got people working much better together…. so, the level of collaboration has improved immensely…. it has generally made people a bit happier because they know what to

		expect from each other. They know what they need to do whereas before [the Lean project] it was really messy" (C4)
Employees, academics and students	Streamlined tasks and processes.	"we always like to try and reduce the staff time where appropriate so [staff] are not having to do things that aren't adding any value,…,remove some of those irritants to improve their day-to-day working life" (C3)
	Identifying value chain and focusing on value enhancing activities.	"I was bringing in standard operating procedures and streamlining overall postgraduate programs. The benefit has been that we are more efficient. One of the reasons for doing it was because we are constantly running MSC's across the departments - joint MSC's -so by streamlining, processes have become easier to integrate with other departments." (F4)
	Identification and elimination of duplication	"One of my major projects I worked on was, review of the admissions onto the post-graduate certificates in learning and teaching for academics….We got the right people in the room to participate in the project. We did a mapping of current state and …It was really bad what we were doing. We had, how can I say this? I guess about 38 stages just to get them to the end of year one….Everybody was amazed at how appalling,…we so surprised, and basically we we're asking an individual for the same information on three different occasions. It was a bit of a mess. So, we got it down to eight [stages]. So, we were delighted that we had an eight step or an eight stage process." (E1)
		"By making some of those [Lean] changes, it has saved months and months of processing work" (C8)
		"This led to a realization that a computer system would not change their life, but by looking at process. They had some hard lessons to learn because it was such a small team, such a massive part of their day job. So, some of the things they were doing were color-coding emails and things, rather than just answering the emails." (C8)
		"We've run projects that have enabled processes to be changed from manual processes to electronic processes. Process that have been taking weeks can now be completed in a matter of hours" (C5)
		"When we get people together, people realize that they've been doing something that another member of staff has being doing as well. There's been duplication so due to Lean we have been able to cut all that [duplication] out" (C5)
Suppliers	Reduce the number of forms	"Thinking about the expenses project, once we'd come online, the benefit was getting rid of paper (forms). We used to lose a

	Automation of processes	lot of claims in mails. [With the online system,] we can pay [suppliers] more quickly." (C6)

When respondents were asked about their perception of what the drivers of Lean HE were, a few recurring themes came through. Some of these included: the need to save time, the need to improve the student experience, the need to streamline tasks and processes, the need to reduce the number of forms that are completed by staff and students etc. A1, for example, outlined that it was all about staff time saving, the Registry department working better and an improved student experience, with fewer forms for students to fill out. Meanwhile, A2 narrated a case where, before Lean was implemented, 9 different staff checked the qualifications of postgraduate applicants. Staff time and effort at institution A was then saved after charting out the process and identifying this area of waste (A2).

Similar stories explaining the need to reduce processes and bureaucracy within HEIs were shared by other respondents. For example, E1 noted that, prior to Lean adoption, the admission process unto the post-graduate certificate in learning and teaching for academics at institution E involved 38 stages. After a review and an application of Lean principles, the entire process was redesigned into a more streamlined 8 stage process. A2 contended that, overall, Lean HE leads to a focus and review of key elements and processes, which leads to a clarity of task requirements and responsibilities. F2 reiterated the fact that Lean places the spotlight on key processes. As evident from several Lean adopters, Lean, when applied to HEIs, leads to better identification of the HEI value chain and a focus on value enhancing activities. In several cases, Lean led to the identification and elimination of duplication across several processes.

There is evidence that Lean improves team working through improved team communication and integration of functions. In institution C, for example, there is evidence that Lean was instrumental in reducing a blame culture as well as the existence of functional silos. The respondents from institution C noted that there is now more collaboration between staff and this has led to a more positive working environment and happier staff.

On the issue of forms, bureaucracy and wasteful process in HEIs, A1 noted that institution A achieved better student experience by going Lean, because they now had fewer forms for students to fill out and these forms were online rather than paper-based, so students (staff) could access and submit forms without necessarily visiting the designated unit for which

the request was targeted. Also, forms could be made more interactive and streamlined so that the information required could be more efficiently collected.

Overall, the evidence drawn from interview data suggests that the need for better services (to staff and students) was the main driver of Lean adoption. The poor services to staff and students was attributed to bureaucracy, the buildup of complex processes developed over several years, the lack of a holistic view on the HEI value chain, the existence of functional silos and the lack of communication and integration across units, which depend on each other to deliver the service. Lean has been instrumental in mapping out processes, identifying what constitutes value to the end customer, elimination duplication in the value chain, streamline processes (and reducing bureaucracy), improving communication across teams, units and functions and leveraging information technology to automate (manual to electronic) a number of processes.

5.5.3 Challenges and barriers to Lean adoption in UK HEIs

A few questions in the interview gave respondents the opportunity to talk about some of the challenges and barriers faced when implementing Lean at their institutions. For example, respondents were asked (1) if they thought Lean and HE were a good fit, (2) how the organisational structure and institutional culture might have inhibited Lean adoption, (3) the approach to Lean implementation (how and why), amongst others. In their responses, respondents highlighted some of the key challenges and barriers facing Lean implementation in the HE sector. Nvivo was used to scour through each interviewee's responses. All responses relating to difficulties faced, challenges and barriers to successful Lean implementation, were then collated. These responses were grouped into different main themes, arriving at 8 themes as follows;

Figure 5.5-1: Challenges to successful Lean implementation in HE
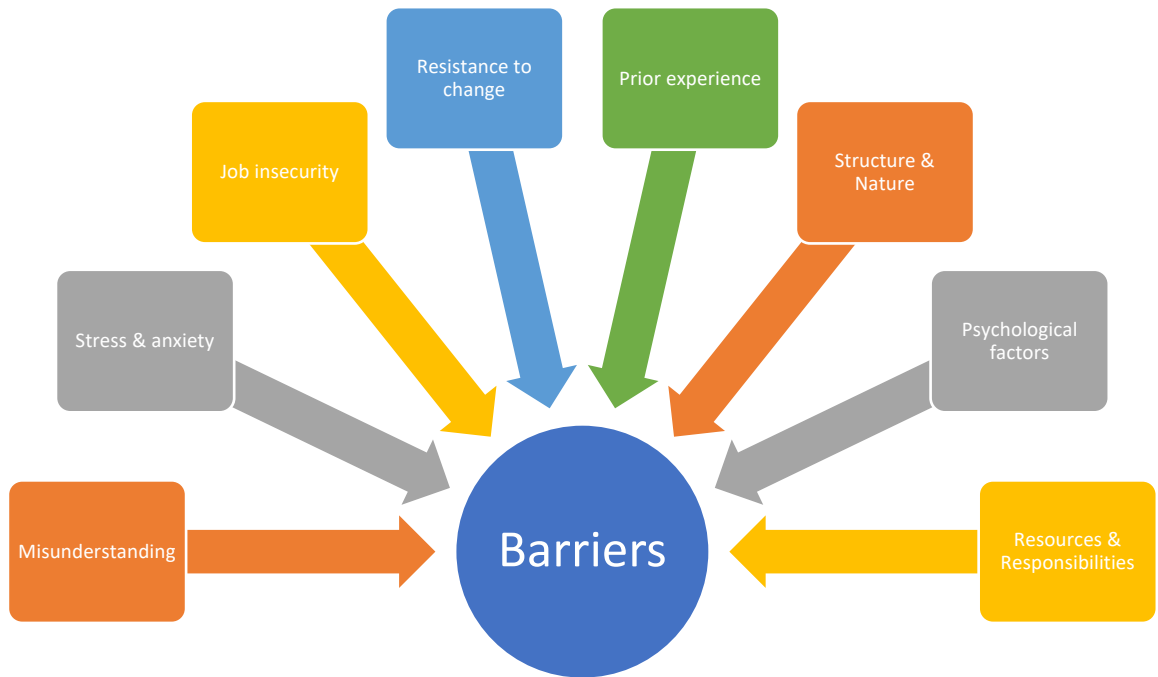
The table (Table 5.5.2) below provides a brief explanation of these 8 themes together with excerpts from the interview(s) that support them.

Table 5.5.2: Barriers to Lean implementation in UK HE.

Theme	Explanation	Evidence (phrases)
Misunderstanding	Individuals are skeptical about Lean, do not understand the concept (plus language/terminology) of Lean, do not understand the role of Lean and the benefit of adopting Lean strategies.	"...people weren't familiar with what Lean was...[Lean] uses much more jargon and unfamiliar terminology, that in my opinion has not been appropriate for the higher education sector...I have witnessed people being confused by the Japanese names of things" (F1) "This is silly. We're playing with posters, we're playing with paper..." (F2) "Lack of understanding… Lack of trust" (A1) "…when they go back to their work area, they may not be able to make the changes for whatever reasons" (A1) "…people within the higher education sector do not understand how to relate to that because it doesn't fit with the type of work that the majority of those individuals do..." (F1) "…some people see the conflict between Lean, six Sigma project management, TQM,..." (B3)
Stress & anxiety	Lean brings about change which creates expectations, necessitates retraining and can lead to anxiety and stress.	"...considerable stress for the individuals..."(A2) "it's a bit like project overload" (F3) "...it's getting them to go back and-and embed the principles..." (E1) "I got into the stage, there's just so much, I can't take all in... because I'm still doing my day job and it was just so much going on " (F3) "…we were too quick to get from one stage to the other..." (F2) "...there is pressure to deliver once you put this amount of time into-into a project." (B5) "...people fear the change because of stress..." (B3)

Job insecurity	Austerity following the global finance crisis created the need for universities to seek efficiency - which might sometimes lead to redundancy. Lean is seen as a ploy to make redundancies.	"…fear of job vulnerability" (A1) "the issue about replacing teams" (A2) "perceived staff reduction" (A2) "…as academics, I think we seem to be losing a bit of our autonomy. " (G4) "staff... they think they might be losing their jobs" (C6) "…people assume whenever you're trying to become leaner, you're trying to cut out steps and possibly people " (F4)
Resistance to change	Lean necessitates changes in the organisation of work - changes which employees may be unwilling or unmotivated to make.	"Sometimes they have a resistance to that and they don't want to be taught to do this a different way. They're really happy doing it that way and that may suit them, but it impacts on the overall" (F3) "you get resistance in some areas people are reluctant to participate" (C5) "so, people who just won't change and we just don't bother them" (E1) "entrenchment against change" (A2) "You may occasionally get someone who is just not keen on the change" (A2) "some of the challenges were with the changing the old habits" (A2) "I think the culture is very much we've been doing it this way and we've been doing it fine why do we need to change it" (C7) "they like things being the way they've been, so they're not that receptive to change even if it does help them" (B6)

Prior experience	Prior poor experience or lack of experience breeds scepticism and impedes change.	"I've seen other colleagues who, you know, the minute a suggestion is made" (F2) "Oh, no. That would never work" (F2) "bad implementation" (B3) "I have not had training." (B6) "quite a painful process" (B5) "while that was good for building engagement we didn't deliver as impactful projects because there were quite small wins" (B6) "if you're used to doing something, and you know how you're doing it, then it makes you comfortable" (B6)
Structure & nature of HE	Some challenges arise from the structure and nature of HE institutions. This could include the way institutions are governed, the presence of functional silos, and the ambiguity of the concept of "customer" in the HE environment.	"we can easily get ourselves organized to do small projects but the bigger projects are the kind of things which generally I think do benefit from having a central team and because we don't have that we've not been able to manage it that way." (E2) "some of the things were out of our control" (B1) "very difficult to have employee autonomy when you're working within the educational environment and within departments because you are in a way governed by the head of faculty" (F4) "I don't think it's a natural fit I think where it's easiest is where it started where Lean started was in manufacturing" (E2) "academic colleagues still appear to have a little bit of an issue with regarding students in a kind of customer focused way because they see academia as something being a little bit different." (B5) "it's difficult to tell people who are experts in their own discipline area as academics that we think we should do this differently" (F3)

Psychological factors	Psychological, lack of belief and mental barriers arising from pre-conceived notions can sometimes stand in the way of Lean adoption.	"it's difficult when people move from one way of doing things to another and at first they don't believe that it can be done so there's some scepticism" (C6) "Oh, that would never work." (F2) "You know, that doesn't really help." (F2) "the frustration is how disciplined you have to be with Lean" (C1)
Resources & Responsibilities	Lean creates new responsibilities, which are sometimes challenging to take on in parallel to the day job or require additional resources.	"It's more because they're just busy rather than resistance to continue working with us." (C8) "I think one main challenge is finding the time to design and implement the improvements that are required" (F1) "It's staff not having enough time or feeling that they don't have enough time to dedicate to get involved with Lean project." (G2) "day-to-day work gets in the way" (B4) "we've already got enough to do, why should we be doing this now, when we're short-staffed and you know we've got so much work on" (G1) "getting buy-in from the staff is taking longer than anticipated" (G1)

The table splits the barriers and challenges to implementing Lean in this context into 8 key themes; misunderstanding, stress & anxiety, job insecurity, resistance to change, prior experience, structure and nature of HE, psychological factors and resources & responsibilities. It is worth noting that these themes are integrally linked and related, although the underlying motivations and drivers are different. The second column of the table provides a brief explanation of each theme while the third column provides extracts of quotes from respondents that support the existence and prevalence of these barriers. These results are discussed below in more detail, vis-a-vis the extant research.

As can be seen from the table, there is evidence that some employees struggle with the concept of Lean and what it entails, or how it can be applied to the HE context. This is sometimes due to the Lean terminologies and jargon, but other times is due to the challenge of translating traditional Lean concepts to this unique environment (i.e. making Lean fit within

the HE context). This is summed up by one respondent who stated that *"people within the higher education sector do not understand how to relate to [Lean] because it doesn't fit with the type of work that the majority of those individuals do."* It could be the case that the focus of Lean in some of the institutions is narrow (i.e., eliminating waste and increasing efficiency), particularly, given the timing and circumstances surrounding the introduction of Lean (austerity, global financial crisis, cuts to government funding to HE).

As documented in Table 5.5.2, there is evidence that Lean increases pressure, stress and anxiety at work. Stress generally constitutes physiological and psychological reactions occurring when an employee meets a challenge which they consciously or subconsciously perceive is beyond their immediate capacity. From discussions with practitioners across these institutions, it was apparent that Lean brings about change. Part of that change is the creation of new expectations and responsibilities. This may necessitate retraining, increased monitoring and reporting of progress. This may lead to anxiety and stress. A few respondents noted that they were sometimes overwhelmed and overloaded with work due to Lean changes, as things moved too fast, leaving staff stressed out.

There is also evidence that the introduction of Lean creates job insecurity with employees sceptical about the true intent of their managers. Specifically, the 2008-2010 global finance crisis, and associated funding cuts towards UK HE sector, created the need for universities to seek efficiency and reduce expenditure across the board. Lean integrally identifies wasteful processes and seeks to eliminate them. Given this backdrop, employees can perceive efforts to introduce Lean as a ploy to identify non-essential areas and personnel in a bid to make redundancies. One of the Lean managers noted this issue of insecurity, stating that, "people assume whenever you're trying to become leaner, you're trying to cut out steps and possibly people". Given the monumental role of employees in the Lean adoption process, this fear and scepticism acts as a major barrier to Lean implementation.

In discussions with respondents, particularly Lean leaders and managers, resistance to change came across as one of the most significant barriers to Lean adoption in this context. Some of this is due to the fact that, unlike private organisations, UK HEIs are public institutions (generally charities, not-for-profit) and hence, the style of work is usually more relaxed. Indeed, some of the respondents noted that several employees just did not want to be taught to do things a different way and others were reluctant to participate in change programmes. It was clear from the discussions that some of the resistance was because employees were not clear

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about how the change would positively impact them (although the benefits to service users might have been clear). There were statements about culture and how things have been done in the past- just the way they liked it. There were statements about how change was pointless and only served to increase employee workloads. Numerous employees, across a number of institutions, were therefore not particularly inclined to support the change initiatives.

One motivation for resistance to change (discussed above) was as a result of employees' prior poor experience of Lean projects or lack of experience in Lean. In general, these issues were seen to breed scepticism and impede change. In discussions with respondents, it was clear that some resistance was met because some staff believed that some of the proposed changes would never work. This was believed to have stemmed from previous (poor) experiences of introducing this change. Some Lean leaders also noted that because earlier Lean projects did not register major wins for both employees and customers (service users), it was sometimes hard to build momentum and engagement by leveraging on the achievements of previous projects. In several cases, scepticism arose from employees' lack of experience. To the researcher's knowledge, while prior research has identified various sources of resistance, it has not been established that poor prior experience of Lean implementation might breed scepticism and stand in the way of future Lean efforts.

One barrier to Lean that might be unique to the HE setting is attributed to the structure and nature of HEIs. As noted in Table 5.5.2, this could be attributed to the way institutions are governed (bureaucracy, hierarchical structure), the presence of functional silos (autonomous units within departments), and the ambiguity of the concept of "customer" in the HE environment. Some respondents noted that the Lean approach was not holistic – institution wide -, because Lean was introduced by certain units without buy-in from HE executives. In such cases, there were no central Lean teams focusing on Lean across the entire institution. Specifically, the respondent lamented; *"we can easily get ourselves organised to do small projects but the bigger projects are the kind of things which generally […] benefit from having a central team and because we don't have that, we've not been able to manage it that way"* (E2). In conversations with practitioners, it was also clear that those responsible for implementing Lean were sometimes not empowered to make certain decisions. For example, respondents noted that some decisions were beyond their control with one stating that; it was *"very difficult to have employee autonomy when you're working within the educational environment and within departments because you are in a way governed by the head of faculty"* (F4). A number of respondents also opined that Lean was not a natural fit for the HE

environment, sometimes because, *"academic colleagues still appear to have a little bit of an issue with regarding students in a kind of customer focused way because they see academia as something being a little bit different."* Again, academic departments are constituted by professors who are experts in their own fields and sometimes, as one respondent noted, it is challenging to convince them to do things differently. In all, this environment throws up new challenges which are not specific to Lean, but are likely to be experienced when introducing any type of major change in HEIs.

Another notable barrier to Lean adoption in HEIs, deduced from discussions with practitioners, was the psychological barrier. In certain institutions, there was an apparent lack of belief in the potential for Lean to create positive change. Lean leaders expressed frustration, encountered when trying to institute changes, with some employees out rightly showing their scepticism by noting that some proposed changes would never work—achieve their goals. Again, this issue of psychological barriers to Lean adoption has not been fully addressed in the prior literature. This is only now identified as this study focuses on the soft or people side of Lean.

Besides resistance to change, the lack of resources and an increase in responsibilities were identified as major barriers to Lean adoption in the HE context. From discussions with Lean practitioners, it was apparent that top management at HEIs do not fully recognise the potential of Lean and the role they can play to foster its adoption and success. At most institutions, issues of staff being too busy to engage in Lean, not having enough time to get involve in Lean projects, being short-staffed etc. were identified as impeding Lean progress. In some institutions, Lean was seen not as the way work is done, but as an additional thing that employees could do. It meant employees needed to set time out after doing their main task, to get involved in Lean. Perhaps there lies a misconception, which must be addressed for Lean to flourish. In most cases, it was apparent that Lean had been adopted and supported by middle-level managers but buy-in from senior management was not always evident. Employees noted the lack of sufficient resources to allow them to engage in some Lean initiatives. As discussed in chapter 2, senior management have a substantial role to play if Lean is to be successful. In some institutions, senior management support was evident. In institution C for example, there was evidence of the Vice Chancellor showing support for Lean projects. The respondents at that institution agreed that the involvement of key stakeholders and their provision of support were critical in facilitating success Lean adoption.

5.6 Strategies for Lean implementation in UK HEIs

5.6.1 Overview

This thesis focuses on the people angle of Lean and not on the process of Lean implementation per se. In this, the role of people across various critical phases and milestones of Lean implementation is explored. This section, specifically, discusses some of the general approaches to Lean adoption across different institutions, the role feedback plays in the implementation process, and how Lean is institutionalised across different UK HEIs.

5.6.2 General approaches to Lean adoption in UK HE

In institution A, as noted by A1, Head of Business Improvement (BI) networked with other directors as part of a director's group. Part of this explored how the BI unit could support directors to make changes at their own departments. At a few institutions, as suggested by a number of respondents (A1, B2, C3, C6, D4, F2), the Lean adoption process starts with an assessment of the current performance levels across the institution and the identification of value drivers. At institution D, for example, staff from different units were brought in to work together, assess current performance levels and establish benchmarks (D1). A1 notes that the strategy of bringing together staff at institution A, at the very beginning of their Lean journey, improved communication across the institution, which was important for successful Lean implementation. C8 added that these initial meetings were helpful in establishing "respect-for-people" (one of the core Lean principles) by seeking their views and buy-in at an early stage, but also to start actively finding solutions to problems they face (i.e., problem solving).

Lean leaders at several institutions used change agents – staff trained in Lean techniques – to promote diffusion of Lean across their institutions. As noted by A2, for example, in institution A, the BI team trained staff in academic units and sections to become local change agents. These change agents were then encouraged to explore how Lean could be applied within their different work areas. Staff (project sponsor) would then complete a project proposal form, which is used to assess and plan the project. The Lean team at institution A, assesses each project and determine its suitability. A1, specifically noted that; *"...in the service that we work in, people know what our rules are, so they'll come to us and tell us if they've got ideas on improvement that they want us to look at, and we'll assess them, and based on what else we're working on, determine whether or not we're going to do them,"* (A1). Besides relying on business units to propose projects, in institution A, the Lean team is instrumental in

proposing, initiating and delivering key strategic change projects such as delivery of new IT systems (A1).

To improve engagement and increase staff involvement, one institution (F) uses anonymous posters (similar to idea boxes) to encourage staff to contribute ideas on how their work/processes could be enhanced. F3, for example, notes that *"...we do anonymous or silent poster activity so people can always express what their ideas or concerns, without it being attributed to someone."* Usually, the staff in the selected Lean area make up the Lean team. For large cross-departmental projects (for example at institution A), people from different teams impacted by the change are brought together to form the delivery team.

In terms of project types, it appears several initial Lean projects conducted across a number of institutions involved the introduction of IT to improve process efficiency by, for example, replacing manual processes with electronic processes in institutions C and F (C4, F6). F6 notes that the introduction of IT allowed for easy identification and elimination of problems (areas of waste). Many of these processes involve the end customer (academic staff and students) and the goal is to enhance the service provision to them. B2 discussed the use of IT to facilitate student matriculation at institution B. Several respondents highlighted projects focusing on transforming HR processes (such as employment) and student services processes (such as admissions, verification of student documents, issuing of certificates, transcripts, attestations etc.).

Besides the more formal projects, some institutions, such as institution C, strive to empower staff to apply the Lean philosophy in their day-to-day work, i.e. empowering staff to take Lean to their desks. Hence, much of Lean implementation at some institutions is unstructured and unrecorded as a formal project. C6, for example, noted that one of the focuses of Lean at this institution is *"encouraging people to own what they do [...] giving them the feeling that they are empowered and able to make a change where they see it,"* (C6). Similarly, F3 discusses the core values of the institution and efforts to encourage staff to embed these values in the work they do. Here, Lean leaders seek to make Lean part of the culture of their institution. The same is true for institution E. One respondent at institution E, describing how he/she applies Lean in her/his workplace, noted that; *"...believe it or not, but there are days I dedicate to sorting things out, tidying things up in a 5s approach…. I could be doing something else, but I choose to do that because I knew that was going to pay dividends. It's an investment of my time and it will pay me dividends in two or three months' time."* (E1).

Overall, it appears Lean implementation takes both a structured and unstructured approach across UK HEIs. In some institutions with dedicated BI or Lean departments, projects are identified both from the top (i.e., by Lean managers) and from the bottom (by employees), and these projects are supported by the BI units and carried out by staff within the affected units. In other institutions, Lean is embedded into culture such that Lean becomes what employees do (or attempt to do) on a day-to-day basis. Irrespective of the approach most institutions try to put employees at the heart of any Lean related changes. As summed up by respondents from institution E, *"...what we wanted to do, was to get staff engaged with the whole process of making change and making things more efficient,"* (E3). *"... the fact that we believe that staff should be involved in change is at the heart of what we do and so for us Lean aligns very much with that [culture], but it's also about making things more effective..."* (E2).

5.6.3 The nature and role of feedback

Given the focus on the people side of Lean, the research also sought to understand the nature and role of feedback and employee support in the Lean implementation process. Specifically, respondents were asked to discuss *"What happens once Lean projects are completed? How is feedback collected? What kind of feedback is collected?"* The question targeted Lean leaders and managers who are in a better position to discuss how Lean is institutionalised at HEIs but also allows employees to discuss their experience of providing feedback on the Lean process. The results from the discussions are summarised in the table (Table 5.6.1) below. The first column summarises the nature of feedback focusing on whether feedback was provided or not, whether feedback was formal or informal and whether feedback was provided prior to, during or post Lean implementation.

Table 5.6.1: The nature of feedback in Lean adoption at UK HEIs

Nature of feedback	Narratives from interviews
Lack of feedback	"I'm not really sure if we had any feedback. There was no process in place to feedback on the process as far as I was aware and I'm not really certain" (D1)
Informal feedback at the end of projects	"…people working on Lean projects were approached… asking, how did something work for you? Is there something that you would want us to do?" (D2).
Customer feedback prior to Lean	"surveys are sent out…to groups of students or groups of academics" (B3), "How did you find this? Anything would you change?" (B6).

Continuous feedback from customers	"Whenever we work with staff members, we ask them to complete a survey about how well we did, what was wrong, what was bad, what were great and so on. And with our team members, we discuss what we did; what we could have done better and so on. But those are very informal meetings to reflect on that [feedback]" (G3).
	"…[we] ask students to rate [processes] on… the Likert scale. So, they do that, but we also allow them some space on our surveys to do verbatim comments" (B5).

As can be seen in the table (Table 5.6.1) above, in a few cases, much feedback was not provided to staff. D1 from institution D, for example, noted that he/she was unaware of any efforts to collect feedback in relation to a specific Lean project he/she was involved in. Perhaps, the process of collecting feedback at this institution was informal as D2 (from the same institution, D) noted that people working on Lean projects were approached to obtain feedback on the Lean project. D2 contended that the requesters wanted to know how employees felt about the Lean project and whether they had suggestions on what could be improved. From the discussions that followed, it was unclear how the feedback was collected (paper, online, verbal) and how the feedback was used to enhance future Lean project implementations.

In some cases, as in institution B, customer feedback (collected both online and on paper) prior to Lean projects, appears to have been used to identify Lean priorities. As noted by B3, at institution B, surveys were sent out to solicit customer (staff and student) suggestions on what processes to improve. Presumably, staff and students were asked to identify those processes that need improvement and what kind of improvements they would like to see. It was however unclear how these surveys were analysed and how the feedback from the surveys were then used to identify Lean priorities.

Also, some institutions collect feedback from the end-user (customer) after the completion of Lean projects. This feedback sometimes focuses on staff experiences during the Lean implementation project and other times, the feedback focuses on end-user perceptions of the "improved" processes.

The responses from the respondents also provides some insight on the role feedback plays in the Lean adoption process at UK HEISs. Following the analysis of the data, 3 important roles of feedback were identified; (1) feedback as a tool for project monitoring and Lean performance assessment, (2) feedback as a tool for identifying areas in which additional support is required, and (3) feedback as a tool for identifying, recognizing and rewarding Lean

efforts and Lean success. Evidence in support of these roles is summarised in the table (Table 5.6.2) below.

Table 5.6.2: The role of feedback in Lean adoption at UK HEIs

Role of feedback	Narratives from interviews
Project monitoring and performance assessment.	"…asking survey respondents …how [they] would rate the [current] process and in comparison to what [they] rated it before" (F3) "…the success of the project, is based on how people have enjoyed working on it as a whole" (C5) "..feedback allows Lean leaders to very closely monitor [] action plans to see whether everything is implemented…" (C3).
Identifying areas for additional support.	"..feedback allows Lean leaders to … questioned why things might be stagnating" (C3). "something else [Lean leaders] were doing was taking people, [they] called them 'Interns', that would come and work with [them] for a while; we wanted to do this over and over again", (D2)
Reward and recognition of Lean efforts and achievements.	"…through feedback received, we can nominate members of staff or nominate teams for medals and team awards, if they've demonstrated the values which most people that we work with do on our project" (F3).

As F3 notes, for completeness, *"both qualitative and quantitative feedback [is collected…]; qualitative through testimonials and free text within surveys, and quantitative through on a scale of one to ten"*. Importantly, in institution F, an attempt is made to compare the current with the situation before Lean, by asking survey respondents to compare the current process to the previous process. Such feedback is essential in measuring Lean success and identifying areas for further improvement, perhaps, an essential element of continuous improvement.

In institution A, the collation of feedback is an essential part of the process of monitoring and reporting on Lean progress. A2 notes that the BI team *"collect feedback […] electronically and produce their own reports"*. This monitoring and sharing of information on Lean progress is important for engaging all stakeholders, but also for sharing wins, and also knowledge with people (A2). Indeed, in institution C, the feedback on specific projects is used to involve or engage faculty (senior management) in the Lean implementation process.

Specifically, C5 notes that "the work is taken back to the faculty or department and we do review the progress of that work once it's been completed" (C5).

In institution C, the motivation for collecting feedback from customers and Lean users is to assess performance. As one respondent puts it, a project is only really successful if participants have enjoyed being part of it – hence, feedback is important in assessing Lean project performance. C3 notes that the feedback can become an essential element for monitoring action plans (by senior management) and for identifying areas that need further support or resources. In some cases, Lean leaders can provide additional support (such as guidance and training) when needed. In institution D, for example, D2 noted that, as part of the feedback and support process, Lean leaders provided additional support by taking on Lean "interns" or trainees from other departments, who were then able transfer the Lean knowledge gained during their secondment once they returned to their departments. This is essential in embedding Lean and developing future Lean leaders.

In other cases, the feedback formed an integral part of the process of recognising, rewarding and celebrating staff/teams/groups for Lean success. F3, for example, noted that the feedback collected is instrumental in identifying people and teams to nominate for medals and team awards.

In summary, feedback appears to play three important roles in the Lean implementation process in UK HE. First, it allows for projects to be monitored against plans (i.e., feedback from staff) and for performance to be assessed against benchmarks (i.e., feedback from end-customers). Secondly, feedback allows Lean leaders to identify areas where additional support might be needed. In such cases, additional training, secondments and direct support were used to address knowledge and experience gaps. Finally, feedback allows Lean leaders to appropriately reward and recognise the efforts and achievements of Lean team members.

5.6.4 Institutionalisation of Lean

This extension discusses strategies used by institutions to institutionalise Lean. Institutionalisation is generally considered an important aspect of continuous improvement. Amongst others, it ensures that Lean is integrally related to business goals, Lean will be managed consistently across the institution, Lean will survive staff and leadership changes, historical data will be collated and used to support future processes, and finally, the institution will put in place resources (people, financial, infrastructure) to support Lean projects. The institutionalisation process across HE institutions are explored in a bid to assess the likelihood

that Lean HE will survive in the long run. Indeed, institutionalising Lean can represent a challenge in this environment given the sometimes unstructured (by staff at their workplaces) and fragmented (e.g., by some units within the faculty) nature of Lean adoption in the HE environment. As G2 puts it; *"the area that we have done less well on, is embedding continuous improvement as a culture and getting people to embrace it,"* (G2).

A number of respondents across different institutions talked about the process of documenting and disseminating *"lessons learned"* (A1, G2, C2, C5 C7). In institution A, for example, the BI team acts as knowledge exchange, spreading lessons learned from department or unit to other departments (A1). As part of this the BI also provides additional training to units to allow them to further embed Lean into their work culture and processes. In institution C, Lean leaders *"... do a review and evaluation at the end of each project. [They] also write a case study, which includes lessons learned"* (C8), which is sent to central Lean team and widely-shared through different media (C2). In institution G, a project write up (similar to a case study) is done at the end of each project. The write up covers the situation before Lean, the process of Lean implementation i.e., how Lean was achieved, and the situation after Lean implementation. This information is collated and sent to senior management once each year. Specifically, G2 noted that *"...we do a project write up to see what happened, what results were obtained and that sort of gets collected, and once a year, goes to our senior management team, so they can see what's been going on, and we sort of move away and go to the next thing"* (G2). In institution G, lessons learned are collated and disseminated through a local process library, a *"how do I"* library and through the Lean ambassadors' network (G4), to foster institutionalisation.

Besides documenting lessons learned, in institution C, a value-for-money report carrying key statistics, is prepared and reported, on those on a regular basis, to management (C5). This report carries information on improvements that have been made and successes recorded. This information is held within institutional repositories and is thus useful for documenting/understanding the impact of Lean and sustaining Lean in the future. Further, in institution C, Lean team meetings are recorded, and memos and documents relating to Lean projects are collated, stored and shared by email (C7).

At institution D, the approach is to have a meeting with management to update on the Lean programme (D2). This doubles as a teaching session during which the Lean team uses posters to portray new processes that have been implemented and the impact of such changes

(D2). As D2 noted, this is generally followed by the development of case studies and blogs which are shared on the Lean team's website.

One outcome from successfully completed Lean projects at some institutions, is the development of standard operating procedures (SOPs). C2 notes that SOPs is an important outcome of Lean at institution C, and once developed, these are generally disseminated and integrated university-wide. SOPs are critical to long term sustainability of Lean, embedding Lean in the culture of the organisation, transferring knowledge gained from one Lean project to other units within the organisation, and allowing for Lean to be sustained into the future, beyond the term of the Lean team and management. In institution F, Lean is further institutionalised by doing an annual audit to investigate the level of adherence to SOPs and to provide further guidance and training when lapses are identified (F1).

In all, most respondents agreed on the importance of documenting and disseminating lessons learned. Indeed, C4 contends that "once you get your reporting right, you can do the continual improvement". This reporting allows for lapses to be identified and as C7 highlighted *"Within my area we would continually review and keep pressing forward, because sometimes not all the specifics have been achieved on time, so we made sure that we mop up any residue tasks that are left"* (C7). As C8 adds it is also imperative to *"make sure that continuous improvement cycle is built in"* to Lean adoption cycle.

5.7 Respondents' views on soft elements relating to Lean

5.7.1 Overview

As earlier noted, Chapter 4, provided some insight on the soft side of Lean within the HE context (based on a single institution). This section builds on Chapter 4 by further exploring research question 3 (*"How does Lean affect employee outcomes directly, independent of changes to work structures and processes?"*), drawing evidence from the multiple case studies. The previous sections have explored objectives, benefits, drivers and challenges of Lean adoption in the HE sector. This allowed for the impact of Lean on employee working conditions, through its transformation of work structures and processes to be explored. This section will focus on research question 3, which seeks to explore the direct impact of Lean on employee working conditions and outcomes.

During the interviews, an effort was made to explore respondents' perceptions of how Lean impacted on soft elements in the workplace. The question was generally phrased as

follows: *"Reflecting on any of the Lean projects you have completed in the past, and citing any examples, were there any effects, direct or indirect, on (1) employee motivation, as a direct result of Lean adoption?"* Interestingly, several respondents noted that they were unsure of how Lean impacted on employees (B1, B2), either because no formal assessments had been done, or because the institution had only recently adopted Lean and has only completed a few projects.

It should be noted that all the institutions surveyed do not formally assess how Lean impacts on employees i.e., the soft side of Lean is generally ignored or assumed to be satisfactory. Indeed, one of the Lean leaders notes that, *"on this question and subsequent questions, it's quite difficult to say, we've only got anecdotal evidence but it's very small,… So, we did not measure all these-all these [soft issues] before we did the project and nor did we measure them afterwards. So, therefore we can say, I don't have scientific evidence to say things improved or didn't improve."* (A1) Hence, the evidence provided here is anecdotal and based on respondents' perceptions. Unfortunately, several of the respondents did not provide useful responses to these questions, noting that they were unsure. A few responses on the possible impact of Lean on employees were provided and these are built into the narrative (on how Lean impacts on employees in UK HEI) below. The table (Table 5.7.1) below first summarises the main findings.

Table 5.7.1: Summary of Lean effects on employee outcomes

Soft element	Impact	Evidence
Motivation	Generally positive – due to employee involvement and the feeling that management is actually listening to employee concerns.	"I think for some employees they were motivated by the fact that the process has been reviewed and there was clarity as to who did what going forward, and so that was a positive effect." (A2) "I think generally just doing the Lean project is a good motivator because I feel like this process wasn't working and we're actually doing something to try and improve it" (B1)
Job satisfaction	Generally positive (for Lean team members and internal customers e.g., academics)	"Some people end up with more job satisfaction as a result of changes because they've been involved in designing the changes." (A1). "[Academics] are actually happy with that [Lean improvements] because they got satisfaction from the fact that they were able to get through more work without having to go through a clunky system" (D3).
Retention	Unclear – most institutions hold no data	"We have very high retention rates meaning that people stick around but we've not done any analysis

	or have done no assessment.	on whether what we've done [i.e., Lean] has changed any of that" (F3).
Autonomy	General increase in autonomy through empowering (training) staff to take on new tasks.	"Some of the Lean changes have led to more autonomy" (A2) "Lean should lead to a focus and review of key elements and processes, which leads to a clarity of task requirements and responsibilities, thus yielding an increased autonomy with higher job satisfaction accumulated through employee involvement in designing the changes." (A2) "actually, giving managers the skills to do it for themselves with their teams are giving team members the ability to be able to do it for themselves is a really important step in embedding Lean as part of an organisation's culture" (E2). "Again, yes because the ideas for improvement are coming from the staff themselves and they have the autonomy to implement those improvement." (F2) "I think it gives them an ownership if they've been involved in the projects. It gives them an ownership of wherever the output happens to be and I think that helps when it's seem to be a bottom up rather than top-down process…we take the people who are experts in it and involve them so rather than the manager tailor the input …it gives a voice to people who actually do that on a day to day basis" (F3) "It is very difficult to have employee autonomy when you're working within the educational environment and within departments because you are in a way governed by the head of faculty" (F4)
Work-related stress	Generally negative – respondents suggest that an increase in workload causes stress	"the biggest challenge is definitely that they were still doing the day job when they're trying to implement some quite huge changes," (C3). "I got into the stage there's just so much, I can't take all in, I can't retain all my head because I'm still doing my day job" (F2). "There is pressure to deliver once you put this amount of time into a project" (B5). "Although the workload remained the same, it became easier to do and I guess that would have allowed more work to be carried out in the same day" (D1).
Workload	Mixed – Lean increases workload for some but decreases workload for others.	"The whole idea is to try to reduce workload to move it from perhaps your more expensive employees to those who are working on a lower grade, if there's an appropriate thing to be done" (A2).

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		"There is pressure to deliver once you put this amount of time into a project" (B5).
		"When you undertake an initiative, you still have your business as usual that has to absolutely continue so you must continue with your own job, as well as running this initiative, which is quite tricky." (B5)
		"Although the workload remained the same, it became easier to do and I guess that would have allowed more work to be carried out in the same day" (D1).
Psychological safety	Generally positive- as employees are encouraged and supported to engage in Lean even if unsuccessfully. But evidence is scant.	"risk taking has been supported"
Working environment	Generally positive – but evidence is scant.	"not having to do things that aren't adding any value, remove some of those irritants to improve their day-to-day working life" (C3)
		"…actually, massively improved the working environment, you know, we did up spaces in our workplace, that were sort of dead spaces, and actually we now utilize the spaces far more than before. So, I think Lean increase it [working environment]." (C1)
		"…redesign of office spaces. I can send you photos. It was horrible before, and that's part of the changes. It is really improved both for the students coming down and the employees. It's very difficult. Space is such an issue within the university" (C8)
		"I don't think Lean has any had any impact on the physical environment. We've never had any dedicated space to run these activities, always within the areas and within resources that we have so I don't think there's been an impact" (B3).
		"…not all teams use 5S but some do and that helps to make sure that we were not working in a bad working environment. We are generally not a high risk environment, I mean there is pockets at the university that are, but making sure that people think about their workspace and about ergonomics is a part of the whole Lean process" (E2)
Organisational commitment	Generally positive	"if [employees] start to see that we are listening and trying to do something to help them, their commitment to get involved in these activities is increased and their enthusiasm is increased" (B6).
		".. we have been given the time out of the office to actually go away and improve something. It means

		that you feel you're being supported by the University and supported by your employer to make things better ... So yeah so I think that it does make you feel more committed because you feel that your employer is working with you." (B1)
		"…this will have a positive effect because it might mean that they [employees] might change roles within the university"
		"…the people who got involved [in the Lean project] were basically saying, 'I care about this organisation. I'm committed to this organisation. I want to make it better.' So, the participation itself signaled the commitment." (F2)
Communication	Generally positive	"the biggest benefit is that they feel listened to, that they do have an opportunity to say what's not working for them and how we could do it better" (C3)
		"increased understanding of the perspectives involved [and] better communication" (B6)
		"people have started to recognize the importance of standardized working, respect for each other and shared understanding of processes" (C3)

The table summarises some of the views expressed by respondents with regards to the impact of Lean adoption on employee outcomes. These are further discussed in the sections that follow.

5.7.2 Employee motivation

In discussions with respondents, it was apparent the motivation and job satisfaction in this environment were integrally linked. The evidence drawn from the interviewees suggest that Lean led to an increase in employee motivation and consequently employee job satisfaction. In some cases, as in institution A, management's interest in addressing failings in processes (through Lean), by streamlining processes while clarifying responsibilities, energised and motivated employees (A2). Similarly, in institution B, management's commitment to try and address processes that were not working through the adoption of Lean (and its associated tenets of respect-for-people and employee involvement) were crucial to maintaining employee motivation (B1). Similarly, increase in motivation were reported in institution D.

Unlike other institutions, in institution D, deliberate efforts were made to increase employee motivation. Indeed, D2 noted that *"a lot of the efforts we made was towards*

motivation, as a way to increase employee job satisfaction; engaging with them, asking them to speak, valuing what they had to say in a safe environment" (D2). This strategy was successful, as noted by D2 *"everybody has increased their motivation as a consequence of working on a Lean project"* (D2). B1 also noted that making things more efficient (i.e., Lean adoption) helps the team to respond quicker (i.e., achieving flow). There is less need to chase people, leading to significant time saving, and employees are generally more motivated and happier with their work. Overall, the evidence suggests that Lean adoption, in most cases, was instrumental in increasing employee motivation.

5.7.3 Employee job satisfaction

As previously noted, employee satisfaction and motivation, as discussed by respondents, are integrally linked. It is clear that internal customers, specifically other employees such as academics, benefit from Lean adoption by non-academic units (such as operations and HR units). D3, for example, notes that this satisfaction comes from the fact that these internal customers are better served when processes are streamlined and efficient. Other respondents also contend that Lean increases job satisfaction, although the rationale for this argument is not always clear. B3 suggests that job satisfaction increases as Lean takes away ambiguity in the workplace.

Other respondents suggested that the impact of Lean on job satisfaction was not as simple. A2, for example, suggests that job satisfaction is contingent on employees' level of involvement in designing Lean initiatives. Specifically, A2 argued that some employees end up with more job satisfaction as a result of changes, because they have been involved in designing the changes or may have received the benefits of such changes. Nonetheless, A2 notes that other employees may feel devalued if their work is suddenly altered without their approval. A2 also notes that communication of what is being done or why it is been done is essential to gaining support, maintaining employee motivation and retaining job satisfaction. Given this important relationship, in institution A, the strategy has been to map each process carefully so that those who are impacted can be identified and consulted or involved as part of the Lean implementation process.

5.7.4 Employee retention

Throughout the discussion, scant evidence was provided in terms of the relationship between Lean adoption and employee retention in UK HE. As will be discussed below, there is evidence that Lean increases stress in the workplace and also increases employee workload,

but there is only weak evidence that these negative effects are strong enough to lead to a significant change in employee retention – i.e., whether employees chose to resign from their jobs. Perhaps, the positive impacts of Lean such as its effect on employee motivation and job satisfaction are strong enough to cancel out any negative effects. Notwithstanding, as F3 notes, no evidence is collected or analysis conducted to see how Lean has impacted retention.

5.7.5 Employee autonomy

The research explored whether employees have more autonomy – i.e., are empowered to make decisions affecting their work. Several respondents noted that that Lean had led to more employee autonomy in certain areas. For example, A2 contended that some of the Lean changes had led to more autonomy. Specifically, A2 argued that in general, Lean should lead to a focus and review of key elements and processes, which leads to a clarity of task requirements and responsibilities, thus yielding an increased autonomy with higher job satisfaction accumulated through employee involvement in designing the changes. This suggests that clarity of tasks and responsibilities together with sufficient training can enable employees to be more effective while requiring little or no further supervision. Indeed, E2 reiterated that, giving managers the skills to do things themselves [i.e., empowerment through training] and giving team members the ability to be able to do things for themselves is a really important step in embedding Lean as part of an organisation's culture.

Similar views on the value of autonomy are held by other respondents, such as B1, who noted that, a recent Lean project he/she was involved in, resulted in giving managers more information and guidance on what they need to do. B1 noted that, as a result of the project, managers became more empowered to manage their portfolios, and also gained clarity to know what they should be doing right from the beginning. The result is that management was less reliant on HR (i.e., the need to contact HR and pose questions at each stage of the process.

Several respondents noted that the bottom up approach to Lean was key to improving employee autonomy. Specifically, Lean projects at several institutions were proposed and driven by staff. This gave them ownership (F3) and placed them in a position of being an expert in the project delivery. Indeed, in conversations with several staff involved in Lean projects across different HEIs, they say themselves as Lean project managers as they were involved in the design, management and delivery of the projects.

It is worth noting, however, that a few respondents called to question the ability of Lean to grant true autonomy to employees. For example, F4 noted that true autonomy was rare in

the HEI environment. Her/his scepticism arose from the bureaucratic and layered governance structure of educational institutions. The respondent noted that faculty (senior management) was always interfering, and employees generally needed approval or sign off from faculty before making several decisions. This layered structure therefore limited leans ability to provide through autonomy to employees.

5.7.6 Employee workload and work-related stress

The research examined the impact of Lean on work-related stress. In sum, the impact on workload, and hence, work-related stress was deduced to be mixed. During the interviews, some employees opined that Lean adoption had increased workloads and as a result, work related-stress. Some respondents suggested that Lean is considered as additional to the job, i.e., their workload increases because they have to be involved in Lean initiatives, in addition to their usual tasks or main job (B5). Others argued that Lean had no impact on workload and that it reduced work-related stress. For example, D1 noted that; although workload remained the same, work became easier to do thus improving productivity by allowing more work to be carried out in the same day. Specifically, Lean allows work to be re-organised so that tasks that are considered mundane can be automated or redistributed to lower grade staff (A2). One way of reorganizing work, which potentially, reduces workload, is to move certain tasks from comparatively higher value employees to lower value employees – upskilling. This cuts costs (for the organisation) and reduces workload (for high value employees) by allowing high value employees to focus on more relevant or important tasks. While upskilling might increase stress for low value employees, it also provides them with training and development, which could enhance their future career prospects.

In most HE institutions covered in this research, Lean projects involved the introduction of IT systems to manage manual processes. This should logically lead to higher productivity, so employees might be expected to achieve higher outputs (e.g., complete a higher number of cases in a shorter time period). One problem highlighted throughout the interview was the problem of "forms" that end-users regularly had to fill when making any request. IT potentially simplifies several processes and eliminates the need to fill (for end-users) and assess (for employees) long forms. Indeed, B2 contends that Lean "… *will definitely have an impact on [] workload, those of [department] assistants and the workload of [department] managers as well, because they won't have to do the forms that we're [currently] asking them to do."* B2 added that IT will also allow the institution to automate several processes which are current done through email. The respondent noted that, several of the regular emails that the unit sends

out will be automated going forward (after Lean adoption), so that will significantly reduce workload within the unit (B2).

Overall, the evidence suggests that there is a general perception that Lean, at least does not substantially increase employee workload and hence, work-related stress. Nonetheless, some employees noted that Lean has led to them feeling overwhelmed and stressed, maybe not due to workload changes, but to other features of Lean implementation such as new expectations relating to efficiency and performance measurement and assessment, the need to take on new responsibilities (and to report on progress), the fact that failings or weaknesses (i.e., due to employee inadequacies) in the value chain can more easily be spotted, and the need for employees to undergo training, upskilling and redeployment.

5.7.7 Working environment

This study also explored how Lean implementation potentially impacts on the working environment. Working environment is considered in the broadest sense to refer to both physical environment (e.g., the place of work, immediate surroundings and layouts) and the intangibles in the workplace (such as, workplace culture, team cohesion and support, employee wellbeing, health and safety etc.).

Evidence in respect of how Lean impacts on the work environment was scant. A number of respondents noted that their institutions were actively engaged in redesigning teaching and learning spaces but it was not clear whether this was related to Lean efforts. There were suggestions that a redesign/streamlining of some processes had led to an improvement in day-to-day working life (C3). Things were clearer and employees could focus on a few processes, meaning that they were more organized and their general wellbeing was enhanced. Respondents noted that this led to a reduction in stress and anxiety in the workplace. Also, in institution C, one of the benefits of Lean was a redesign of office spaces (C8). C8 noted that the improvements in office layouts, designed to support Lean efforts, had led to an improvement in the experience (and wellbeing) of students (the end customer) and employees. Adding to this, C1 noted that prior to Lean, they had a lot of dead (underused or unused) spaces within their unit. C8 highlights the fact that a lot of space was, for example, use to store paper and forms, and this was no longer needed when Lean was introduced. As part of Lean at institution C, the office was re-designed, and these spaces were put to good use.

B2 highlighted the fact that employees were more aware of what was going on within their units (due to increase communication) and this enhanced their engagement and their

outlook on their working environment. This improved cohesion within units as well as teams. While C2 noted that much has not changed in terms of the working environment, it was clear that staff enthusiasm (wellbeing) had improved. Other respondents noted that, due to the adoption of IT systems, paperwork had reduced. This also reduced the need for storage and filing allowing more space for other users.

5.7.8 Communication

One other aspect that was explored was how Lean impacted on communication in the workplace. Here, the researcher attempted to establish how Lean impacted on communication between team members (employees), bottom-up communication (from employees to senior management) and top-down communication (from senior management to employees). It was evident that Lean improved communication in the workplace. There was more communication between employees as they collaborated on Lean projects (A2, C3, B6). The small size of BI teams and other Lean project teams also enhanced top down and bottom up communication (A2). For instance, C3 noted that one of the biggest benefits of Lean is that employees felt senior management were listening to their concerns and taking action, by finding better ways of doing work. Employees also gained a better understanding of the vision of management and the motivations for certain decisions (B6). In all, the evidence suggested that Lean had led to an all-round improvement in communication in the HE workplace.

5.7.9 Organisational commitment and psychological safety

The research also attempted to explore the impact of Lean on soft features such as organisational commitment and psychological safety. There was scant evidence to build a comprehensive picture on how Lean impacts on these two soft issues. There were some suggestions that Lean can lead to improvements in employee psychological safety as risk-taking was supported (C2).

On organisational commitment, for example, B5 noted that *"I think you do find that staff who work in universities are here because we kind of want to be. So, they are usually quite committed to their job anyway."* The respondent, therefore suggested that it might be difficult to capture the impact of Lean on commitment as staff at HEIs are integrally committed. C3 adds that this was not something they explicitly measure. Specifically, the responded stated that *"it's not something we've measured but you would hope to see that with greater than employee autonomy, less stress and better workload, you would see an improvement in commitment"* (C3).

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F2 argued that employee involvement in Lean projects by itself was evident of commitment to the attainment of organisational goals. Lean projects were not compulsory and employee involvement was not contracted hence, the respondent argued that the willingness to get involved in such projects, while still getting the day job done, was evidence of organisational commitment. Consistent with this view, F3 noted that employee efforts in making changes to processes in order to achieve positive outcomes for the end-user was essential to long term commitment and having a role to play in the "next stage of the institution" (F3).

There were also suggestions that employee commitment could be positively impacted by the fact that management is making a sustained effort to improve their working environment through Lean. Specifically, B6 noted that once employees start to see that they are being listened to and something is being done to help them, their commitment to get involved in these activities (Lean) is increased and their enthusiasm is increased (B6). B1 noted that Lean sometimes means that employees have the opportunity to take on different roles within different departments or units. This kind of engagement gives them more ownership and the feeling that they are an integral part of the community. This is therefore likely to increase their commitment to their organisation. A few respondents supported this view by highlighting the importance of empowering staff. They (e.g., C3, F1) noted that empowerment allowed staff to become an integral and value member of the community and this is likely to increase their long-term commitment to their organisation.

5.7.10 Comparison of views of Lean leaders/managers and employees

One issue that was picked up in the initial study was the fact that the views of team managers/leaders and team members with regards to the impact of Lean on employees (soft issues in the workplace) were sometimes very different. It was argued that deployment managers, perhaps, did not have a full understanding of how Lean impacted workers in the HEI environment. In this section, one of the recurrent finding across the 7 case studies was the fact that the impact of Lean on soft elements was not assessed – i.e., there were no formal systems or processes for understanding how Lean affected employees in the workplace. Indeed, much of the evidence collected (on impact of Lean on soft elements) was anecdotal with respondents frequently noting that they were not sure as no evidence had been collected to investigate these issues.

Here, the researcher therefore broadly compares the responses of respondents within the same institution to understand (focusing on institutions with sufficient responses) whether the differences documented in the initial study persist. The focus is on case B, C and F in which some respondents identified themselves as team leaders while other identified themselves as team members. Appendix F summarises some of the views of different stakeholders organized by role (team leader or member). In the first column of the appendix (Appendix F), the researcher makes a comment on her assessment of the overall view of leaders and team members. The views are summarized as "**positive**" (when responses suggest that Lean improves a particular soft element), "**negative**" (when responses suggest that Lean has an adverse impact on a particular soft element), "**unsure**" (when responses are inconsistent across respondents), "**no effect**" (when respondents generally argue that there is no impact) and "**both**" (when respondents note that the effect has been both positive and negative).

The results from the table (Appendix F) show mixed perspectives amongst team leaders across institutions and even within the same institution. To clarify, the following table (Table 5.7.2) summarises the views of team leaders (L) and team members (M) from the different case institutions.

Table 5.7.2: Summary of similarities and differences in the views of stakeholders

Soft element	Case	Positive L	Positive M	Negative L	Negative M	Both L	Both M	Unsure L	Unsure M	No Effect L	No Effect M
Motivation	B	▓	■								
	C	▓							■		
	F	▓	■								
Job satisfaction	B	▓	■								
	C	▓	■								
	F	▓	■								
Retention	B			▓					■		
	C			▓					■		
	F							▓	■		
Autonomy	B	▓	■								
	C	▓	■								
	F	▓	■								
Work-related stress	B						■	▓			
	C		■					▓			
	F			▓					■		
Workload	B		■	▓							
	C		■						■		
	F		■	▓							

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Psychological safety	B		■(blue)					■(gray)			
	C	■(gray)							■(blue)		
	F	■(gray)							■(blue)		
Working environment	B	■(gray)	■(blue)								
	C	■(gray)								■(gray)	
	F								■(blue)	■(gray)	
Organisational commitment	B	■(gray)	■(blue)								
	C							■(gray)	■(blue)		
	F	■(gray)	■(blue)								
	B	■(gray)	■(blue)								
	C	■(gray)	■(blue)								
Communication	F	■(gray)	■(blue)								

Notes: L (Lean team leaders and managers), M (Lean team members)

As can be seen from the table, there is a broad consensus amongst team leaders and team members that Lean improves job satisfaction, employee autonomy and communication. There is however a general lack of consensus on how Lean impacts on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. In several cases, the lack of consistency arises from the fact that either leaders or members are unsure about the impact of Lean on a specific issue.

5.8 Summary and Conclusion

This chapter has explored Lean adoption across 7 HEIs in the UK, drawing evidence from in-depth interviews with 32 Lean practitioners across the 7 institutions. The 7 institutions are at different stages of their Lean journeys and the practitioners within these institutions have varied involvement (roles) and experience in Lean projects within UK HEIs. In general (and in response to the first and second research question), the data revealed that there is an increasing interest in the adoption of Lean practices in HEIs across the United Kingdom. Indeed, while the research focused on 7 case studies, there was evidence of a growing network of HEIs applying Lean methods. Practitioners are clear about Lean theory and the benefits of adopting Lean. However, the nature of Lean in this context is very different from Lean in other settings such as private manufacturing and service sector companies. For example, it was found that in some cases Lean implementation takes a structured approach where employees are empowered through training and encouraged to adopt Lean practices at their desks. In some cases, employees do Lean as something additional to (or outside) their main role. Perhaps, this unstructured approach is due to the fragmented nature, the existence of silos, and the bureaucratic nature of HEI leadership. Often, certain decisions had to be made at the faculty-

level and in most cases, it was not clear that senior management at that level were in full support of Lean adoption. This was evident as employees frequently noted the lack of resources as an impediment to Lean implementation.

The third research question explored how Lean affects employees through its impacts on work practices, processes and structures. The evidence collated suggested that Lean was useful in streamlining several work processes, allowing employees to directly focus on more value-adding activities. In several institutions, IT systems were being used to improve a number of processes (e.g., document submission, admission, recruitment etc.) as part of Lean adoption. It was apparent that these improvements, while not reducing employee workloads, reduced duplication, allowed for time saving and allowed employees to be more productive. There is also evidence of extensive documentation of Lean and sharing of good practice and lessons learned. While this is necessary for the institutionalisation of Lean, it also promotes communication, engagement and important, recognition and reward for employee achievements on Lean initiatives. As part of Lean adoption, several universities empowered employees (through training) to take Lean to their desks (and improve their day-to-day work processes and environment). Employees were also provided support and feedback, allowing them to be more efficient in their work. Some employees also noted changes (improvements) in their physical work environments. These improvements improved the experience of these employees, as well as service users (students and staff).

The fourth research question focused on how Lean impacts on employees directly. A key finding from chapter 4 was that the impact of Lean initiatives on employees in the UK HE context is not clearly understood by Lean leaders and managers. Prior research suggests that these soft elements are important for successful Lean implementation and Lean sustainability (Rinehart et al. 1997; Post and Slaughter, 2000; Neirotti, 2018), hence they should be assessed and evaluated and managed. For successful Lean implementation, a closer look has to be taken into these issues. This chapter sought to re-examine the latter findings by drawing evidence from more HE institutions. In discussions with practitioners, it was surprising again that very little was done by Lean leaders across the different HE institutions to understand how Lean impacts on employees. Indeed, the focus on Lean has generally been on customers (mainly internal customers such as academics, service users and students). The views put forward by employees suggest that Lean has improved employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication. There is some evidence that Lean leads to work-related stress. The findings on workload are mixed, with

some respondents arguing that Lean increases workload while others arguing otherwise. There was no clear evidence on how Lean has impacted employee retention in UK HE. Perhaps, it is worth recognising that if employees and Lean team members are to be encouraged to pursue Lean strategies, then Lean adoption must clearly have positive outcomes for them.

CHAPTER 6: DISCUSSION OF FINDINGS

6.1 Introduction

This chapter discusses the findings from the initial and the main studies vis-à-vis the existing literature. The objective of the chapter is to assess the findings of the study against the extant literature and to show how the study complements and extends existing research and theory.

The initial study was exploratory and aimed at understanding the state of Lean in UK higher education. The research question for the initial study was stated as follows;

"What are the benefits and challenges of adopting Lean in a higher education context, and how does Lean adoption impact on employee working conditions and outcomes?"

Given that Lean is a relatively new concept in HE, as emphasized in the literature review, the research question was addressed through an in-depth case study focusing on one UK higher education institution which has considerable experience in implementing Lean. This UK HE institution (University X) has explicitly implemented Lean techniques across several projects in different business functions since 2006. Hence, consistent with Eisenhardt (1989) and Yin (2017), the selection of the case study was shaped by the research question.

As will be discussed, it was clear from the case study that Lean adoption strategies where driven by the underlying requirements of the institution. Consistent with this view, the benefits and challenges of adopting Lean could vary across institutions. Further, the impact of Lean on employee working conditions and outcomes could be a function of the underlying Lean implementation strategies. Given that Lean adoption strategies were unlikely to be homogenous across institutions, the main study focused on the exploring these issues in a bigger sample consisting of Lean practitioners working in different institutions.

The main study set out to address four research questions. The first research question sought to explore the extent to which Lean had been adopted across different institutions in the UK. More specifically the question sought to document the experience of current Lean implementers, the motivations for adopting Lean, critical success factors of Lean implementation in the UK HEI setting, and the process of Lean implementation. The question was framed as follows;

To what extent have higher educational institutions in the UK adopted Lean management practices?

The second research question builds on the first by exploring the challenges and benefits of Lean deployment within this setting. The goal is to document similarities and differences in the experiences of Lean implementers in the HEI setting when compared to implementers in other settings. The research question was stated as follows;

What are the benefits and challenges of adopting Lean in a higher education context?

The third research question builds on this by taking into account the recurrent finding (discussed in the literature review) that several unsuccessful attempts to implement Lean are a result of people factors. Yet, there is a paucity of research on this issue. The research therefore sought to understand how Lean affected employee working conditions and outcomes indirectly by transforming work structures and processes. Specifically, the research question was stated as follows;

How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., psychological safety, motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?

Finally, the fourth research question explores whether Lean has direct effects on employees independent of Lean's impact on work structure and work design. The question was framed as follows;

How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?

The study explores these questions through the lens of the socio-technical systems (STS) theory which posits that organisations, as a system, are typically made up of two main sub-systems; technical and social systems (Trist and Bamforth, 1951; Trist, 1981). The premise of the exploration is the observation that prior Lean research has largely focused on the role of technical subsystems in facilitating successful Lean adoption, while ignoring the role of social subsystems. Here, while the focus is on the soft side (social subsystem) of Lean, it is acknowledged that the technical subsystems (such as appropriate deployment of Lean tools and techniques) are essential for successful implementation.

The initial study explored Lean adoption in a single UK HEI institution (case study) using an exploratory research approach (Percy and Rich, 2015). Data was collected through semi-structure interviews with 12 Lean practitioners who held different positions within the institutions, had been at the institution for varying lengths of time and were involved in Lean in different capacities. Specifically, some respondents were Lean leaders (those who were responsible for introducing Lean to the institution), Lean managers (those who led lead projects) and Lean team members (those who participated in Lean projects but were not managing the Lean project). The data was collected through semi structured interviews lasting between 50 minutes and 80 minutes each.

The main study builds on and extends the initial study by exploring Lean adoption in UK HEI using a sample of 32 respondents across 7 UK HEIs. Similar to the initial study, the participants had varying experience in Lean and were involved in different capacities (leaders, managers, team members) across the different Lean projects. Across the two studies, the interviews were recorded, later transcribed and a thematic analysis framework was adopted as the main tool for analysing the data.

The rest of the chapter is organised as follows. The results from the initial and main study are summarised and discussed against the existing literature in the next section (section 6.2). Specifically, results on perception of Lean, motivation & objectives for adopting Lean, challenges of Lean adoption within this context, strategies for Lean implementation in UK HEI, and impacts of Lean on employee working conditions and outcomes, are discussed. Concluding remarks are presented in section 6.3.

6.2 Perception of Lean

The research explored respondents' perceptions of what Lean was about and what it meant in their respective contexts. It was noted in the literature that various definitions for Lean exist with some more general than others. Bhamu and Sangwan (2014), identified over 33 separate definitions for Lean noting that Lean has been perceived as '*a way, process, set of principles, approach, concept, philosophy, system, program and paradigm*' (p. 925), and its meaning and how it is applied across different contexts depends on how it is viewed or defined. It was therefore imperative that this study of Lean starts with an exploration of how Lean is viewed by the respondents.

The views from the initial study suggest that respondents view Lean as driven by two key factors; continuous improvement and people. Specifically, respondents opined that Lean

constituted efforts towards driving continuous improvement and pursuing and agenda of constant betterment of the organisation. This idea of continuous improvement is a one of the core principles of Lean (termed "Perfection") per the Womack and Jones (1996) framework (see Table 2.3.1). Per the framework (Womack and Jones, 1996), the other core principles include Value, Value Stream, Flow and Pull. Womack and Jones (1996, p. 308) see perfection as involving the complete elimination of waste so that all activities along the value stream create value for the end customer. Interestingly, however, a few respondents from the initial study noted that, while efficiency (i.e., the reduction of waste, a condition for Perfection, per the Womack and Jones (1996) framework) is important for Lean, the focus of Lean at their HEI is not merely on the reduction of waste. In order words, the respondents suggested that within this context, certain types of waste are permissible. Based on later discussions, it appears, given the non-profit nature of HEIs, Lean is tailored so as to put people before profits. Specifically, the respondents in the initial study contended that people played an integral part in Lean efforts at University X (the pilot and initial study institution). Specifically, they argued that Lean in their context involved the right people continuously searching for the best ways to meet customer needs. In this sense, teamwork, particularly, getting people together to genuinely engage with each other, was critical to Lean efforts. In all, the respondents in the initial study noted that fundamental respect for people was the foundation of Lean.

The main study was more extensive and yielded more detailed findings on how Lean is perceived in UK HEIs. Indeed, the assertion put forward in the literature review (Chapter 2, section 2.3.1) that the meaning of Lean varies depending on how Lean is viewed, whether as a way, process, set of principles, approach, concept, philosophy, system, model, program or paradigm, is again supported. Consistent with the views of prior researchers (e.g., Bhamu and Sangwan, 2014) and the findings from the initial study, some respondents in the main study associated Lean to efforts to eliminate waste and enhance efficiency and value to the end customer (Womack and Jones, 1996; Shah and Ward, 2003; Taj and Morosan 2011; Bhamu and Sangwan, 2014). Other respondents in the main study saw Lean as a philosophy, culture or doing things in a manner in which efficiency and continuous improvement is sought in every task (Womack and Jones, 1996). In other words, Lean involved concerted efforts towards driving continuous improvement. Importantly, a number of respondents recognized Lean as a cyclical process (Kringe et al. 2006; Manrodt et al., 2008), noting that perfection is not an end in itself but a goal to continuously pursue or aspire to i.e., there is always room for

improvement. Following Kringe et al. (2006), this puts Lean sustainability at the heart of Lean adoption.

Like in the initial study, people aspect of Lean was also emphasised by several of the respondents. The respondents argued that Lean was imperatively a people-focused methodology with respect-for-people at its very core. Linking the people side to views about its role in driving efficiency, a few respondents noted that Lean involved empowering people to drive changes and pursue efficiency and eliminate waste (Flynn et al., 1999; Hoffman, 2017). These views of Lean as having a social dimension directly supports the STS theory (Hadid et al., 2016; Soliman et al., 2018) which sees technical and social subsystems as integral to organisations. In the case of Lean, people are empowered by putting in place adequate technical systems including training on Lean methodology and techniques, as well as the provision of human and financial resources to support Lean projects and initiatives. Indeed, several respondents from the main study argued that staff were best placed to identify improvements within their work area, hence should be trusted and supported to do so. Besides adequate training and guidance, there is need to build capacity and allow for flexibility in how Lean is implemented.

One important issue that was observed from the main study was that Lean can be emergent, unconscious and unstructured within this environment and, to a certain extent, people can do Lean without calling it Lean. To the researcher's knowledge this finding is new and has not been documented in prior studies. Lean implementation research implicitly assumes that Lean implementation is a planned and conscious activity, with several studies suggesting critical steps and readiness factors for Lean implementation (Radnor, 2010; Radnor 2011; de Souza and Pidd, 2011; Ben-Tovim et al., 2008; Radnor et al., 2012; Secchi and Camuffo, 2019). In several cases in this research, Lean started without an outright or formal plan or assessment of readiness factors and generally did not follow documented steps for Lean implementation. In some cases, Lean started as an outcome of employees' efforts to improve their outcomes by improving local processes. Here, employees engaged in Lean practices without naming it, Lean such as calling it as Rapid Improvement Events (RIEs). These local successes stories tended to propagate Lean through parts of the organisation. There are questions whether such an emergent and unstructured approach to Lean adoption has any merits and whether such a practice will still be classified as Lean. Besides the obvious flexibility and adaptability which this approach offers, one of the key merits of this bottom-up approach appears to be the fact that Lean is born out of necessity, employees see its value (in improving their outcomes, quick

wins) and are more like to engage (or less like to resist) compared to a case where Lean was entrusted upon them.

Relating to the above, across the two studies, it was observed that respondents with more knowledge of Lean theory (such as Lean leaders) were always able to provide more formal definitions of Lean with more detailed explanations of how traditional Lean concepts were applicable to their contexts. Importantly, the views on what constitutes Lean in UK HEI were shared by respondents across the different institutions involved in the study.

In all, practitioners in HEIs share views of Lean similar to those documented in prior research. While the importance of creating value by eliminating waste is recognised, there is a significant emphasis on respect-for-people.

6.3 *Motivation, objectives and benefits of adopting Lean*

6.3.1 Motivation and objectives for Lean adoption

Lean in some of the institutions in the study have a background around the change in funding structure for UK HEIs. For example, the institution in the pilot and initial study (University X) faced challenges due to a reduction in government funding for HEIs. At the same time, following the 2008 Global Financial Crisis, HEIs in England and Wales, in particular (but not Scotland) increased tuition fees substantially due to the UK government decision to cut HEI funding and raise the cap on tuition fees. Given the tuition fees paid by students (outside of Scotland), the end customer in HEI has, perhaps, become more important and Universities (particularly those in England and Wales) are increasingly expected to deliver value-for-money services to this important stakeholder. The institutions who lag in the delivery of such services risk losing out on competition for student places, with adverse effects on their annual incomes. As documented from the interviews, partly as a consequence of reduction in government funding, several institutions have turned to Lean and other improvement methodologies to allow them design and deliver improved services while reducing waste. Importantly, Scottish Universities (which dominate the sample institutions in this study) also have a greater need to save cost and improve efficiency as they do not charge fees to the local students. Given their reliance on government funding and the volatile nature of this funding, it is, perhaps, important for Scottish universities to improve their operational efficiency in order to minimise their expenses without compromising on customer satisfaction or meeting students expectations.

Studies looking at Lean in the manufacturing industry generally argue that the main motivations for adopting Lean are related to the reduction of production or manufacturing cost and an improvement in turnaround time, quality, flexibility and ultimately performance, amongst others (Womack and Jones, 1996; Chavez et al., 2013; Arlbjorn and Freytag, 2013; Bamford et al., 2015; Secchi and Camuffo, 2016; Hadid et al., 2016; Marodin et al., 2018; Ghobadian et al., 2018). In the context of the services industry, Hadid and Mansouri (2014) identify over 20 motivations and potential benefits of Lean[15] with much of this documented from the Health services and office operations sectors.

This research documents the reasons why different institutions adopt Lean. Firstly, it is found that some institutions adopt Lean because managers within these institutions have an interest in Lean either from prior experience or through engagement with other stakeholders (e.g., at conferences and Lean events). Similar to this, in some cases, the decision to adopt Lean was driven by a Lean champion with prior experience in Lean adoption. The findings here complement prior research on Lean in HEI which general posit that institutions adopt Lean to seek efficiency (Vijaya Sunder 2016; Svensson et al., 2015) but fails to explain how the decision to adopt such Lean practices is reached at. Given that Lean competes with other quality improvement methodologies (e.g., Six Sigma), it is perhaps important to understand the drivers behind the Lean choice. Here, this research shows that interest from top management can potentially lead to the search for Lean consultants

Secondly, several respondents also suggested that, once a decision was made to pursue efficiency, when compared with other improvement methods such as Six Sigma, Lean was a more natural fit for HEIs. It is worth noting that a few studies have raised the possibility of using an integrated Lean Six Sigma approach to address continuous improvement issues in HEIs (Antony et al., 2012; Antony, 2014; Sunder 2016; Gupta et al., 2020). Indeed, these studies suggest that Lean by itself is not an optimal improvement method given that it can be improved by combining it with Six Sigma. While this issue might be valid, there is no indication from the cases studied that this integrated approach is being pursued in UK HEIs.

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[15] These include; '(1) freeing staff time, (2) identification and elimination of waste, (3) improvements in capacity, (4) improvement in customer perception of product/service quality, (5) improvement in customer satisfaction, (6) improvement in employee satisfaction and their performance, (7) improvement in employee understanding of the process, (8) improvement in operational efficiency, (9) improvement in process flexibility, (10) improvement in productivity, (11) improvement in the organisation of work areas, (12) reduction in costs, (13) reduction in inventory, (14) reduction in lead time and cycle time, (15) reduction in reworks, (16) reduction in staff turnover and absenteeism, (17) reduction in the number of human errors, (18) reduction in work in progress, (19) savings in space, and (20) profitability' (p.762).

It is however possible that this practice is pursued although a formal name (Lean six Sigma) is not attributed to it.

Thirdly, consistent with Thomas et al. (2015), several respondents across different institutions noted that funding challenges (following a reduction in the UK government's spending on HEI) necessitated the pursuit of process improvement strategies. Related to this, the need for HEIs to respond to the new landscape, specifically, the demands from one important customer (i.e. students) for value-for-money services, has encouraged institutions to pursue Lean. The importance of students as the main customer for HEIs, and hence the focus of Lean initiatives is also documented in Mergen et al. (2000), Wallace (1999) and Vijaya Sunder (2016).

Fourthly, a number of respondents highlighted the bureaucratic nature of HEIs and its lack of responsiveness to the needs of students, as a catalyst for process improvement, particularly, the adoption of Lean methods. A few prior studies (Balzer, 2010; Thomas et al., 2015; Ciancio, 2018) highlight issues relating to bureaucracy and lack of participative decision making in some educational institutions. There is also a realization that this state of affairs is unsuitable if institutions need to compete effectively on a global front (Ciancio, 2018).

Fifthly, success stories from other institutions applying Lean appears to have motivated other HEIs seeking to improve their processes. Specifically, evidence that other Universities have successfully implemented Lean and are enjoying some of the promised benefits, particularly in relation to the feedback from students (as documented in TEF and NSS scores), has encouraged other Universities to follow suit. To the researcher's knowledge this source of motivation for Lean adoption has not been documented in prior Lean HEI research.

Finally, the usual motivations for Lean adoption including reducing costs/waste, increasing service quality, increasing efficiency and responsiveness (Douglas et al. 2015; Hadid and Mansouri, 2014; Imiliani 2004; Dey 2017; Balzer et al., 2015, 2016) appears to have motivated different institutions to adopt Lean. Interestingly, in a few cases, there is some evidence that the motivations for adopting Lean are emergent and unclear. Specifically, Lean was taken as a given and a few respondents were unclear about why Lean was being adopted at their institution.

6.3.2 Benefits of Lean in HEIs

The research identified several benefits of Lean adoption in this context drawing evidence from the initial and main studies. One of the main benefits of Lean highlighted during the initial study was the fact that it improves cross-functional communication and promotes transparency within HEIs. HEIs are generally known for their very strong/bureaucratic organisational structures, with several units/departments/functions operating as functional silos. STS theory emphasizes a holistic view of the organisation rather than the focus on silos, units or departments. The existence of functional silos mean that communication is impeded across the value chain. Given the importance and fundamental nature of clear communications and transparency to Lean operations (Womack et al., 1990; Lamming, 1993), particularly in the HE sector (Douglas et al., 2012; Svensson et al., 2015), Lean has the potential to break down functional silos or at least provide opportunities for the silo mentality to be addressed. This could be through the creation of cross-functional teams to work on some projects or through the development or strengthening of internal networks. Importantly, Lean advocates a process or holistic view of operations or service delivery, with a focus on the entire value chain rather than the work of any unit (silo) within this value chain.

The benefits of Lean in HEIs were more fully explored in the main study. Several Lean benefits in UK HEI were highlighted by respondents. Firstly, respondents noted that Lean allows for the identification of the HEI value chain. The importance of this is that, once the value chain is identified, managers can focus on value enhancing activities, curbing waste, unnecessary steps and enhancing value to the end customer (Douglas et al., 2015). This chimes with the findings from prior research that Lean enhances customer satisfaction and perceptions of service quality (Douglas et al., 2015; Balzer et al., 2016, Dey 2017; Emiliani 2004, 2005; D'Andreamatteo et al., 2015; Hess 2015).

Secondly, consistent with prior research (Holden 2011; Svensson et al., 2015), the research finds that Lean benefits HEIs by improving employee engagement. This occurs as, when Lean is adopted, employees start to feel listened to and have an opportunity to voice issues they face or make suggestions on how their work could be enhanced. Some respondents noted that, for this and similar or related reasons, Lean adoption has the potential to reduce staff turnover. This is consistent with suggestions by prior researchers outside the HEI context, that Lean leads to improvements in employee satisfaction and consequently, employee performance (Piercy and Rich, 2009; Hadid and Mansouri, 2004, Shradha et al., 2015; D'Andreamatteo et al., 2015; Roemeling et al., 2017).

The research also documents improvements in student experience as a third benefit of Lean HEI. From discussions with respondents, it was evident that Lean led to the delivery of faster and more efficient services mainly by reducing the need for unnecessary time consuming processes such as form filling while allowing service users to access routine services (e.g., applications for transcripts, reference letters and student status letters) electronically. The improvements in customer services as a consequence of Lean has been documented across prior studies (Piercy and Rich, 2009; Bortolotti and Romano, 2010, Emiliani, 2004; Hadid and Mansouri, 2014; Roemeling et al., 2017) and this study complements this body of research by showing that this is also the case in HEIs as also suggested by Svensson et al. (2015), Thomas et al. (2015) and Douglas et al. (2015). This finding is particularly useful given that unique nature of the customer in this context (i.e., the service or learning is co-created). Related to this, the study also reveals other types of customers within this context, notably research and teaching (academic) staff, as well as, suppliers of goods and services to HEIs also benefit from Lean interventions.

Fourthly, the research finds evidence that Lean allows for core problems within HEIs' operations to be identified and addressed. One of the core problems which was repeatedly tabled by respondents was the issue of duplication across different processes, units and functions. Due to the silo nature of HEIs, there is general lack of information sharing across units. This means that students might be required to, for example, submit the same document to different units when requesting for different services. This also means that efforts are duplicated as the same process could be conducted by different employees working in different units due to lack of information sharing. As found during the research, process mapping was used in some HEIs to identify and eliminate duplicate activities, freeing up employee time (i.e., consistent with Antony et al. (2012); Piercy and Rich (2009), Papadopoulos (2012), Bortolotti and Romano (2012), Hagan (2011), Hadid and Mansouri (2014), D'Andreamatteo et al. (2015)) and enhancing customer outcomes.

Fifthly, as documented in the cases and consistent with Douglas et al. (2015), one source of waste in HEI working environment is the abundance of routine processes which require repetition. As noted by respondents, much of the work that is done in one year (e.g., filling forms, admissions, timetabling etc.) is repeated in the next year with little variation. Hence, there is significant scope to automate a number of processes within this environment. The research found that Lean benefits HEIs by allowing for automation of a number of processes. In some cases, IT systems were used to affect this automation with service users

such as students and academic staff, able to access this automated service. This effectively reduces the task of frequent form filling, saving customer and employee time, improves the working environment and ultimately, consistent with Piercy and Rich (2009), Bortolotti and Romano (2010), Emiliani (2004), Hadid and Mansouri (2014) and Roemeling et al. (2017), enhances customer outcomes.

Finally, and perhaps unique to the HEI context, the research finds that Lean adoption improves and allows for a better working environment, with improved communication within and across teams and overall better team working. Again, this is particularly important in this context given its bureaucratic nature and the existence of functional silos.

Given the above points, the current research finds that the key benefits of Lean services (Hadid and Mansouri, 2014; Piercy and Rich, 2015) and Lean health (Burgess and Radnor, 2012) are also shared by Lean HEIs. While prior Lean HEI studies have generally contend (without specific evidence) that Lean allows implementers to enjoy efficiency benefits (Vijaya Sunder 2016; Svensson et al. 2015; Antony et al., 2012; 2015), this study complements prior research by documenting the specific channels through which efficiency is created through Lean adoption in UK HEIs.

6.4 Challenges and barriers of Lean implementation in HEIs

The challenges of implementing Lean in organisations have been documented in prior studies exploring Lean implementation in various contexts. Specifically, prior studies document the factors that are critical to successful implementation of Lean (Hirzel et al., 2017; Netland and Aspelund, 2014; Marodin and Sauriin, 2013) as well as, some of the reasons why Lean fails across different contexts (Achanga et al., 2006; Bhasin and Burcher, 2006; Kilpatrick and Osborne 2006; Hines et al., 2008; Antony et al., 2012). Several of these issues are discussed in section 2.4. Nonetheless, these prior studies, with the exception of Antony et al., (2012), generally focus on contexts outside HEI, allowing this study to contribute to the literature by documenting context (HEI)-specific challenges and barriers to Lean implementation.

The current study identifies 8 key challenges and barriers to Lean implementation in the HEI context. These include; misunderstanding of Lean, stress and anxiety, job insecurity, resistance to change, prior (poor) experience, structure and nature of HEI, psychological factors and resources & responsibilities.

Misunderstanding of Lean emerges as a challenge to Lean implementation in HEIs based on the finding that HEI employees are sometimes skeptical about Lean. This is consistent with prior research by Antony et al. (2012). Here, the study findings that employees are sometimes unsure about the "true" motives for Lean adoption within their institution, as well as, the possible impact on Lean on their wellbeing at the workplace. This scepticism appears to have partly arose from anecdotal evidence suggesting that Lean frequently leads to layoffs. This views, which are echoed in discussions with respondents, is consistent with prior evidence suggesting that Lean generally results in significant cost cutting (increase in efficiency) which might, unfortunately, be achieved through the reduction of staff (de Souza and Pidd, 2011). This scepticism can amplify employees' tendency to resist change brought about by Lean. The research also finds that misunderstanding of Lean arises due to lack of knowledge of Lean theory and concept at the point of Lean adoption. In particular, a number of respondents raised the issue of the overly complex nature of Lean language and terminologies. The issue of Lean terminology potentially becoming a barrier to Lean implementation is documented in Waterbury and Holm (2011). The use of standard Lean terminology, with origins from the Japanese language, hence, impedes successful adoption by HEI employees with no background in Lean. Perhaps, therefore, Lean in HEI should be preceded by basic Lean training during which staff are introduced to Lean concepts and Lean terminology. This will ensure that staff have an adequate background and dispel some of the concerns relating to Lean implementation.

Importantly, it could be the case that the focus of Lean in some of the institutions is narrow (i.e., eliminating waste and increasing efficiency), particularly, given the timing and circumstances surrounding the introduction of Lean (austerity, global financial crisis, cuts to government funding to HE). Indeed, prior research emphasises that Lean adoption should be driven by the desire to increase service quality and not solely to reduce cost (Makarem and Al-Amin, 2014; Matthias and Brown, 2016). Importantly, this challenge (misunderstanding of Lean) is not unique to this context, as previous studies looking at the translation of Lean concepts from the manufacturing sector (for which it was traditionally intended) to the service sector have highlighted issues relating to the transfer of Lean concepts to other sectors (Radnor and Osborne, 2013; Hadid and Mansouri, 2014; Roemeling et al., 2017).

A number of respondents noted that stress and anxiety that comes with implementing Lean changes creates a barrier to successful Lean implementation. Specifically, Lean creates new expectations about the way work should be done, necessitates retraining and can therefore increase employee levels of anxiety and stress. Employees can become stressed due to the fear

that they might be unable to thrive in the new work environment. This barrier to Lean is consistent with prior research by Sprigg and Jackson (2006) showing that Lean negatively impacted on employee outcomes by creating job strain, anxiety and depression. Contrary to what the current study finds, other researchers such as Dellve et al. (2015) have also argued that Lean does not lead to increased physical, cognitive and mental stress.

Related to the problem of employee stress and anxiety is the issue of job insecurity. Several of the institutions in the sample adopted Lean over the last decade. This period has been plagued with the global financial crisis which resulted in the UK government's austerity economic strategy. As part of the austerity plan, the government reduced funding to HEI's forcing HEIs to seek efficiency savings (Thomas et al., 2015). Given the context (austerity), Lean adoption at several HEIs was seen as a ploy to effect employee redundancies. Indeed, consistent with de Souza and Pidd (2011), several respondents in the institutions studied saw Lean as a strategy to identify slack within operations in order to make redundancies.

Resistance to change also emerged as a challenge and barrier to successful Lean implementation. This resistance to change is not unique to Lean programmes. Lean necessitates changes in the organisation of work. Given the human element in Lean, Lean success is therefore contingent on employees' willingness and motivation to accept and make changes. Opponents of Lean such as Rinehart et al. (1997) and Post and Slaughter (2000) argue that the resistance to change is due to the tendency for Lean to create alienating and highly limiting work conditions, which stifles intrinsic motivation, creates tension, and leads to the deskilling of workers.

The research finds that several respondents hold and/or held pre-conceived notions about Lean and its impacts based on prior (mainly poor) experience of Lean adoption in other contexts and institutions. These psychological factors, lack of belief and mental barriers arising from pre-conceived notions about Lean can sometimes stand in the way of Lean adoption. The issue of psychological barriers to Lean adoption have not been fully addressed in the prior literature. This is only now identified as this study focuses on the soft or people side of Lean. Other studies have noted the existence of resistance to change as an impediment to Lean adoption (see, for example, Radnor et al., 2006; Narayanamurthy et al., 2018) but, with the exception of the current study, the underlying reasons for this resistance have not been fully explored.

The current study documents a number of challenges to Lean implementation that arise due to the peculiar structure and nature of HE institutions. These challenges are specific to this context. These challenges arise due the way HEIs are governed, the presence of functional silos, and the ambiguity of the concept of "customer" in the HE environment. In terms of the nature of governance and the existence of functional silos in HEIs, Thirkell and Ashman (2014) concluded that Lean efforts had very little effect on working practices and on overall organisational efficiency within Universities. Thirkell and Ashman (2014) contended that HEIs were laden with inherent public sector characteristics such as hierarchy, bureaucracy and a silo mentality, which made it difficult to successfully embed Lean within the institutional culture. This research documents similar issues of an over-emphasis hierarchy and bureaucracy across a number of institutions. This tended to stifle innovation, discourage effort and limited opportunities for true staff empowerment.

The concept of the "customer" in the HEI context is regarded to some as a myth. As discussed earlier (section 2.6.3), Osborne et al. (2013) contends that services (such as education) are different from traditional manufacturing for 3 core reasons; intangibility, simultaneous production and consumption, and end-users (or customers) as co-producers of services. Radnor and Osborne (2013) contend that, while "customers" expect a service to be fit-for-purpose, their judgement of the quality of service is based not only on outcomes but also on the congruence of their expectations and their experience of the service delivery process. HEI have multiple end customers including students, academic colleagues (perhaps), funders, businesses, the government and local communities who have a substantial stake in these institutions. The respondents from the research suggest that successful Lean implementation is challenging due to the different customer groups that institutions need to cater to.

Finally, the research found that, in the HEI context, Lean creates new responsibilities, which need to sometimes be performed in addition to an individual's normal or contractual duties. Some respondents highlight the fact that the new responsibilities are sometimes challenging to take on in parallel to the day job or require additional resources (time, personnel) which are usually not provided. Here, therefore, Lean is not always treated as the way work is done but as something that is done in addition to the day job. This form of operationalization of Lean (i.e., as an added task) is clearly against the basic principles of Lean suggested by Womack and Jones (1996).

Some of the challenges and barriers to adoption are broadly a result of the social subsystem within HEIs. The research finds that lack of employee understanding of Lean, stress and anxiety, the lack of communication or presence of functional silos, psychological factors (pre-conceptions about Lean, lack of belief and mental barriers) are partly impeding Lean success in this context. Consequently, the impediments to Lean success are not only in relation to its fit within HEI operations but also its interrelation with the HEI social subsystem. Drawing on the STS theory, it appears Lean efforts at most institutions focus on optimising the technical subsystem while ignoring the social subsystem even though the social subsystem appears to be under new strain as a direct result of Lean adoption. Specifically, Lean efforts are tailored to making Lean work while ignoring its potentially unsettling effects on employees. Per STS theory, such an approach is not holistic and is likely to fail (Cherns, 1976; Hicks et al., 2015).

6.5 Strategies (and scope) for Lean implementation in UK HEIs

The research explored the strategies that were used for operationalizing Lean across the different institutions covered in the research. From the case study, a model for Lean implementation in HEIs was established. This model suggested that Lean implementation in this environment (specifically at University X) is an 8-step cyclical process. The steps in this process include Request; Scoping, Training, Planning, Redesign, Implementation, Review and Feedback (which closes the loop). Each of these steps takes a different amount of time, has different key outcomes and is undertaken and/or led by different Lean team members.

The Lean deployment process starts with the identification of the process to be improved. In University X, such projects were identified by a manager from a service unit within the university. Scoping begins after the request is made. The scoping phase involves the identification of project goals and resource (including personnel) requirements. In the training phase, Lean experts and consultants provide training to Lean project team members focusing on Lean core concepts. Project team members usually constitute those directly involved in the underlying process. Training is followed by a development of a project plan which details goals, approaches, and timeline. At the redesign phase the project team works towards the development of the new process which is distinct and different from the old process and adheres to the initial goals set. This new process is then fully documented to facilitate implementation. At the implementation phase, the old process is replaced with the newly developed process. The review phase involves monitoring of the new process to address any barriers to success (including the need for training or additional resources such as equipment, space, personnel,

materials etc.). The project ends after the review and allows for feedback to be collated and used in the continuous improvement of the process and/or the design of new Lean projects.

In terms of Lean scope, the study has documented extensive use of Lean methods across different projects in UK HEIs. There is evidence that Lean has been used to improve library services, admission services, and routine student services such as the award of transcripts, student status letters etc. Lean has also been used to enhance HR services in relation to staff, employment and contracts. Much of Lean within UK HEI focuses on operations. Indeed, unlike prior studies showing that Lean has been expressly used to enhance teaching (Emiliani 2004, 2005, Dey 2007), the current study did not document any cases of Lean use in research and teaching. Perhaps, this was mainly because the respondents were mainly drawn from staff services. However, this was not deliberate but was based on the organisation of Lean teams and focused on those who were involved in Lean projects within each of the institutions.

Overall, the research finds that several institutions have adopted a project-by-project approach or piecemeal approach (as opposed to a holistic) to Lean implementation in the HEI context. This approach focuses on improving simple processes mainly around HEI operations. The merit of this approach is that it allows for quick wins to be registered, what Radnor and Osborne (2013) refer to as the "low hanging fruit and windfalls". These quick wins can be important in building morale amongst employees, which is critical for Lean sustainability (Radnor and Osborne, 2013). However, Womack et al., (1990) as well as the STS theory emphasise a focus on the entire value chain rather than silos or individual processes. In that sense, current strategies and scope of Lean adoption in UK HEIs falls short. This is particularly evident as teaching and research, which are core services provided by HEIs, are generally seen as outside the remit of Lean implementation.

6.6 Lean impacts on employee working conditions and outcomes

Research questions 3 and 4 focus on exploring Lean direct and indirect impacts on employees. Question 3 focuses on indirect effects on employees which arise as a result of changes in work design due to Lean adoption. Hence, the question explores whether changes in work design impacts on autonomy, workload, psychological safety, motivation, work related stress, job satisfaction, retention. The fourth research question explores the extent to which Lean adoption impacts on the same issues, irrespective of changes in work design. The findings in relation to these research questions are discussed in this section.

Prior researchers such as Rinehart et al. (1997), Post and Slaughter, (2000) and Neirotti (2018) suggests that soft elements or people factors are important for successful Lean implementation and Lean sustainability, hence these soft elements should be assessed, evaluated and managed. Further, the STS theory contends that the social subsystem is not merely an add-on to the technical subsystem within an organisation, it is an essential element which must be optimized in the quest for efficiency and performance. Nonetheless, much of the Lean literature focuses on processes and tools of Lean implementation, thereby generally ignoring or downplaying the role of soft issues (Chavez et al., 2013; Arlbjorn and Freytag, 2013; Bamford et al., 2015; Secchi and Camuffo, 2016; Hadid et al., 2016; Marodin et al., 2018; Ghobadian et al., 2018).

Table 6.6.1: Impact of Lean on employee outcomes

Employee outcomes	Findings from the initial study	Findings from the main study
Employee motivation	Employees are generally more motivated as a result of Lean, although motivation is sometimes quelled when staff are empowered in principle but not in action.	Lean has a generally positive impact on motivation due to employee involvement and the feeling that management is actually listening to employee concerns. This suggests that Lean has impacted on motivation directly.
Job satisfaction	Lean implementation has generally led to higher levels of staff satisfaction with the work they do. While a number of team members do not feel that Lean implementation has changed satisfaction, they acknowledge that they now have more responsibility and voice in what happens at the workplace. This suggests that Lean has impacted on job satisfaction directly.	Employee involvement in Lean projects increases job satisfaction. Satisfaction derives from elimination of bottlenecks and improvements in work systems. This suggests that Lean has impacted on job satisfaction indirectly by eliminating bottlenecks that impede employees from effectively completing tasks.
Employee retention	Although there is no hard evidence that employee retention has increased, some employees might have stayed with their institutions because Lean makes work more interesting and employees feel more valued as a result of Lean. This suggests that Lean might impact retention indirectly through its impact on work design.	Impact on retention is unclear as most institutions hold no data and have not done any assessment.
Employee autonomy	Lean increased the level of employee autonomy within participating departments as staff are empowered to take more ownership of the work they do by implementing Lean techniques at the local level. This suggests a direct effect of Lean on autonomy through empowerment. However, there is evidence of some issues with building employee	Lean adoption generally increases employee autonomy through empowering (training) staff to take on new tasks. Tasks and responsibilities are clearer, employees are provided the training needed, hence are better able to work without supervision. This suggests that Lean can positively impact autonomy by necessitating employee empowerment-its core principle.

	confidence to a level that will allow and support full autonomous working.	
Work related stress	Lean can initially increase work-related stress and anxiety as team members engage in the Lean process or employees try to understand new ways of doing things. (Indirect impact of Lean on stress). Stress levels may go down as things improve and work is conducted more efficiently. In some cases, Lean converts one type of stress (i.e., the stress of dealing with inefficient processes) to another type of stress (i.e., the stress of dealing with targets and increased scrutiny). This also suggests a direct impact of Lean on stress, with stress increasing due to the need to document/report performance or level of improvement and meet targets post Lean implementation.	Lean generally increases workload and, hence, causes stress. One reason for the increase in workload is the treatment of Lean as something that is done alongside or in addition to the main day job, rather than the way the main day job is done.
Workload	Lean does not decrease workload. Work loaded either increases or stays about the same. Even though workload increases, under Lean, staff do more interesting work, using more efficient methods. Time saved by avoiding waste is generally redeployed in other useful areas.	Lean has a mixed effect on employee workload. Specifically, Lean increases workload for some but decreases workload for others. Lean increases productivity and so employees can do more work (than before) within the same day.
Employee psychological safety	Lean improves employee psychological safety through better team building and strengthened personal relationships across functions. Employees become more aware of the role they play within the institution and how their contribution leads to overall success. They get to work with one another and begin to feel like an essential part of the whole institution.	Lean generally has a positive impact on employee psychological safety as employees are encouraged and supported to engage in Lean even if unsuccessfully. But evidence is scant. This suggests a direct impact on psychological safety as employees operate within a culture that is tolerant to failure.

Working environment	While the physical working environment may not have changed significantly, there have been substantial improvements in working relationships and communication since the implementation of Lean. Working relationships have improved as people now work together on projects, communicate cross-departments and see upstream and downstream links with work done in other units.	Lean generally as a positive impact on the working environment because it allows for irritants in the day-to-day working life to be removed. Some institutions also redesigned their physical working spaces to improve use of space and enhance efficiency in the work environment.
Organisational commitment	Not explored in-depth	Lean increases employees' organisational commitment. Employees are trained to and can take on varying roles across the organisation. Employees are listened to and are directly involved in enhancing the activities or driving the vision of the organisation. They feel respected and an integral part of the organisation, hence are more committed to the organisation. This suggests a direct impact of Lean on employee organisational commitment.
Communication	Not explored in-depth	Lean enhances communication within and across teams. It also enhances top down as well as bottom up communication in the workplace.

This study addresses the gap in the research by exploring the impact of Lean adoption on employees. Indeed, the researcher is unaware of any other study looking at the soft side of Lean in the HEI setting. The table (Table 6.6.1) above summarises the key findings from the initial and main studies. One of the key findings from the initial study was the fact that perceptions of the impact of Lean appear to be dependent on the respondent's role within the Lean team. Specifically, the research revealed that the views of Lean team leaders (and managers) differed from those of Lean team members. This issue is unique to this study, and to the researcher's knowledge, has not been documented by prior studies. Hence, where relevant the table (Table 6.6.1) highlights differences in views between Lean leaders and Lean team members. These differences are discussed in more depth later in this chapter.

Another salient finding from the initial and main study is that most implementers of Lean in the HEI setting have not done any assessment on how Lean impacts on employees. This is in contrast to suggestions by prior researchers including Rinehart et al. (1997), Post and Slaughter, (2000) and Neirotti (2018) who argue that soft elements (i.e., constituents of the social subsystem) are critical for successful Lean implementation and Lean sustainability, hence should be assessed, evaluated and managed. Also as noted previously, the soft side of Lean is generally ignored in prior studies, with no study (to the researcher's knowledge) extensively exploring Lean's impacts on employees working conditions and outcomes.

Overall, the research (initial and main studies) documents that Lean has a positive impact on several soft elements including employee motivation, job satisfaction, autonomy, psychological safety, working environment, organisational commitment and communication within the workplace. Importantly, the impact of Lean on soft elements is not always for to be indirect, i.e., through changes or improvements in work systems. Consistent with Holden (2011), the evidence suggests that Lean increases employee engagement and involvement within the organisation. Some respondents talked about the feeling of being listened to, a shared vision where their views have become important to the development and future of the organisation. This feeling came not from participation in Lean projects but by a change in the culture of the organisation. Holden (2011) refers to this effect as a potential by-product of Lean initiatives.

Also the results on the positive impact on Lean on the social subsystem are consistent with prior research suggesting that Lean positively impacts on employees (Womack et al, 1990; Brown and O'Rourke; 2007), but extends this research by highlighting the areas in which

employee outcomes are improved. There are benefits to enhancing employee outcomes such as motivation, satisfaction and empowerment or autonomy. The goal of Lean is to ultimately improve organisational outcomes such as performance and efficiency. Prior research has linked employee outcomes to such organisational outcomes (Hackman and Oldman 1980; Tomer 2001), with Tomer (2001), for example, finding that employee empowerment with greater responsibility, improves employee skill and competency, resulting in a more creative, cooperative and productive workforce.

The results on the impact of Lean on motivation and job satisfaction, i.e., a positive impact, reflect the view of prior research (Hopp and Spearman, 1996; Womack et al., 1990; Hirzel et al., 2017; Neirotti, 2018) suggesting that workers under Lean production environments are intrinsically motivated, more driven, more satisfied with their work and more productive, than their counterparts in traditional work environments. While Treville and Antonakis (2006) note that motivation is limited by excessive Leanness, the current research does not identify any cases of excessive leanness in the UK HEI context.

Lange (2012) highlights the importance of empowerment by noting that autonomy leads to job satisfaction, retention and performance. Lean puts forward employee empowerment as a key ingredient for Lean diffusion and sustainability (Lam et al., 2016; Jurburg et al., 2016; Hirzel et al., 2017). Womack et al. (1990) contends that the empowerment of employees to take responsibility of how work is organised within their units and the adoption of flat corporate structures with self-directed teams should all create the sense of autonomy. Indeed, the current research finds that Lean implementers in the HEI context prioritise employee empowerment through enhancing employee autonomy. This is achieved through skill development and by providing employees opportunities to take on new roles within and across-departments and work-teams. Autonomy within current work streams is enhanced by providing clear procedures and guidance so that employees can conduct work with little supervision. In discussions with respondents a few issues still impeded full autonomy and empowerment. This include, firstly, employee reluctance to take on new roles and sometimes, employees lack of confidence to support fully autonomous working. Secondly, the bureaucratic nature of HEI institutions, with departments and units having to answer to faculty, which intend answers to the central university, makes full autonomy and decision-making at the local level challenging.

A number of Lean opponents such as Lewchuk and Robertson (1996), Sterling and Boxall (2013), Conti et al., (2006) and Carter et al., (2013) call into question the assertion that Lean positively impacts on employees. These studies contend that employee working conditions do not necessarily improve when Lean is implemented. The results from the current study suggests that Lean negatively impacts on employee work-related stress by increasing stress and anxiety. The study finds that anxiety and stress increase due to the change Lean introduces. There is evidence that Lean changes the nature of stress within the workplace. Specifically, the results complement Conti et al. (2006) by suggesting that the source of employee stress changes from stress of getting the job done to stress of meeting targets and deadlines.

Further, several respondents in the current study argue that the increase in stress is as a result of an increase in workload when Lean is introduced. Indeed, in some cases, Lean is treated as an addition to what employees would normally do rather than a new way of doing things. Hence, Lean creates new tasks which employees must complete. Consistent with this view, the results from both studies suggest that Lean does not lead to a decrease in workload. Indeed, in the current research, it is found that Lean increases workloads in some cases. This supports Lewchuk and Robertson (1996) view that Lean led to faster work and increasing workloads. Given the finding that employees are more motivated and satisfied with their work due to Lean, the increase in workload might not necessarily be a bad thing as Lean increases productivity, allowing employees to do more with the same resources, (particularly, time) and thereby enhancing their ability to take on higher workloads.

Kyndt et al. (2009) contends that finding the right employees, with the right skills and the right fit within the organisation is both a time consuming and expensive task of HRM. Hence, employee retention is vital to ensure success and organisational performance (Kyndt et al., 2009). Prior studies suggest that Lean leads to job strain, creates intensified work pace, increases demands on employee effort, with adverse health effects (Landsbergis et al. 1999). This literature suggests a negative impact on Lean on employee retention. In the current study, the evidence on Lean's impact on retention in UK HEI is weak. There are suggestions from respondents that Lean increases employee involvement and participation, with employees feeling more valued and hence, may decide to stay longer with the organisation. This corroborates the finding the Lean enhances employees' organisational commitment. However, several respondents were quick to note that their institutions do not routinely collect data or perform analysis to explore how Lean impacts on retention.

6.7 The Divergence in Team Leader (manager)-Team members' views

The results on disparities in Lean perceptions between team leaders and managers are new in the literature and hence, constitutes one area in which this study contributes to the Lean literature.

In the initial study, it was revealed that Lean leaders and managers held more positive notions about the impact of Lean on Lean team members while, at the same time, the team members held negative notions about how Lean had impacted on them and their work. Specifically, in the initial study, leaders and managers generally agreed that Lean improves employee motivation, job satisfaction, retention, autonomy, psychological safety and working environment, while reducing work related stress. Meanwhile, team members contended that Lean adversely impacts on employee motivation, job satisfaction, retention, autonomy and psychological safety. Despite the disagreements on the above issues, both team leaders and team members generally agreed that Lean improves work environment and does not reduce workload.

In the main study, across the different institutions, there was a broad consensus amongst team leaders and team members that Lean improves job satisfaction, employee autonomy and communication. However, consistent with the initial study, there is a general lack of consensus on how Lean impacts on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. In some cases, the lack of consistency arises from the fact that either leaders or members are unsure about the impact of Lean on a specific issue. For example, while leaders noted that Lean had negatively impacted on retention, team members were unsure.

The divergence in the views of Lean team leaders and team members on the impact of Lean on employees mirrors findings outside the Lean research area (Miles and Mangold, 2002; Cogliser et al. 2009). These studies have documented significant differences in views of leaders and subordinates in different contexts. The results here suggest the, potential, existence of a communication gap or lack of appropriate feedback loops or mechanisms to address employee-related issues when Lean is implemented. Addressing this issue is clearly critical for Lean sustainability (Rinehart et al., 1997, Post and Slaughter, 2000; Neirotti, 2018).

6.8 Mapping findings on the Holden framework

The initial and main studies explored the impact of Lean on employees focusing on soft-issues. As discussed in section 2.8.1, the Holden framework (2011) suggests that Lean may impact on employees directly or indirectly through changes in work design brought about as a result of Lean. The results from this study are broadly consistent with Holden (2011). In this study, the researcher finds evidence that Lean does indeed impact on employees' outcomes including motivation, satisfaction, autonomy, job-related stress, workloads, psychological safety and the (physical and social) working environment. While Holden (2011) implicitly assumes that Lean will have positive impacts on these employee outcomes, the evidence from the current study suggests that this is not always the case. Indeed, in the initial phase of the study, it was evident that team members did not always agree that Lean had improved their outcomes, particularly workloads. Also, significant differences in perception of the impact of Lean were found between Lean team leaders (managers) and team members.

Consistent with the Holden (2011) framework, this research finds evidence that the impact of Lean on employees occurs through two channels (direct and indirect). For example, in some institutions, it was found that the news of eminent Lean deployment (prior to a change in work design) created stress & anxiety, job insecurity, sceptism with adverse effects on employee motivation etc.—i.e., a direct channel. In several other institutions, it was found that Lean led to automation (a change in process design leading to reduction of form-filling) and this reduced employee workloads and improved the working environment (by creating more space)—i.e., an indirect channel.

Notwithstanding, the direct and indirect channels are not clear-cut—i.e., the channels are sometimes intertwined and indistinguishable from each other. Specifically, the same outcome may be achieved as a direct consequence, as well as, an indirect consequence of Lean adoption. Taking the example, of job satisfaction, during the initial phase of the study, respondents noted that they were more satisfied with their work as Lean had led to more responsibility (empowerment) and a voice in the workplace (i.e., a direct channel). Meanwhile, during the main phase of the study, other respondents noted that they were more satisfied with their work as Lean had led to the elimination of bottlenecks and improvements in work systems—an indirect channel.

6.9 Chapter summary

Lean HEI is a relatively new (with few implementers to date) and perhaps, evolving or continuously developing concept. The fact that implementers do not have a point of reference remains a significant challenge. In implementing institutions, Lean leaders spend a lot of time educating stakeholders so that Lean can be self-driven. Other approaches of implementing Lean (e.g., by obligation) appear to have been met with much more resistance in this setting. Training events are used to share ideas on Lean tools and techniques. These events also bring together management and staff, creating opportunities for knowledge sharing and the empowerment of staff to take on new Lean-related responsibilities. Staff who are knowledgeable about Lean become more comfortable at constructively challenging management, ever seeking new ways to improve processes.

Some of the main benefits of Lean (e.g., improving customer satisfaction, increased efficiency etc.) in the manufacturing, service and other public sector organisations (such as the NHS) documented in prior research are also shared by Lean HEIs. Nonetheless some of the challenges faced by Lean HEIs, including the difficulty of implementing Lean techniques in the areas of research and teaching, are unique. Also the challenge of bringing together previously (or culturally) autonomous units, departments and faculties is one faced by HEIs and healthcare institutions.

The results from this research provide new insights into the how Lean adoption impacts, particularly, frontline staff, in the context of UK HE. As expected, Lean HE generally leads to improvements in employee autonomy, psychological safety, the quality of the non-physical working environment and employee satisfaction. The impact on employee motivation appears to be dependent on the extent to which employees are empowered to take responsibility and develop solutions for the work they do. Interestingly, while the research reveals that Lean HE has a limited impact on overall worker job stress, the study reveals that the nature of job stress is altered from one type of stress (e.g., the stress associated with heavy workloads) to another (the stress of meeting targets) by Lean adoption. The evidence suggest that Lean does not decrease employee workload, as time saved through process improvements is redeployed into performing more useful tasks. Most importantly, the initial study documents several discrepancies between the perceptions of Lean team leaders and team members suggesting that the impact of Lean on the working conditions of frontline staff is, perhaps, not fully understood by deployment managers. In general, managers from the initial study perceive that Lean has an

overall positive impact on employee working conditions and outcomes but team members do not perceive that Lean has such an impact.

Similar trends were documented in the main study. Notably, the main study revealed that Lean positively impacted on job satisfaction, employee autonomy and communication. However, respondents across different roles (leaders versus members) failed to agree that Lean positively impacted on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. It was clear that the impact of Lean on employees had not been given sufficient thought and data on this issue was not routinely collated across different institutions.

CHAPTER 7:   CONCLUSION

7.1 Introduction

Chapter 6 of this thesis discussed the findings from the initial study (chapter 4) and the main study (chapter 5). This chapter concludes the research by revisiting and addressing the aims, objectives and research questions of this study. This chapter also articulates the contributions of the study. In addition, the limitations of the study are noted and potential areas or opportunities for future research are noted.

7.2 Aim, objectives and research questions

As discussed in chapter 1, the aim of this study was to explore Lean adoption in HEIs focusing on the case of UK HEIs. The research explores Lean adoption in HEIs by collecting data in two phases; an initial and main study. The first phase focuses on one UK institution (University X) which is considered to be one of the pioneer implementers of Lean in the UK HEI sector. The research question underlying this phase of the study is stated as follows;

- *What are the benefits and challenges of adopting Lean in a higher education context, and how does Lean adoption impact on employee working conditions and outcomes?*

During this phase of the study, the researcher collected qualitative data through in-depth interviews (lasting 50 to 80 minutes each) with 12 individuals who were actively involved in Lean projects at this institution. These individuals had varying level of experience in Lean implementation, held different positions within the institution and were engaged in Lean projects either as Lean leaders/Lean team managers or Lean team members. The initial study allowed the researcher to obtain a deeper understanding of the context, to fine-tune research questions and to further reshape the interview protocol.

The main phase of the study builds from the initial study. The research questions underlying this phase of the study are stated as follows;

- *To what extent have higher educational institutions in the UK adopted Lean management practices?*
- *What are the benefits and challenges of adopting Lean in a higher education context?*

- *How does Lean affect employee working conditions (e.g., autonomy, workload) and outcomes (e.g., psychological safety, motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?*
- *How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?*

This phase obtained data by interviewing 32 individuals across 7 HEIs in the UK. Similar to the initial study, these individuals had varying experience in Lean deployment, held various roles within Lean deployment teams/projects and had worked across a variety of projects. The key findings from the two phases of the study are summarised below.

7.3 Key findings in relation to research questions

7.3.1 To what extent have higher educational institutions in the UK adopted Lean management practices?

To address this research question, the study explores the profile and history of Lean adoption, the understanding of the concept of Lean by Lean implementers and the processes and strategies used in Lean implementation. In course of searching for suitable case studies the research uncovers that Lean HEI is a relatively new concept with few implementers to date within the UK context. In fact, several UK HEIs appear to have no formal Lean programmes in place. This was ascertained through the researcher's attendance of conferences bringing together Lean practitioners from different UK HEIs. Further, most of the institutions implementing Lean have only started to do so in the last few years with the oldest implementers having implemented Lean for over a decade. Where Lean was implemented, it was generally not implemented at an institutional level per se. It was driven by a few units within the institution and mainly focused on operating activities and professional services (student, academic and library services). There were no documented cases of Lean being applied to learning, teaching and research. This suggests the absence of a holistic approach to Lean implementation. Given the importance of transforming the entire value chain through Lean, this approach appears to be inadequate. Indeed, STS theory also advocates for a full systems approach when deploying Lean, an approach that should consider the social and technical subsystems within HEIs. Practice, as identified in this study, is inconsistent with core principles of Lean, as well as with tenets of the STS theory.

Practitioners within the HEI environment share documented perceptions about what Lean constitutes within their context. Several of them saw Lean as: a process focusing on eliminating waste; a philosophy and culture where seeking efficiency becomes part of the everyday job; a strategy for improvement by breaking down complex systems into simpler steps or process which can be automated, measured and improved in order to improve overall efficiency of the system; a way of achieving efficiency by thinking holistically about what processes creates value for the end customer; finally, an emphasis on respect-for-people, valuing the contributions of individual staff members, building capability through training and empowering staff to take initiative and continuously seek improvements within their work area. Different from what the literature has documented, the research uncovers instances where Lean was emergent, unstructured and done but not termed. There were several instances where Lean tools were explicitly used within institutions but the process was not referred to as "Lean". Some respondents argued that "Lean" does not have a good connotation within HEI, hence, the decision to not use the word "Lean" to refer to improvement processes or activities.

The Lean adoption process in several institutions is driven by top management interest hailing from previous experience or recent introduction to the concept through conferences or other continuous personal development events. Some institutions have a dedicated Lean or continuous improvement unit or team which is charged with leading Lean within the institution. At several institutions, the Lean adoption process starts with an assessment of the current performance levels across the institution and the identification of value drivers. This is done by bring together staff across various units in events akin to rapid improvement events. These events are a way of embedding the "respect-for-people" principle of Lean. It encourages communication, participation, teamwork and buy-in and empowers staff to sustain Lean initiatives. These initiatives are also pivotal in training change agents who are central to Lean diffusion across the institution. Specifically, trained change agents (which may include managers of different units e.g., library, student services etc.) trained in Lean techniques then become local change agents. Lean leaders provide ongoing support in multiple Lean projects across the institution. They are able to identify skill deficiency, provide extra training, and reallocate Lean project resources to ensure the Lean projects are run smoothly. To encourage bottom up continuous improvement, in a few institutions, staff are encouraged to propose Lean projects by completing proposal forms or by making entries in idea or suggestion boxes.

While there were no cases of Lean being explicitly used in the area of learning, teaching and research, Lean has been used across a number of project types spanning operations, human resources, library, student and academic services. In most cases Lean recognised the bureaucratic and complex nature of HEIs, seeking to remove duplication across services, identify and eliminate complex non-value adding activities, streamline the nature of work and adopt IT to automate repeated and routine tasks. The outcome has been an improvement in the speed of delivery of student services, improved ability to deal with suppliers, better outcomes for employees, less bottlenecks and a more streamlined service in different areas.

7.3.2 What are the benefits and challenges of adopting Lean in a higher education context?

As noted earlier, Lean HEI is a recent phenomenon. The fact that implementers do not have a point of reference remains a significant challenge. Lean leaders spend a lot of time educating stakeholders so that Lean can be self-driven. Other approaches of implementing Lean (e.g., by obligation) appear to have been met with much more resistance in this setting. One reason for this is general liberal culture (termed "academic freedom") in this context. Training events are used to share ideas on Lean tools and techniques.

Some of the main benefits of Lean (e.g., improving customer satisfaction, increased efficiency etc.) in the manufacturing, service and other public sector organisations (such as the NHS) documented in prior research are also shared by Lean HEIs. The research finds that Lean led to streamlined services, the elimination of duplication and hence, time saving when providing services to students, leading to improvements in student experience (and presumably, better results in National Student Surveys). Similarly, Lean allows professional services units (e.g., HR) to be more responsive to the needs of employees/academics, leading to high job satisfaction and potentially, retention. The introduction of Lean also appears to improve team cohesion, team working, communication and employee engagement (as a result of Lean empowerment) within the organisation. Linking back to STS theory, it appears that Lean (as a technical subsystem) positively enhances the social subsystem by improving relationships between actors. Some institutions documented positive effects of Lean implementation on their relationship with their suppliers. Specifically, Lean led to the reduction of number of forms suppliers needed to fill, streamlined the

buying process, and automated a number of supplier-related processes, meaning that suppliers could be paid quicker.

Despite the benefits of Lean in this environment, institutions adopting Lean faced a number of challenges. There was a tendency for Lean to be misunderstood within this context. This misunderstanding arose from scepticism on the role of Lean, the benefits of Lean and the timing of Lean adoption (austerity and a reduction in government funding for UK HE), as well as, a lack of understanding of Lean terminology (with Japanese origins). Secondly, stress and anxiety around Lean implementation discourages uptake. Specifically, Lean brings about change which creates expectations, necessitates retraining and can lead to anxiety and stress. Thirdly, and in relation to the first point, Lean creates fears about job security. Austerity following the global finance crisis created the need for universities to seek efficiency, which might sometimes lead to redundancy. Lean is seen by many with UK HEI, as a ploy to make redundancies. Fourthly, like in other industries, Lean change is met with resistance. Here, Lean necessitates changes in the organisation of work, changes which employees may be unwilling or unmotivated to make. Similarly, prior poor experience in Lean adoption or lack of experience/knowledge around Lean breeds scepticism and impedes change. Additionally, psychological biases, lack of belief and mental barriers arising from pre-conceived notions around Lean sometimes stood in the way of Lean adoption.

Some challenges faced by HEIs while on their Lean journey appear to be unique to the HEI environment. Firstly, it appears to be difficult to implement Lean techniques in the areas of research and teaching. There were no cases of Lean implementation in these areas and it was not clear even to Lean leaders how Lean could be implemented within these areas. Secondly, some challenges arise from the structure and nature of HE institutions. This could include the way institutions are governed, the presence of functional silos, challenge of bringing together previously (or culturally) autonomous units (departments and faculties), and the ambiguity of the concept of "customer" in the HE environment. Finally, Lean was sometimes seen as something people do in addition to their daily work. Lean was not fully embedded within some institutions. Indeed, in some cases, Lean created new responsibilities, which were sometimes challenging to take on in parallel to the day job, hence requiring additional resources.

7.3.3 How does Lean affect employee working conditions and outcomes (directly and indirectly)?

Overall, the research finds that, consistent with the Holden (2011) framework, within this context, Lean has improved employee outcomes including employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication, both directly and indirectly through its impact on work design. There is some evidence that Lean leads to work-related stress. The findings on how Lean impacts on employee workload are mixed, with some respondents arguing that Lean increases workload while others arguing otherwise. There was no clear evidence on how Lean has impacted employee retention in UK HE.

Importantly, one unexpected finding of this study is that there are some differences in perceptions of Lean managers and Lean team members in terms of the benefits of Lean with HEI and its impacts on employee working conditions and outcomes. HEI managers seem to believe that Lean has had a positive impact on their employees in terms of job satisfaction, motivation, and work-related stress. This is however not fully supported by the views of the Lean team members. There is broad consensus amongst team leaders and team members that Lean improves job satisfaction, employee autonomy and communication. However, there is a general lack of consensus on how Lean impacts on retention, work-related stress, employee workload, psychological safety, the working environment and employees' organisational commitment. In several cases, the lack of consensus arises from the fact that either leaders or members are unsure about the impact of Lean on a specific issue. Importantly, the study raises some concerns about differences in the perceptions of key stakeholders on the impact of Lean. Given the importance of communication in successful Lean implementation, this finding generates new questions about the nature of Lean deployment in this context. Finally, the research highlights the fact that Lean leaders within HE do not fully understand the impact of Lean on employees. Data on this issue is not routinely collected and there are rarely any processes to collect feedback from employees on how Lean impacts on them as the focus is typically on how employee characteristics shape Lean success.

7.4 Contributions of the study

7.4.1 Contribution to the literature

This study has made a number of contributions to the literature, which are discussed below. Table 7.4.1 summarises some of the areas in which the thesis has directly and more evidently extended prior research in the area. Some unique contributions to research and practice are discussed thereafter.

Table 7.4.1: Contributions of the thesis

Research Question	Findings which are consistent with the literature	Novel findings unique to this study.
RQ1: To what extent have higher educational institutions in the UK adopted Lean management practices?	• Lean HEI is a relatively new concept with few implementers. Also documented in Radnor and Bucci, (2011), Francis (2014), Balzer et al. (2015), Svensson et al. (2015), Antony (2014) and Lu et al. (2017). • Practitioners within HEI share perceptions of Lean documented outside the HEI context. • The Lean deployment process in the HEI context bares similarities to other contexts. E.g., the use of Lean consultants and standard Lean tools (Hines and Lethbridge, 2008). • Lean is applied across a number of projects spanning operations, human resources, library, student and academic services (Taylor, 2012). • Lean HEI leads to improvement in the speed of delivery of student services, improved ability to deal with	• Lean was not implemented at an institutional-wide level (the absence of a holistic or systems approach to Lean deployment). It was mainly driven by professional services (research and teaching portfolios were exempt). • Lean HEI places a substantial emphasis on respect-for-people as a principle of Lean. • The term Lean sometimes bare negative connotations. There are instances where Lean is emergent, unstructured and done but not termed or called Lean. • Lean adoption is sometimes driven by the presence of a Lean champion or by leadership interest. • Sometimes, there is no clear motivation for adopting Lean or for choosing Lean over other continuous improvement approaches. Lean is a better fit for HEIs

	suppliers, better outcomes for employees, less bottlenecks and a more streamlined service in different areas (Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017). • HEIs adopt Lean to improve efficiency in service delivery (Svensson et al., 2015; Antony, 2014; Lu et al., 2017). This shows still the 'technical' aspect of Lean gets prioritised over 'socio-aspect'	when compared to Six Sigma (due to its data requirements and its lack of emphasis on respect-for-people.) • Lean adoption to address bureaucracy problems inherent in HEIs. Lean promises to address workload issues by eliminating duplication and pushing implementers to focus on core value-adding activities. • Success stories from other implementers motivates HEIs to adopt Lean.
RQ2: What are the benefits and challenges of adopting Lean in a higher education context?	• Lean adoption leads to efficiency through time saving and improvements in the student experience (Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017). This shows productivity-based metric (technical aspect of STS) still receives more attention • In terms of barriers, resistance to change from employees and the bureaucratic structure of HEIs (including the presence of function silos) impedes successful Lean adoption (de Souza and Pidd, 2011; Antony et al. 2012).	• Lean adoption leads to improvements in staff experience, increases employee engagement (due to participation in a shared vision), improves team working and enhances the working environment. • Other barriers to Lean adoption in the HEI context include misunderstanding of Lean and its role, stress and anxiety surrounding Lean implementation, job insecurity, prior poor experience and issues around resources and responsibilities.
RQ3: How does Lean affect employee working	• Prior studies in the HEI setting have not explored the impact of Lean on employees. Few studies outside the HEI setting	• Disparities between the views of leaders and team members on the indirect impact of Lean on employees. Deployment

conditions (e.g., autonomy, workload) and outcomes (e.g., psychological safety, motivation, work related stress, job satisfaction, retention) indirectly by transforming work structures and processes?	consider the issue. Findings here are therefore generally novel. • Research outside the HEI setting argues that Lean can have positive influences on employees. Tomer (2001) cites improvements in employee skill, competency, creativity and productivity due to Lean empowerment. Lange (2012) also highlights the importance of empowerment by noting that autonomy leads to job satisfaction, retention and performance. • On the contrary, Lewchuk and Robertson (1996), Sterling and Boxall (2013), Conti et al., (2006) and Carter et al., (2013) call into question the assertion that Lean positively impacts on employees. These studies contend that employee working conditions do not necessarily improve when Lean is implemented.	managers do not fully understand the impact of Lean on employees. • Lean leaders generally over-estimate the impact (benefits) of Lean to employees' working conditions and outcomes. • Consistent with Holden (2011) and STS theory, by transforming work structures, Lean has generally improved employee motivation, job satisfaction, autonomy, the working environment, organisational commitment and communication within this context. • Lean leads to work-related stress. • Lean's impacts on employee workload are mixed. • No clear evidence on how Lean has impacted employee retention. • Implementers do not routinely and systematically assess the impact of Lean on employees.
RQ4: How does Lean affect employee outcomes directly (e.g., motivation, satisfaction), independent of changes to work structures and processes?	• Similar to the above (RQ3), few studies outside the HEI context have explored the issue. • Similar to Holden (2011) and consistent with STS theory the current study finds that Lean increases employee engagement (albeit, in an HEI setting). Holden (2011) finds similar results in a hospital setting.	• Disparities between the views of leaders and team members on the direct impact of Lean on employees. Leaders generally over-estimate the impact of Lean to employees' working conditions and outcomes. • Consistent with STS theory, Lean implementation has had a direct effect (generally positive) on employees (in terms of organisational

		commitment, motivation, satisfaction, working environment), irrespective of whether they are involved or not in Lean projects. For example, through better communication and empowerment, staff are more engaged, satisfied and motivated by the knowledge that their views are shaping the vision and future of the HEI.

Lean HEI is a relatively recent phenomenon hence, research in this area is still at its infancy. To the researcher's knowledge, this study is the first attempt at an in-depth exploration of Lean adoption in UK HEIs focusing on multiple case studies. There have been other studies on Lean HEI but the focus has been exploration of Lean practices in early adopters. Previous studies looking at Lean in UK HEI (see, for example; Emeliani 2004, 2005; Fearn, 2010; Radnor and Bucci, 2011; Francis, 2014; Balzer et al., 2015; Svensson et al., 2015; Antony, 2014; Lu et al., 2017) have focused on documenting the proliferation of Lean practices and the types of Lean tools deployed by Lean implementers. The current study detracts from this line of questioning by providing a more extensive and in-depth narrative of the experience of Lean implementers in the HEI context. Specifically, the study compiles perspectives of implementers on how Lean is defined, what Lean entails within this context and why Lean is important for HEIs. Different from prior studies, the current study also documents the challenges, benefits and strategies for Lean implementation in this context.

Building on the views of Rinehart et al. (1997), Post and Slaughter (2000) and Neirotti, (2018) who highlight the importance of understanding how Lean impacts on employees, this study contributes to the Lean literature by being one of the few studies to explore the soft side of Lean— something which is largely ignored in prior Lean HEI research. Indeed, to the researcher's knowledge, in spite of the importance of employees in ensuring successful Lean deployment and Lean sustainability, particularly within the unique HEI context, no prior study looks at how Lean impacts on employees in this context. This presents an opportunity for this study to contribute to

the literature. The research finds that Lean has different impacts (positive, negative, none, mixed) on different aspects of employee working conditions and outcomes.

Importantly, and unique to this study, the research documents significant differences in perceptions between Lean leaders and/or deployment managers and Lean team members, on how Lean impacts on employees. This suggest that deployment managers, perhaps, do not fully understand how Lean impacts on those involved. Given the importance of communication in successful Lean implementation, this generates new questions about the nature of Lean deployment in this context. It also highlights the possibility that studies that only assess Lean benefits from the perspective of managers are positively biased in their assessment of Lean. More attention needs to be paid to the views of employees who are directly involved in Lean projects. Importantly, this study uncovers the lack of focus on the soft-side of Lean by deployment managers. Indeed, deployment managers in this context were not in the habit of collating impact data and there were very few efforts to obtain feedback from employees in relation to how they had been impacted by Lean.

Finally, the study draws on the STS theory as a theoretical lens to unpack the relationship between Lean (as an integral unit of the technical subsystem with HEIs) and people (as an integral part of the social subsystem). Consistent with the views of Cherns (1976), Trist and Bamforth (1951), Trist (1981) and Hicks et al. (2015), the study highlights the importance of both (technical and social) subsystems in achieving or driving the organisation's vision. While Cherns (1976) argues that both subsystems need to be optimised in order to drive performance (implicitly assuming that the systems are independent of each other), this study documents an interaction between the two subsystems (social and technical). Answering the first two research questions highlights that most of the university implemented Lean to improve operational efficiency and reduce cost- this aligns with the focus on the technical aspects of the STS theory. Lean research has highlighted the importance of socio-system and having a balance between technical and social system to sustain Lean benefits and drive away from efficiency focus (e.g. Bortolloti et al., 2015; Hadid and Mansouri, 2014, 2016). The findings reported when answering RQ3 and RQ4 highlighted the differences in perception between Lean leaders and employees, which is an important socio-aspect, to drive change and sustain the benefits realized through Lean implementation. Indeed, it is clear from the results that successful Lean implementation requires

expertise from the social subsystem. In the study, the expertise was provided by Lean leaders and managers (including consultants). Interestingly, the results show that Lean, once implemented, impacts on the social subsystem both directly and indirectly (through the changes in work systems which it necessitates). Hence, the study provides some evidence in respect of how the social and technical subsystems within the socio-technical framework interact by impeding and strengthening each other.

7.4.2 Contribution and recommendations to practice

This study explores current Lean implementation practice in UK HEIs and identifies a number of issues which may be of interest to practitioners. Firstly, the study highlights differences in perceptions of the impact of Lean between Lean leaders and Lean team members. In general, the research documents that Lean leaders overestimate the benefits (or positive impact) of Lean to employees. This suggests the Lean leaders might not fully understand the impact of Lean on their employees.

Secondly, and in relation to the first point, the impact of Lean on employees is not routinely assessed by Lean leaders and institutions do not collate data that may allow them to assess this. Given the importance of employees to Lean sustainability, there is need for leaders to more carefully assess how Lean affects employees. Perhaps, this could be achieved by opening up several channels to promote bottom-up communication, as well as, through the use of more formal and informal feedback channels. If this can be done, then steps can be taken to enhance employee working conditions and outcomes through Lean.

Finally, this study has provided an overview of the nature and extent of Lean adoption across UK HEIs. The study has documented the experiences of implementing organisations, highlighting some of the challenges that they have faced, some of the areas in which Lean has been applied with positive impacts on efficiency and organisational effectiveness and the scope of Lean in HEIs. The study has discussed some of the contextual elements that have supported or impeded successful Lean implementation in different institutions. As the need for UK HEI to pursue efficiency is likely to grow over the next decade, more institutions are likely to be turning to Lean as a solution. This study therefore provides pointers that HEI seeking to deploy Lean could benefit from.

Following the research, the below recommendations (in addition to those discussed above) are likely to enhance the successful deployment of Lean in the HEI context.

Clearly, the HEIs involved in this study are not reaping true benefits of Lean due to lack of systems thinking and a generally disjointed approach to continuous improvement. Overall improvement is, perhaps, only possible when Lean in implemented in a joined up approach across teaching, research, and professional services portfolios. STS theory also emphasises the importance of joined up approach between sub-systems and people driving those systems for optimal improvement across the organisation. There is therefore need for Lean leaders to consider ways in which teaching and research portfolios can be included in the Lean efforts.

Secondly, if Lean is solely treated as an efficiency improvement methodology (as was seen in some of the case HEIs), it is bound to fail in the HEI setting (Hines et al., 2008). Too much focus on efficiency and targets will may encourage dysfunctional behaviours that may jeopardize the Lean initiative and adversely affect the sustainability of improvements derived through Lean. The STS theory emphasises the importance of socio- aspects of Lean, and when combined rightly with technical aspects of Lean, will result in optimal improvement and long-term sustainability (Hadid and Mansouri, 2014; Bortolotti et al., 2015).

Thirdly, a number of respondents noted that Lean was something that was done in addition to the day job. HEI leaders, perhaps, need to allocate more time and resources to staff members to lead and contribute to continuous improvement projects on a regular basis. Particularly, staff at the lowest levels of the organisations should be empowered to contribute to the improvement projects. Leaders should facilitate in breaking the functional silos and propose projects that cut across functional boundaries of research, teaching, and professional services portfolios.

Finally, teaching and research outcomes should not be seen separately as they are two sides of the same coin. Given HEIs are now focusing on both TEF and REF, an imbalance between the two outcomes may impact on income and student experience. Lean may help HEIs to achieve the balance.

7.5 *Limitations and areas for future research*

The study draws evidence from a total of 8 UK HEIs (1 HEI in the initial study and 7 HEIs in the main study) and 44 respondents (12 respondents in the initial study and 32 respondents in the

main study). The selection of this cases was based on the researcher's ability to obtained access to these institutions and to the individuals. The views expressed here are therefore relevant for these institutions. Perhaps, the evidenced could be enhanced by triangulation, i.e., using alternative sources of evidence (e.g., documents). There was an attempt to use archival data to triangulate and support early findings but not all institutions were able to provide additional archival information.

Lean practice differs from one institution to another. The case study approach celebrates context specificity and hence, there was no attempt to make generalisations about Lean HEI. For example, the findings from the first phase of the study do not fully corroborate those from the main phase in terms of how Lean impacts on employee working conditions and outcomes. The current study does not have sufficient evidence to explain how the differences between the institutions may explain the different Lean outcomes. Much of the evidence is obtained from conjectures and perceptions which vary significantly by person and are a factor of the researcher's interpretation of the responses provided.

Interesting findings started to emerge in terms of differences in perceptions between Lean leaders and team members. These findings have been discussed. Nonetheless, a more in-depth analysis on the issue was stifled by the fact that the team members (who typically had less experience in Lean) generally provided limited responses.

Due to constraints in gaining access to several institutions, several of the institutions (cases) from which data was drawn were based in Scotland. Scottish universities face unique institutional challenges, particularly in relation to funding, which are somewhat different from those faced by their English and Welsh counterparts. Nonetheless, all universities face uncertainty around government funding and increasing calls for them to deliver value-for-money services either to "students as customers" (i.e., for English and Welsh Universities) or for the tax-payer (for Scottish Universities. The evidence documented here could, perhaps, be extended by exploring Lean adoption across other English universities.

Finally, several of the institutions involved in this study have only just started their Lean journey. Some of the respondents had only been involved in a few Lean projects. There were therefore no opportunities to assess Lean maturity in this context. Also, the given that the data had to be collected within a short space of time (time constraint in relation to the PhD), they were no opportunities to conduct a longitudinal-type study following an action research strategy.

Importantly, despite its limitations, this research opens up new areas for further research. Firstly, this study is one of the earliest studies exploring Lean in the HEI context in depth. The research has identified a significant gap in research exploring the soft-side of Lean in HE, and the same is true for other industries. Perhaps, future research can reexamine this issue in other contexts. This could include the health service and other public and private sector organisations. Specifically, there is need to understand how Lean potentially impacts on working conditions and outcomes. It may be the case that different strategies for Lean deployment shape outcomes differently. Hence, future studies may look at the relation between strategies for Lean implementations and the effects on employees.

Secondly, this study has relied heavily on interview data collected from semi-structured interviews. Given this, the study is unclear about the state of Lean adoption across the UK HE landscape. Perhaps, there is need to assess the state of Lean by sending out questionnaires to different institutions.

Thirdly, this study has uncovered significant differences and a divergence in perspectives of leaders and members in respect of how Lean impacts on employees. There are perhaps opportunities to explore this issue further across different sectors. It is unclear whether these differences persist only in the context of Lean adoption or whether it is common to the deployment of other change programmes. Future research can therefore explore divergence between leaders and members in different settings, the reasons for divergence and how this can be addressed.

One assumption made throughout the study, based on the STS theory is that, if the social subsystem is optimized then Lean can be successfully and sustainably deployed. There is need to explore this more formally. This study is particularly silent about strategies for improving the impact of Lean on employee outcomes and working conditions, as well as, strategies for assessing this impact. The thesis is also silent on the channels through which positive employee outcomes and working conditions drives sustainability and successful Lean deployment. This presents an opportunity for future research to more carefully address this issue.

Further, this research is particularly silent on Lean in area of teaching and research. No cases of Lean in teaching and research were documented across the cases studies. Given that a significant part of UK HE activity is in teaching and research, there is need to further explore this issue by

finding suitable cases. It may be the case that some institutions deploy Lean philosophies in this area but, as documented in this study, do not call it "Lean".

Additionally, and in relation to the above, the UK HEI landscape is in a period of significant change. For example, the TEF has recently been introduced and one of its objectives is to put teaching quality under the spotlight. At the time of writing, the results from the last TEF showed that several Redbrick institutions, which are traditionally considered to be more research intensive, were not awarded a gold rating in the TEF. This has implications on the competitive positions of these universities and their ability to retain and grow income streams. This increases pressure on the institutions to consider how core services in relation to teaching are being delivered. It is therefore interesting to explore how external pressure from outside forces or the institutional environment, such as TEF and REF, can influence institutions' openness to Lean adoption, as well as, strategies deployed when adopting Lean under such pressure or duress.

Finally, this thesis is silent about other quality improvement methods (such as Six Sigma) which UK HEIs may be using, as well as, the possibility that UK HEIs are combining different improvement methods (such as Lean Six Sigma). Again, this may be challenging to discern, especially if the institutions do not use formal terminology (as documented in this research). However, it is worth exploring this issue and examining the extent to which different/alternative methods, as well as, combinations of quality improvement and efficiency models, has yielded positive outcomes for institutions and their employees, relative to using Lean as a standalone.

7.6 Concluding remarks

Lean HE has been heralded as the path to efficiency improvement in the UK HE context and hence, has gained significant traction over the last decade. Nonetheless, research on the state, progress and impact of Lean HE has lagged. This research provides one of the first in-depth study of this issue. Overall, it is clear that several institutions are have adopted Lean philosophies and have tailored it to suit their specific circumstances. While there have been challenges in Lean adoption, some of the key benefits of Lean are being enjoyed by current adopters. While Lean leaders perceive that Lean has had a positive impact on employees, this view is not fully shared by employees, and no convincing evidence is available to support their conjectures. Understanding the impact of Lean on employees is critical to successful implementation, diffusion and sustainability. Overall, this research is vital as part of efforts to promote sustainability of

continuous improvement initiatives in the UK HE sector. It is an essential part of the debate on Lean's relevance for HEIs and how Lean can be tailored to better suit the HE environment.

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CONFERENCE PAPERS

Overview

This addendum presents 3 conference papers and one extended abstract which were produced and disseminated as part of this study.

The first paper (PhD development paper) was developed at the start of the project and summarised the researcher's initial ideas on the direction of study. This paper presented no data.

The second paper was a full paper which was written for and presented at the 5th World Production and Operations Management Conference Havana in 2016. This paper was written after preliminary analysis of the data collected from the initial study.

The third conference paper was written for and presented at the 24th European Operations Management (EurOMA) Conference, Edinburgh 1st – 5th July, 2017. It heavily draws from chapter 4 of the thesis.

Finally, the extended abstract was written for and presented at the 21st QMOD Conference which took place in Cardiff, Wales between the 22nd AND 24th August 2018.

PhD development paper

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British Academy of Management

PhD Development Workshop

Lean in UK Higher Education Institutions: Challenges, experiences and a research agenda

Abstract

This development paper explores Lean adoption, implementation and maturity in the 'third sector' by focusing on the unique case of UK Higher Education Institutions (HEIs). While UK HEIs appear to share certain similarities (the 'end-customer' cannot be clearly identified and the 'production-lifecycle' is unusually long), these institutions cannot, perhaps, be unambiguously identified as a homogenous group given the significant differences in orientation and historical background. Even though some preliminary exploratory work on the adoption of Lean practices by UK HEIs has been conducted, there is, perhaps, value in exploring how these unique institutional characteristics impact on the adoption, implementation and maturity of Lean within implementing HEIs. This paper identifies several unanswered questions and puts forward a research agenda on Lean in UK HEIs.

1.0 Introduction

There is consensus amongst researchers that most organisations adopting Lean practices have enjoyed a significant decline in inefficiency and waste evidenced in improved performance, greater productivity, improved product and service quality, greater through put, reduced costs of operations, smoother operations, lower waiting times and less fire-fighting amongst others (Womack and Jones, 1996, Bhamu and Sangwan, 2014). Notwithstanding, several of the research papers exploring Lean implementation and the benefits of Lean adoption focus on private sector, profit-making, and to large extent, manufacturing companies. Chavez et al. (2013), for example, explores the experience of over 228 Irish manufacturers, reporting a positive relation between Lean adoption and firm performance in terms of delivery, flexibility, cost and quality. This focus on manufacturing organisations can, perhaps, be attributed to the fact that the concept originated in this industry. Building on the success of Lean, several non-manufacturing, service and public sector organisations adopted Lean principles in their operations. Research exploring adoption, implementation and success of Lean in this setting (e.g., Staats et al. 2011, Hadid and Mansouri, 2014, Radnor et al., 2012 and Piercy and Rich, 2009) has corroborated the argument for Lean implementation in organisations.

Lean in the 'third sector' appears to be a new but rapidly developing trend. The term –third sector – has been used to describe those institutions which are neither private nor public sector organisations. Examples of such organisations include Social Enterprises, mutual, cooperatives, self-help groups and charities. The unique feature of these organisations stems from their pursuit of social goals. While their main goal is not to generate distributable profits, they are expected to operate sustainably by building surpluses which can be used to further the organisations' objectives. This implies that such organisations face the challenges of private sector institutions but without the protection enjoyed by public sector institutions. The case of UK Higher Education Institutions (HEIs) or universities is a particularly interesting one. UK HEIs are part-funded by the UK government with the funds allocated to each university being a factor of measures of efficiency, performance and research quality and output. Universities now generate most of their funding by charging tuition fees to students. This suggests that it is in the interest of universities to strive for operational efficiency and waste elimination to ensure sustainability.

2.0   The challenge of implementing Lean in UK HEIs

In the context of Lean management, UK HEIs appear to share certain similarities. Particularly, the 'end-customer' cannot be clearly identified and the 'production-lifecycle' is unusually long. Notwithstanding, UK HEIs cannot be unambiguously identified as a homogenous group given the significant differences in orientation and historical background. These two factors make UK HEIs a unique setting to explore Lean adoption, the process of Lean implementation and the factors moderating Lean implementation and Lean maturity. These factors are briefly discussed below.

2.1   Orientation: Research-led versus Teaching-led

A dichotomy has recently emerged with universities being classified as research-led (particularly, Russell Group universities) versus teaching-led universities. While the origins and applicability of the terms are unclear, a clear distinction can be made by examining the research funding that each university attracts. Heavy dependence on research funding suggests that 'students' are unlikely to be the primary customers for research-led universities. Teaching-led universities, on the other hand, generate most of their income from students – hence, their primary customer group.

2.2   Historical background: Ancient, Red Brick, Plate Glass and New universities

Another distinction can be made by looking at the historical backgrounds of UK HEIs. This is, perhaps, vital to our understanding of Lean adoption, as processes, procedures and structures in most UK HEIs are likely to be shaped by their historical backgrounds, influences and traditions. UK universities are generally classified by age within one of several categories including Ancient universities (pre 19th century), Red-Brick universities (Victorian era), Plate Glass universities (mid-twentieth century) and New universities (post-1992). The older universities are likely to be more established and more prestigious making it easier for them to attract prospective students. These universities are also likely to place great emphasis on their cultural heritage and values – the way things are done here – which may adversely affect their ability to successfully implementing Lean practices.

2.3   The HE customer dilemma

The implementation of Lean generally focuses on streamlining operations to efficiently the needs of the end customer. Successful implementation of the philosophy therefore requires the identification of end customer. The key question to answer here are 'who are the customers and what do the customers want?' The HE customer is unlike the traditional customer. A myriad of customers can be identified in the context of UK HEIs. Students appear to be the primary/direct customer as they pay for and experience the provision of the service. This is likely to apply to Teaching-led universities more than it does to Research-led universities. Even so, contemporary Learning and Teaching approaches (such as those promoted by the High Education Academy) position students as collaborative learners rather than conformist consumers and encourages the promotion of independent learning, guided by teaching staff.

Much of research in Research-led institutions is funded by the UK government. Within this context, HEIs have the task of attracting and retaining high quality research active staff. This might suggest that, to an extent, both the government and staff (at least, research-active) can be considered as customers to such institutions. The role of universities is also to prepare graduates by empowering them with the skills, knowledge and ability to take on future roles within companies. In this sense, graduates can be considered the product and employers can be considered as the customer.

Even when students are considered as the end customer, the service is multidimensional. For example, Borden (1995) notes that student satisfaction is related to both student priorities and the campus environment while Elliott and Shin (2002) contend that the Noel-Levitz student satisfaction inventory with over 11 dimensions (including academic advising effectiveness, campus climate, campus life, campus support services, concern for the individual, instructional effectiveness, recruitment and financial aid effectiveness, registration effectiveness, campus safety and security, service excellence and student centeredness) captures HEI student satisfaction. Implementing Lean given the broad nature of the needs of the end customer can therefore present a significant challenge.

2.4   The long service life-cycle

Unlike a traditional product or service, education as a service or product takes a long time to be delivered. Students and staff work collaboratively for a long period of time (3-4 years for an undergraduate programme, 1-2 years for a postgraduate programme, and over 3 years for a research degree). This long cycle means the perception of service quality and value to the customer (Student, in this case) is likely to change over time. While this poses a challenge, it is unclear how this, potentially, impacts the design of Lean programmes.

3.0　The Experience of implementing HEIs

A few surveys have looked at the adoption of Lean management in UK HEIs (see, for example, Radnor and Bucci, 2011, Emeliani 2004, 2005). Radnor and Bucci (2011), for example, explore the adoption of Lean management at five institutions including Nottingham Business School, Cardiff University, Portsmouth Business School, Warwick Business School and the University of St. Andrews. Further, work by Fearn (2010) suggests that other institutions including Manchester Metropolitan University, University of Aberdeen, Southampton Solent University, University of Strathclyde and Warwick Universities have also implemented management programmes. Evidence from Radnor and Bucci (2011) suggests that the process of Lean implementation and experience across different institutions has been vastly different.

Cardiff University, for example, implemented Lean management to complement the work of its established Lean Enterprise Research Centre of Excellence, allowing its undergraduate and postgraduate students to directly experience Lean in practice (Radnor and Bucci, 2011). The Lean project at Cardiff University was sustained through the recruitment of a Lean manager and the creation of a dedicated Lean University Team. The team has employed a myriad of Lean tools and techniques including RIWs, Process Mapping, Value Stream Mapping, 5Ys, Fishbone Diagrams, Visual Management and Team information.

On the other hand, Portsmouth Business School has employed a more subtle approach by focusing on improving administrative processes within its finance and undergraduate centre. The Lean facilitators have used simple tools such as RIWs, Process Mapping and Flow Charts to drive through their ideas for change. Here, there is clearly no dedicated Lean management team and no budget allocation. The Lean programme is completely run by two individuals who undertake this as part of their duties at the University with no support from an external Lean manager.

In the case of The University of St Andrews, for example, a full external consulting firm has been hired to drive through change. It appears most of Lean implementation in UK HE is fashioned through staff (as in the case of Nottingham Business School) and management (as in the case of Cardiff University) training. Radnor and Bucci (2011) find that factors determining the success of Lean adoption in the cases studies included: (1) staff engagement in the process e.g., through participating in improvement activities, (2) training on Lean management and the use of Lean tools (3) the use of Rapid Improvement Workshops (RIWs) to develop and implement Lean solutions to challenges faced in different departments (4) the experience, enthusiasm and personalities (human factors) of those in charge of leading the Lean programme (5) the use of a dedicated Lean team (6) the enthusiasm and commitment (human factors) of front line staff implementing Lean process, and (7) the time and resources dedicated to the Lean programme.

The impact of Lean implementation within these institutions and the level of Lean maturity achieved by these institutions is subject to debate and future research. Arguably, all the implementing institutions face the HE customer dilemma and the unique feature of an unusually long service-long cycle. Interestingly, these institutions have different historical backgrounds and orientations which possibly shape their motivation for and the process of Lean adoption and implementation. For example, Portsmouth Business School is within a post-1992 university while St Andrews University is considered an ancient university.

4.0   A research agenda

While some research has been done on the subject, several unanswered questions remain. First, research suggests that several UK universities (HEIs) have adopted and implemented Lean programs. There is a need to explore the experience of current implementers, the motivations for adopting Lean, and the process of Lean implementation. In this regard, the role of the 'soft' side of Lean management, such as the inhibitive or supportive role played by different actors (students, staff, management, regulators, government), is under-researched. Actor Network Theory can, potentially, provide a gateway for understanding the complexities surrounding Lean adoption and implementation within UK HEIs (Latour, 2005, Law and Hassard, 1999 and Papadopoulos et al., 2011).

Second, our understanding of how well the underlying philosophies of Lean transfer to UK HEIs is limited. There is a need to understand how institution-specific factors potentially impact on the nature of Lean implementation. This could, for example, be done by evaluating how the HEIs' orientation (Research versus Teaching-led) and background (Ancient, Red-Brick, Glass Plate and New) shapes its adoption of Lean. Organisational Learning Theory (OLT) is, perhaps, a suitable lens to explore this issue. OLT (see, de Geus, 1997, Alves et al., 2012) contends that a learning organisation is one with the capacity to learn from experience and develop over time, thus allowing for continuous improvement. Exploring Lean under this lens will necessitate an assessment of how soft elements such as leadership, strategy, culture, values, rules, norms support or inhibit the adoption of Lean principles.

Third, while we now know that some institutions have adopted Lean practices, to my knowledge, there are no studies evaluating the extent of Lean implementation. There is need to explore the level of Lean maturity (Lean maturity assessment) within these institutions and to identify factors that have moderated or stifled the attainment of Lean maturity within this context. This will necessitate the development of a bespoke Lean maturity scale suitable for assessing maturity attainment in the UK HEI context.

Fourth, to my knowledge no studies have assessed the impact of Lean programmes in this context. It is interesting to explore whether Lean has delivered its promise to implementing UK HEIs, perhaps, through increased efficiency, increased 'customer' satisfaction (e.g., better university ranking, higher National Student Survey performance), improvements in funds allocations by the UK government, higher income (for both Research and Teaching-led universities).

5.0 Conclusion

Clearly, research on Lean implementation in the 'third' sector, particularly in HE, is at its infancy. This paper suggests complexities and challenges involved in the adoption of Lean thinking in the context of UK HEIs. The unique contextual challenges range from institutional orientation and historical backgrounds to the length of the service life-cycle and the difficulty of identifying the end customer. Evidence of adoption of Lean in UK HEIs is provided and the

experience of some implementing organisations such as Cardiff University is highlighted. Finally, the paper sets out a research agenda by identifying research gaps in the area.

Second full conference paper

Title:

Lessons from Lean implementation in the UK Higher Education Institution

Abstract

Purpose

The relatively small number of studies exploring the adoption, implementation and success of Lean in the non-manufacturing, service and public sector setting have generally corroborated the argument for Lean implementation in such organisations. A few surveys have explored the recent adoption of Lean management in higher education institutions (HEIs). Evidence from these surveys suggest that the process of Lean implementation and experience across different UK institutions has been vastly different. Clearly, several unanswered questions remain. Mainly, there is a need to explore the experience of current UK HEI Lean implementers, the motivations for adopting Lean, the process of Lean implementation, the challenges of implementing Lean and the impact of implementing Lean in this context. In this regard, the role of the 'soft' side of Lean management, such as the impact of Lean on soft elements (such as employee working conditions and outcomes) is under-researched. In this study, we investigate the challenges facing HEIs implementing Lean and how Lean adoption has affected employee working conditions and outcomes (such as autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention).

Design/Methodology/Approach

Our study is an in-depth case study of one UK HEI which was an early adopter of Lean. As part of the study, we develop a bespoke interview protocol which focuses on five main areas: (1) background and motivation for Lean adoption in HEI, (2) objectives and challenges of Lean adoption, (3) Lean adoption strategy and scope, (4) experience on individual Lean projects, and (5) soft elements relating to Lean. Data was gathered through in-depth interviews with two Lean deployment managers and Lean (10) Lean project managers and Lean project team members/front-line staff. All interviews lasted between 50 minutes and 80 minutes. The interviewees were selected based on their extensive experience and involvement in multiple Lean projects. In addition to interviews, data was gathered through observations of Lean project environments [observations] and the review of several Lean project documents [archival sources]. We deploy the thematic analytical framework based on our interview protocol to analyse the data.

Findings

The results from this analysis shed light on the contextual benefits, challenges and impact of Lean implementation within this unique context. Some of the main benefits of Lean in the manufacturing, service and other public sector organisations documented in prior research are also shared by Lean HEIs. Nonetheless some of the challenges faced by Lean HEIs are unique. These include the difficulty of implementing Lean techniques in the areas of research and teaching and the challenge of bringing together previously (or culturally) autonomous units, departments and faculties.

Incidentally, while the evidence confirms it has led to efficiency in service provision, its impact on working conditions and outcomes of frontline staff is, perhaps, not fully understood even by deployment managers. Their view that Lean has had a positive impact on employees ' job satisfaction, motivation, and work related stress is not fully supported by employees. There is broad consensus that Lean improves the working environment and the psychological safety of employees but does not decrease employee workload within this context. Lean HEI is still in its early days. Hence, there is really no hard evidence beyond convincing conjectures that Lean has made a difference in implementing HEIs.

Relevance/Contributions

While some studies have been done on Lean in the third sector, limited attention has been paid to the soft-side of Lean - its impact on employee outcomes and working conditions. The results of

this study is central to our understanding of how Lean impacts on employee working conditions and outcomes including autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention. This is vital as many UK HEIs are now turning to Lean in response to government funding cuts to HEIs.

Keywords: Lean, Education, University, Interviews

Topic(s): Lean and Agile Operations, Operations in the Public Sector, Service Operations Management

1.0   Introduction

Universities are fundamentally organised for teaching and research (services) and this service must be provided in a way that guarantees optimal customer experience (measured by student satisfaction). As a consequence of the financial crises, the UK government has significantly reduced its funding of HE, instituting tuition fees which are borne by students. There is growing competition between institutions to attract students. There is now more impetus than ever to pursue efficiency in HE to minimise resource use (e.g., time) on processes which do not add value to the end customer.

There is consensus amongst researchers that most organisations adopting Lean practices have enjoyed a significant decline in inefficiency and waste, evidenced by improved performance, greater productivity, improved product and service quality, greater throughput, reduced costs of operations, smoother operations, lower waiting times and less fire-fighting, amongst others (Womack and Jones, 1996; Bhamu and Sangwan, 2014). Notwithstanding, prior research exploring Lean implementation and the benefits of Lean adoption focus on private sector, profit-making, and to a large extent, manufacturing companies (Chavez et al., 2013). The relatively small number of studies exploring the adoption, implementation and success of Lean in the non-manufacturing, service and public sector setting (e.g., Staats et al. 2011; Hadid and Mansouri, 2014; and Radnor et al., 2012) have generally corroborated the argument for Lean implementation in such organisations. A few surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005 and Fearn, 2010) have explored the recent adoption of Lean management in higher education institutions (HEIs). Evidence from these surveys suggest that the process of Lean implementation and

experience across different UK institutions has been vastly different (Fearn, 2010; Radnor and Bucci, 2011).

Clearly, several unanswered questions remain. Mainly, there is a need to explore the experience of current UK HEI Lean implementers, the motivations for adopting Lean, the process of Lean implementation, the challenges of implementing Lean and the impact of implementing Lean in this context. In this regard, the role of the 'soft' side of Lean management, such as the impact of Lean on soft elements (such as employee working conditions and outcomes) is under-researched. In this study, we explore the benefits and challenges of implementing Lean in the public sector by focusing on the implementation of Lean in the context of higher education. Further, we investigate how Lean adoption has affected employee working conditions and outcomes (including autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention).

The rest of our paper is organised as follows. We discuss the related literature in section 2.0, our research method in section 3.0 and present our findings in section 4.0. Concluding remarks are presented in section 5.0.

2.0   Literature Review

Lean emerged in the manufacturing sector as a radical alternative to Fordism (Holweg, 2007). The documented benefits of Lean promoted its transfer to the service sector as Lean service. Lean service is a relatively new concept when compared with the traditional notion of Lean manufacturing (Hadid and Mansouri, 2014). The literature on Lean service suggests that the benefit of Lean in the service industry are enormous, and amongst others include; eliminating waste and reducing costs, improving customer perception of the quality of the service, driving customer satisfaction, freeing staff time, improving employee performance, productivity and satisfaction, reducing staff turnover and absenteeism (Piercy and Rich, 2009; Hadid and Mansouri, 2014).

The public sector has traditionally been characterised by inefficiency, part of which is due to its key goal of providing essential services at no-to-low cost to the public, it's very large size, its political agenda, and the seemingly unavoidable bureaucratic nature of its activities. The status quo appears to be changing rapidly across many nations, as new governments are increasingly

banking on an agenda for change (as evidenced by campaign promises), one which promises to provide more for less by using tax payers' funds more efficiently to provide state of the art services.

The UK is a prime example of this emerging trend which has seen the adoption of Lean techniques across different public sector institutions. Radnor and Osborne (2013) trace the introduction of Lean in UK public services to 2001, when Lean initiatives were first adopted by the National Health Service (NHS). They note that that since 2006, such initiatives have been rolled out across several central government departments including HM Revenue and Customs, HM Court Services and the Department for Works and Pensions.

Today, the implementation of Lean methods in public services spans institutions including Health, Armed Forces & Defence, Policing, central government and local government, amongst others (Radnor and Bucci (2011). Radnor and Bucci (2011) note that the need to reduce cost and increase quality, government agendas, the threat of competition, the need for service expansion, the demand for more efficient services, and the struggle with performance indicators account for the recent surge in the adoption of business process improvement methods such as Lean.

This surge has not been without its challenges. Radnor and Osborne (2013), noted that, while there are several challenges surrounding the implementation of change programmes in public services, the following four challenges are unique to the implementation of Lean initiatives: An over-reliance on Lean workshops or rapid improvement events; a tool-kit type approach to Lean implementation, without an understanding of its underlying principles; public sector culture and structures (as impediments); a lack of understanding of the centrality of the customer and the service process to Lean implementation (p. 270).

The general message from Lean research in the public sector is mixed. Radnor et al (2012) provide two reasons why the public sector constitutes a special case. These include (1) the customer (residents) and commissioner (the government) are different hence 'customer value' becomes an unclear and conflicting concept. (2) Public services (such as healthcare) are capacity-led implying that demand cannot be easily influenced and excess capacity cannot be easily utilised (Radnor et al., 2012). This problem is shared by several HEI where several different stakeholders (e.g., government, students, donors, industry, employers, parents & sponsors and partners) can be considered as 'customers'.

Lean management appears to be a more 'foreign' concept in management of HEIs. Waterbury and Holm (2011), for example, argue that six major barriers (including language or terminology, lack of quality knowledge, time commitment, financial resources, lack of quality metrics and the absence of a formal reward system) account for slow adoption of Lean concepts in HEI.

Universities are, perhaps, institutions with very complex structures. Several universities are organised into faculties which are subdivided into departments and further into programs. Different programs sometimes pursue different projects which are run by autonomous teams. Universities also generally have different management bodies such as committees which oversea different cross-function/departmental/faculty projects. This creates a complex web around which different subcultures are likely to emerge. It is therefore interesting to explore the implementation and impact of Lean within such a context. A few studies have looked at Lean in higher education. Hines and Lethbridge (2008) discuss the adoption of Lean concepts by a UK and US university. They note that the University had just been through a recent merger and was reorganising to position its self as one of the global leaders in the sector. The goal of Lean adoption in this case was *'to enable internal and external users to value services as being timely, responsive and uncomplicated…encourage and support the creation of a vibrant working environment where people are confident to act and innovate and pursue perfection'* (Hines and Lethbridge, 2008, p. 53). The authors make several interesting conclusions. While they find that several staff were enthusiastic about the promise of Lean, they note that the academic environment was more resistant (or harder) to change than traditional Lean environments. For example, university staff members were uncomfortable with the idea of a 'customer' in the university setting. The research suggests that the resistance to change was more common in older universities, with strategic structures which are unfamiliar to rapid change.

There is evidence attesting to the success of Lean programmes in public services. Radnor and Osborne (2013), reviewing prior research, emphasised that the HM Revenue and Customs, for example, saved over £400 million from introducing a Lean initiative – its Pacesetter initiative. Nonetheless, the authors criticised this particular programme as *'…'picking the low hanging fruit (and windfalls!)' of public management reform'* (Radnor and Osborne, 2013, p. 275). Their central argument for this assertion is that, while making a saving is important in its own right, Lean is not primarily a cost-cutting strategy. Lean success should be measured in terms of the programme's

effectiveness in supporting or facilitating the delivery of end-outcomes to service users and the extent to which it improves the quality of life of such users.

In the next section, we discuss the methodology applied in this study.

3.0   Research method

This research aims to identify benefits and challenges of Lean implementation in the context of HE. Particularly, it seeks to explore the impact of Lean on employee working conditions and outcomes (including autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention). Limited research has been conducted on Lean in HE, hence, following Percy and Rich (2015), we adopt an exploratory approach. The absence of validated knowledge on Lean in HE, supports the use of a qualitative approach to explore complexities in this environment. Case studies have been extensively used as a method of enquiry in social science research (Yin, 2017) and in prior research on Lean (Piercy and Rich, 2015). Voss et al. (2002) provide guidance on the use of case studies as a research tool in social sciences. Their framework identifies six (6) stages of case study research including; (1) defining the research question, (2) selecting a suitable case, (3) developing a research or measurement instrument, (4) collecting data, (5) analysing the data, and (6) disseminating results. This framework has been used in Lean research (see, for example, Piercy and Rich, 2015).

Our research questions is stated as follows: *"What are the benefits and challenges of adopting Lean in a higher education context, and how does Lean adoption impact on employee working conditions and outcomes?"* As noted in the literature review, Lean is a relatively new concept in HE. Thus, to address this question, we identify a UK higher education institution which has considerable experience in implementing Lean. This UK HE institution (University X) has explicitly implemented Lean techniques across several projects in different business functions since 2006. Hence, consistent with Eisenhardt (1989) and Yin (2017), the selection of our sample is not random, but driven by our research question.

Table 1: Interviews, role, length of services and involvement in Lean projects

Interviewees (anonymized)	Position	Length of service	Capacity of Lean involvement
Respondent 1	Senior Consultant	10 years	Consultant
Respondent 2	Head of Change	13 years	Change manager
Respondent 3	Library Manager	20 years	Lean team member
Respondent 4	Finance Manager	5 years	Manager
Respondent 5	Library Manager	6 years	Project Leader
Respondent 6	Admin. Manager	26 years	Lean team member
Respondent 7	Business services	6 years	Lean team member
Respondent 8	Finance Manager	32 years	Project manager
Respondent 9	Procurement Manager	2 years	Manager
Respondent 10	Safety Manager	26 years	Lean team member
Respondent 11	Change Manager	9 years	Lean team member
Respondent 12	Portfolio manager	5 years	Facilitation of Lean events

Due to the nature of the study, we resort to using semi-structured interviews with Lean managers and Lean project team members to obtain information required to answer our research question. Our interview protocol focuses on five main areas: (1) background and motivation for Lean adoption in HEI, (2) objectives and challenges of Lean adoption, (3) Lean adoption strategy and scope, (4) experience on individual Lean projects, and (5) soft elements relating to Lean. Consistent with Piercy and Rich (2015), all interviews were tape recorded and transcribed immediately after the meeting. All interviews lasted between 50 minutes and 80 minutes. The interviewees were selected based on their extensive experience and involvement in multiple Lean projects. We adopted a snowballing sampling technique to identify suitable respondents. Here, we first contacted the Head of Change at University X who then identified and extended our invitation

to participate to Lean project managers and team members. We supplement the interview information set with data from archival sources (such as Lean project documentation) which allows us to build a fully picture of the underlying context. Our approach to analysing the data is discursive. Here, following Braun and Clarke (2006), we deploy the thematic analytical framework based on our interview protocol to explore recurring themes within the data. All interviewees have been involved in different Lean projects across the organisation.

4.0 Findings and Discussions

4.1 Background, motivation and benefits of Lean in HE

Like most UK HEI, University X has faced challenges due to dwindling government funding for HEIs and competition with the sector. University X has established itself as one of the UKs leading HEIs in terms of teaching quality and research output. Despite this success, internal processes and administration lagged behind, and hence there was a general drive for improvement. The desire to seek alternative ways of working at University X is also attributed to emergent challenges which came with the rapid growth in technology post-2000 and the increasing demand by stakeholders for technological solutions that can improve operational efficiency. Respondent 1 recalls being bombarded with requests for technological solutions from staff and departments. Some of such problems included dealing with backlogs. Rushing to a solution of technology without getting to the root cause of the problem meant that new problems were likely to emerge down the line. Lean was initiated in 2006 at University X after one of its managers attended a Lean conference and became aware of the benefits of Lean and its potential contributions to organisations. Lean provided an approach to identifying root cause of problems before finding a suitable solution to fix it. The strategy has been to use a Lean approach to redesign different processes within the institution. This was operationalized by empowering staff to find innovative ways to improve work process by allowing for more flexibility in decision making. For example, allowing decisions can be taken at a sublevel (management level) without necessarily bringing them forth to a board.

We find that the key benefits of Lean services (Piercy and Rich, 2015) and Lean health (Burgess and Radnor, 2012) are also shared by Lean HEIs. We keep our discussions here brief given the large body of research in this area. One of the key benefits of Lean recurrently cited by our

respondents is the fact that it improves cross-functional communication and promotes transparency within HE. This is consistent with Womack et al (1990) and Lamming (1993) who note that clear communications and transparency are fundamental to Lean operations. Universities traditionally have strong independent or autonomous organisational structures (departments, faculties, units) which are all involved in the delivery of the service but which may fail to communicate with each other. As suggested by respondents 1 and 2 (Lean managers), Lean allowed for a holistic process thinking approach in the delivery of the service (teaching and research) by breaking down barriers between different functions, departments, units etc. This contention is also shared by respondents who participated in Lean projects as team members. Overall, there was a consensus that Lean had contributed positively to the university, with respondent 1 describing their experience of adopting Lean as:

"...a non-zero sum game..., a win win win for everybody involved...staff are advantaged as they no longer have to undertake the burden of waste activity, customers get what they want and the university achieves this by using fewer resources".

The findings on benefits of adopting Lean in this context largely mirror those reported from other contexts. Nonetheless, the challenges faced in the context are unique, and hence, allows us to contribute to this literature.

4.2   Some challenges of implementing Lean in HEI

The challenges of implementing Lean in organisations has been documented in prior studies, hence, we focus on the unique challenges which face HEIs implementing Lean.

In discussions, respondents suggested that the structure of Universities and how they have traditionally been managed (i.e., autonomously run academic departments/schools and administrative areas), posed a major challenge to Lean implementation. While autonomously run, the customers (students) are serviced by these different units which might not be communicating with each other. The service can therefore be fragmented. Lean in HEIs aims to address this by promoting a systems view of the entire organisation

While Lean holds great promise, Respondents suggest that it is challenging to implement Lean approaches in the area of teaching and research. Respondent 1 suggested that the output of research

is different each time, hence it is challenging to standardize the underlying processes. In terms of teaching, there is the need to identify what processes can be standardized. On the issue of academic staff resistance to adopt Lean approaches (discussed in Radnor and Bucci, 2011) respondent 1 contend that academics are overly focus on their subjects without much appreciation or time to explore much else beyond. Nonetheless, they can be engaged, if they are made to understand that the purpose of Lean is to streamline their work so they can focus their efforts on teaching and research. The respondents notes:

"...creativity (in research) requires chaos, Lean can create the space to allow chaos to happen".

Lean can eliminate wasteful process, potentially freeing up time for academic staff to engage in more value-adding activities. While useful in this area, it is difficult to implement. Respondent 2 notes that:

"Lean might not be suitable for some areas such as academic. Implementation through rapid improvement events take time, typically 5 days. Academics are hardly available for the full five days".

Lean requires empowerment of employees to take control of their work and make continuous changes that will lead to improvement. Nonetheless, as noted by Respondent 1, the hierarchical nature of HEI means that:

"…employees are not always willing or comfortable to challenge their bosses".

Frequent changes in management (heads of academic departments) mean building and sustaining relationships need for Lean remains a challenge. As noted by Respondent 2, the solution has been for Lean leaders to:

"...build relationships with office secretaries as they turn to know more about what is going on within the school".

The next section focuses on soft elements relating to Lean.

4.3   Lean impacts on employee working conditions and outcomes

Due to space restrictions we do not fully discuss concepts such as motivation, job satisfaction, employee retention, autonomy, work-related stress, workload, psychological safety and working environment, within this paper as these concepts are frequently discussed in prior literature (see, Holden, 2011 for a review). The results from our 12 interviews with professionals involved in the implementation of Lean in one HEI are summarised in table 2 below.

Table 2: The soft-side of Lean: Summary results from interviews

Employee working conditions and outcomes	R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9	R 10	R 11	R 12
Improves employee motivation	Y	Y	N	Y	U	N	N	Y	N	N	Y	U
Improves job satisfaction	Y	Y	N	Y	U	N	N	Y	N	N	Y	U
Improves employee retention	Y	U	N	Y	U	N	N	Y	N	N	N	N
Increases employee autonomy	Y	Y	N	Y	N	U	N	Y	N	N	Y	Y
Reduces work related stress	Y	U	N	Y	U	Y	N	Y	N	Y	N	Y
Reduces workload	N	N	N	N	N	Y	N	N	N	N	N	N
Improves empl. psychological safety	Y	Y	N	Y	U	N	Y	Y	N	U	Y	U
Improves working environment	Y	Y	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
Notes: R1 to R12 indicates Respondents 1 to 12. Y indicates "YES", N indicates "NO", U indicates "UNCERTAIN"												

In general, the results suggest differences in perceptions between different parties involved in Lean projects. Particularly, we find that respondents with managerial positions (e.g., Lean project managers and consultants) are more likely perceive Lean as having a positive effect on employee working conditions compared to Lean project team members.

Effect on employee motivation

The respondents (Lean project managers) note that despite some resistance to Lean adoption, in the long-term employees are generally more motivated as a result of Lean. A respondent notes:

"Staff report they feel more motivated, they feel that their work is more manageable and they feel that they are better aligned to their customers and they enjoy doing that... Staff enjoy their work more, they feel more under control of that work and more able to do the right thing for the customer".

Lean team members on the other hand, contend that employee motivation is sometimes quelled when staff are empowered in principle but not in action. One respondent notes that:

"Staff are empowered to come up with solutions which when put forward are sometimes undermined by senior managers. This becomes very challenging for those staff, very demotivating and disengages them with the institution".

In support another respondent states:

"… it's been a few of the things that we haven't been able to complete that have led to frustrations… we spent that time, we invested that time…and senior management are meant to have bought into it and accept it but sometimes that didn't happen…"

Effect on employee satisfaction

Respondents at management level also suggest that Lean implementation has led to higher levels of staff satisfaction with the work they do. One respondent notes:

"...they [staff] are going to have the input, it is going to be their ideas, they themselves are going to be valued, respected. They are going to be something out of the ordinary day job, I think it is great for people."

While a number of team members do not feel that Lean implementation has changed satisfaction, they acknowledge that they now have more responsibility and voice in what happens at the workplace. One respondent notes:

"...it makes me happy…I feel like I have a voice…doing something good within that role, and actually I have more ownership of the work I was doing. It means making changes for which you can see the benefits".

Effect on employee Retention

Whilst there is no hard evidence that employee retention has increased, one respondent notes:

"I don't think people have taken to their heels to escape the university because of Lean. It may have been a contributing factor to some people staying rather than leaving because it suddenly made life more interesting for them and they may have felt more valued just a consequence".

Effect on employee Autonomy

Staff are empowered to take more ownership of the work they do by implementing Lean techniques at the local level. Hence, Lean adoption has potentially, increased the level of employee autonomy

within participating departments. One respondent notes that there are still issues with building employee confidence to a level that will allow and support full autonomous working. The respondent notes:

"So, if I looked at the training I ran this morning, people provide feedback sheets and I looked at them all. One of the areas for feedback was about how confident they were in terms of actually making changes in their area, you know, using some of those Lean tools. Many of the people had indicated somewhere in the middle reasonably confident or lower."

Effect on employee job-related stress

The effect on job related stress is mixed. One respondent notes:

"...Lean make things easier but it may raise stress in other areas because they [staff] might be thinking I have got to be thinking about something else, that is another process, we can improve. They might be a lot of stress around actually putting a new process in to place".

Another respondent contends that:

"Rapid improvement phase brings stress and anxiety as staff try to figure out how things should be done…Once the process is sorted. Stress levels go down as things improve".

A number of respondents contend that Lean has brought with it a culture of continuous performance measurement through the setting of targets, and this raises employee stress levels. A respondent notes:

"… previously it was stressful to see the number of books that were waiting to be done. And now it might feel stressful to have certain targets to meet. So, I think probably the kind of stress levels are about the same but for different reasons".

Effect on employee workload

Almost all interviewees agree that Lean does not decrease workload. Work loaded either increases of stays about the same. The contention is that even though workload increases, staff now do more interesting work, using more efficient methods. The time saved by avoiding waste is generally redeployed in other useful areas. This is clearly captured in the following statement made by one respondent:

"...if we stopped doing some of the things that we don't need to do because we stripped the waste out of the process, then the workload might go down. But what we are looking for is not to make the workload go down, we are looking to make sure we are doing the right thing...the workload of whoever is doing the wrong thing should go down. The actual workload itself would stay the same because in the time that they have saved...they can get on and do some other things."

Effect on employee psychological safety

The culture of measuring success in HE via positions in league tables and accreditations makes it difficult to convince stakeholders of the need for further efficiency in operations. A respondent recalls sustained efforts (including guarantees that Lean will not result in job losses) to dispel fear, suspicion and mistrust from employees when the Lean programme was initiated.

"...we have made Lean work quite successful in University [X] by providing an environment that is free from fear. People understand we are here primarily for process, we are here to give you tools and techniques, we are here to change culture but not about cutting costs, not about saving money, not about your job. It is about how can we make this university better than it is? And you know we need your help to go on that journey"

Other respondents agreed that Lean improves employee psychological safety through better team building and strengthened personal relationships across functions.

"...people are going get to know you. Because you are stuck with them in a room for five days [rapid improvement events] you kind of get to know something about them. You are going to form those relationships...you don't know X from accounts, you might have head of him but you spend four days in a room with him you get to know him. You get to know a bit about how he thinks, what he does, what motivates him, he becomes a person to you".

Employees become more aware of the role they play within the institution and how their contribution leads to overall success. They get to work with one another and begin to feel like an essential part of the whole institution.

Effect on working environment

Respondents note that there has been little change in physical working environment in most cases. Nonetheless, there have been substantial improvements in working relationships and communication since the implementation of Lean. Working relationships have improved as people

now work together on projects, communicate cross-departments and see upstream and downstream links with work done in other units. Another respondent notes a substantial reduction in silo mentality and blame culture which is has improved the overall working environment.

5.0   Concluding remarks

Lean HEI is a relatively new concept with few implementers to date. The fact that implementers do not have a point of reference remains a significant challenge, amongst others discussed in the paper. In our case study, we find that Lean leaders spend a lot of time educating stakeholders so that Lean can be self-driven. Other approaches of implementing Lean (e.g., by obligation) appear to have been met with much more resistance in this setting. One reason for this is general liberal culture (termed "academic freedom") in this context. Training events are used to share ideas on Lean tools and techniques. These events also bring together management and staff, allowing management to concede that staff have brilliant ideas, leading to empowerment down the line. Staff who are knowledgeable about Lean become more comfortable at constructively challenging management, ever seeking new ways to improve processes.

Some of the main benefits of Lean (e.g., improving customer satisfaction, increased efficiency etc.) in the manufacturing, service and other public sector organisations (such as the NHS) documented in prior research are also shared by Lean HEIs. Nonetheless some of the challenges faced by Lean HEIs are unique. These include the difficulty of implementing Lean techniques in the areas of research and teaching and the challenge of bringing together previously (or culturally) autonomous units, departments and faculties.

There are some differences in perceptions of Lean managers and Lean team members in terms of the benefits of Lean with HEI and its impacts on employee working conditions and outcomes. HEI managers seem to believe that Lean has had a positive impact on their employees in terms of job satisfaction, motivation, and work-related stress. This is however not fully supported by the views of the Lean team members. There is broad consensus that Lean improves the working environment and the psychological safety of employees but does not decrease employee workload. Lean HEI is still in its early days. Hence, there is really no hard evidence beyond convincing conjectures that Lean has made a difference in implementing HEIs.

Third full conference paper

Lean Higher Education and its impact on employee working conditions and outcomes.

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Abstract

Using a case-study approach, we investigate the impact of Lean implementation on working conditions and outcomes for higher education (HE) employees. While the evidence suggests Lean has led to efficiency in HE service provision, its impact on working conditions and outcomes of frontline staff is, perhaps, not fully understood by deployment managers. We find discrepancies in the perceptions of leaders and followers. Particularly, the view (of leaders) that Lean positively impacts on job satisfaction, motivation, and work-related stress is not held by followers. Both leaders and followers concede that Lean improves the working environment and psychological safety but does not decrease workload.

Keywords: Lean, Education, University, Interviews

1.0   Introduction

Prior research focusing on Lean manufacturing (e.g., Womack and Jones, 1996; Chavez et al., 2013; Bhamu and Sangwan, 2014) has established that Lean adoption in this sector generally leads to increased efficiency and effectiveness at operations and supply chain levels. Similar results have been reported by researchers (e.g., Staats et al. 2011; Hadid and Mansouri, 2014; and Radnor et al., 2012) looking at Lean in the non-manufacturing, service and public sector settings. Lean Higher Education (HE), particularly in the UK, has emerged as one of the potential solutions to address the changing landscape of UK HE funding challenges, with several institutions looking to Lean as a suitable improvement methodology. Several surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005 and Fearn, 2010) have consequently explored this with a focus on UK HE stakeholders' perception of Lean, the process of Lean implementation, as well as, the benefits and challenges of implementing Lean in this unique context. Notwithstanding, little is known about softside of Lean i.e., how employee characteristics shape Lean success and how Lean implementation impacts on employee working conditions and outcomes.

In this paper, we extend the literature by exploring the impact of Lean adoption on employee working conditions and outcomes in the HE setting, focusing on the perceptions of Lean team leaders (managers) and Lean team members (followers). These softer issues that affect Lean sustainability have been largely ignored by the literature. In more detail, we explore how Lean HE affects employee autonomy, workload, psychological safety, motivation, work-related stress, job satisfaction and retention, as perceived by employees themselves (Lean team members) and by implementing managers (Lean team leaders).

2.0   Literature Review

Lean in the public service sector

Prior research suggests that Lean adopters in the service sector benefit from waste elimination, cost reduction, improved customer perception of service quality, increased customer satisfaction, improved employee productivity, increased job satisfaction, reduced employee turnover and low absenteeism (Hadid and Mansouri, 2014). While the public service sector has traditionally been blighted by inefficiency, there are increasing calls (e.g., in the UK) for efficiency and effectiveness in the use of tax-payers' funds to provide these services (Radnor

and Bucci, 2011). Several challenges surrounding the implementation of change (e.g., Lean) programmes in public services have been documented (Radnor and Osborne, 2013) and the general message on whether Lean (as an improvement programme) can be successfully implemented in the public sector is mixed (Radnor et al., 2012).

Lean in Higher Education (HE)

While there is an extensive literature on Lean service, relatively few studies have explored Lean in the HE context. Waterbury and Holm (2011), for example, argue that six major barriers (including terminology, lack of knowledge, time commitment, resource constraints, lack of quality metrics and the absence of a formal reward system) account for slow adoption of Lean concepts in HE. Universities have very complex organisational structures – most are organised into faculties which are subdivided into departments and further into programs. Different programs sometimes pursue different projects which are run by autonomous teams. Most have a myriad of management bodies such as committees which oversea different cross-function/departmental/faculty projects. This creates a complex web around which different subcultures are likely to emerge (Hines and Lethbridge, 2008). A few studies have explored the recent adoption of Lean in the HE setting (Emeliani, 2005; Thomas et al., 2015; Hines and Lethbridge, 2008). While Hines and Lethbridge (2008) find that several HE staff were enthusiastic about the promise of Lean, they note that the academic environment was more resistant to change than traditional Lean environments. For Lean to be sustainable in this environment, it must, perhaps, have clear benefits for institutions and their employees.

The soft side of Lean

To our knowledge no prior study has looked at the soft side of Lean in HE, hence we seek to address this issue. Some prior research has explored employee-related impacts of Lean in the manufacturing industry (Womack et al., 1990; Rinehart et al., 1997; Parker, 2003; Lewchuk and Robertson, 1996; Treville and Antonakis, 2006). Parker (2003), for example, finds that Lean production implementation led to negative employee outcomes including reduced organisational commitment and increased job depression due to declines in perceived job autonomy, skill utilisation and participation in decision-making.

Divergence in team member (follower) – team leader perceptions

Several studies outside the Lean literature have highlighted the tendency for divergence in team member (or followers) and team leader perceptions of team performance even in the same task

(Miles and Mangold, 2002; Cogliser et al. 2009). Our paper focuses on the soft side of Lean looking at critical issues such as employee satisfaction, motivation, work-related stress, autonomy and psychological safety amongst others. Prior research suggests that leadership has a direct bearing on employee perceptions of these issues. For example, Banker et al. (1996), Armour (1997), Drexler and Forrester (1998) and Aeppel (1997) argue that team members are often dissatisfied or lose motivation due to underperforming colleagues, inadequate communication and conflict within their teams amongst others – issues over which team leaders exert direct control. Piczak and Hauser (1996) also emphasise the importance of team leaders in communicating group goals, resolving disputes and building consensus amongst members. It is therefore interesting to explore the impact of Lean of soft issues both from the perspective of leaders and followers. Any discrepancies or lack of consensus will highlight potential limitations to Lean sustainability in this environment.

3.0　Research Method

Our underlying research question is stated as follows: *"How does Lean adoption impact on employee working conditions and outcomes?"* As noted in the literature review, Lean is a relatively new concept in HE. Therefore, to answer our research question, we adopt an in-depth inductive case study approach (Eisenhardt, 1989; Voss et al., 2002). We start by identifying a UK HE institution which has considerable experience in implementing Lean. This UK HE institution (which we refer to as University X to maintain anonymity) has explicitly implemented Lean techniques across several projects in different business functions for over a decade. Hence, consistent with Eisenhardt (1989) and Yin (2017), the selection of our sample/case is not random, but driven by our research question.

Due to the nature of the study, we resort to using semi-structured interviews with Lean managers and Lean project team members to obtain information required to answer our research question (see Table 1 for information about our respondents). The respondents were selected based on their extensive experience and involvement in multiple Lean projects. We adopt a snowballing sampling technique to identify suitable respondents. Here, we first contacted the Head of Change at University X who then identified and extended our invitation to Lean project managers and team members. All respondents were actively involved in one or more Lean projects over the last 5 years. Table 1 provides some information about the 12 respondents in this study.

We develop a context-specific interview protocol to understand the impact of Lean on working conditions and outcomes of employees who experience Lean implementation in this institution. Our protocol required respondents to reflect on Lean projects which they were involved in as managers or as team members. Interviews lasted between 50 and 80 minutes, were tape recorded and then transcribed following the interviews. Consistent with Braun and Clarke (2006), we identify emerging themes and explore related stakeholder perceptions by analysing these narratives. We supplement the interview information set with data from archival sources (such as Lean project documentation) which allows us to build a complete picture of the underlying context. We analyse our transcripts and, for conciseness, we report only our main results in the next section.

Table 1– Respondents: Position, length of service and capacity of involvement in Lean projects.

ID	Position	LOS	Capacity of Lean involvement
1	Senior Consultant	10	Consultant
2	Head of Change	13	Change manager
3	Library Manager	20	Lean team member
4	Finance Manager	5	Manager
5	Library Manager	6	Project Leader
6	Administrative Manager	26	Lean team member
7	Business services Manager	6	Lean team member
8	Finance Manager	32	Project manager
9	Procurement Manager	2	Manager
10	Safety Manager	26	Lean team member
11	Change Manager	9	Lean team member
12	Portfolio manager	5	Facilitation of Lean events

Notes to Table 1: The first column provides the respondent's ID in order of how they were interviewed. The second column presents their position within the institution – University X. "LOS" in third column is the length of service in years. The final column details their capacity of involvement in Lean projects.

4.0   Results & Discussions

In this paper, we focus on exploring the impact of the implementation of Lean on employee working conditions and outcomes in University X. We identify several inter-related themes including (motivation, satisfaction, workload, stress, autonomy, retention, working

environment, psychological safety) and explore leaders' and followers' perceptions on how Lean impacts these different themes in relation to specific Lean projects carried out at University X. In our primary analysis, we use a simple classification scheme to summarise respondents' perceptions into three (3) categories; YES, NO and UNCERTAIN. For example, with respect to the theme "Motivation", we summarise each respondent's perception on whether Lean "improves employee motivation" into the three categories based on their position and the arguments they present during the interview. We then calculate the percentage of respondents who share the same perception.

Impact of Lean on working conditions and outcomes: Survey results

Figure 1 presents summary results from 12 interviews exploring the impact of Lean on softer issues at University X. The results show that over 92 percent of respondents perceive an improvement in the working environment due to Lean implementation. We also see that a high proportion of respondents believe that Lean improves psychological safety in the workplace (50 percent), reduces work-related stress (50 percent) and increases employee autonomy (50 percent). From the summary results, there is no evidence that Lean impacts on employee motivation or job satisfaction. We find that Lean does not lead to a reduction in work loads. From our interview transcripts, we see a clear distinction between responses provided by leaders versus those provided by followers, and hence, we explore this in our analyses.
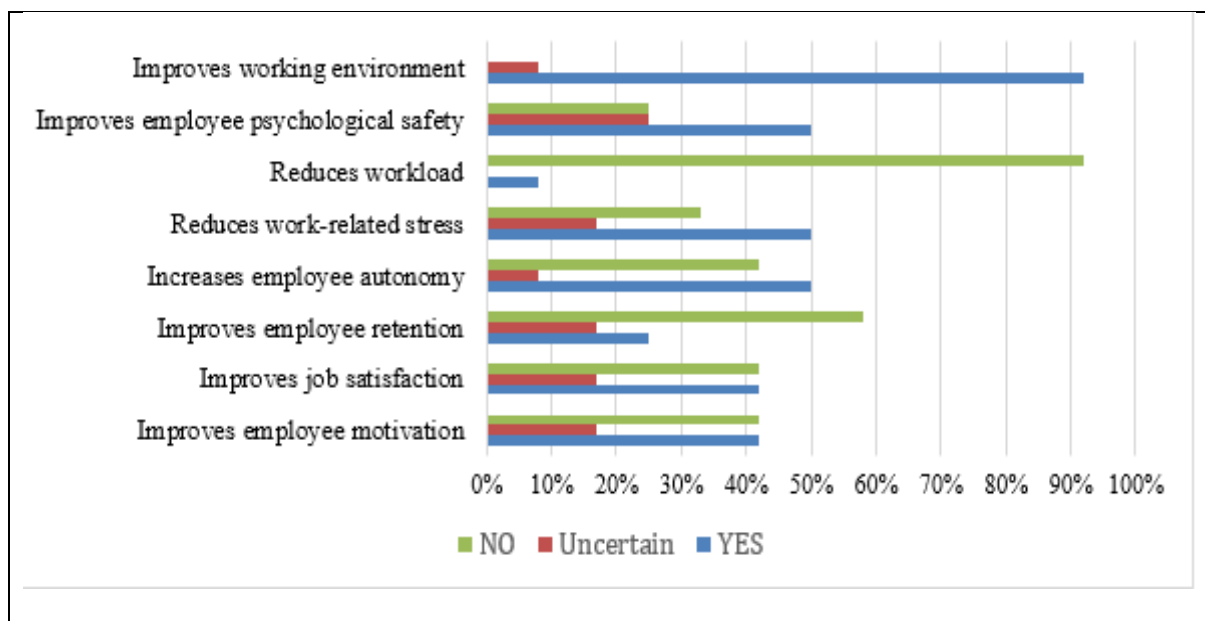
Figure 1– Summary results from interviews

Table 2– Perception of managers versus team members

Panel A: Managers

Respondent	1	4	2	5	8			%Y	%U	%N
Improves employee motivation	Y	Y	Y	U	Y			80%	20%	0%
Improves job satisfaction	Y	Y	Y	U	Y			80%	20%	0%
Improves employee retention	Y	Y	Y	U	Y			80%	20%	0%
Increases employee autonomy	Y	Y	Y	N	Y			80%	0%	20%
Reduces work-related stress	Y	U	Y	U	Y			60%	40%	0%
Reduces workload	N	N	N	N	N			0%	0%	100%
Improves psychological safety	Y	Y	Y	U	Y			80%	20%	0%
Improves working environment	Y	Y	Y	Y	Y			100%	0%	0%

Panel B: Team members

Respondent	3	6	7	9	10	11	12	%Y	%U	%N
Improves employee motivation	N	N	N	N	N	Y	U	14%	14%	71%
Improves job satisfaction	N	N	N	N	N	Y	U	14%	14%	71%
Improves employee retention	N	N	N	N	N	N	N	0%	0%	100%
Increases employee autonomy	N	U	N	N	N	Y	Y	29%	14%	57%
Reduces work-related stress	N	Y	N	N	Y	N	Y	43%	0%	57%
Reduces workload	N	Y	N	N	N	N	N	14%	0%	86%
Improves psychological safety	N	N	Y	N	U	Y	U	29%	29%	43%
Improves working environment	U	Y	Y	Y	Y	Y	Y	86%	14%	0%

Notes to table 2: The table summarises responses from 12 respondents (1 - 12) on their perceptions of the impact of Lean on working conditions and outcomes. Y indicates "YES", N indicates "NO", U indicates "UNCERTAIN", M indicates "MANAGER", T indicates "TEAM MEMBER". %Y, %U and %N provide a percentage of Y, U and N, respectively, for each working condition/outcome.

In table 2, we explore how respondent perceptions are shaped by the respondent's role (leader or manager versus followers or team members) in the team. The colour codes in the table 2 show clear disparities in perceptions of leaders (panel A) and followers (panel B). Panel A shows that managers generally have a positive perception (colour green) about the impact of Lean on employee working conditions and outcomes. For example, at least 80 percent of managers believe that Lean improves motivation, satisfaction, employee retention, employee autonomy, psychological safety and the working environment. In contrast, panel B shows that team members have a negative perception (colour pink) about the impact of Lean on employee working conditions and outcomes. Less than 15 percent of followers believe that Lean improves motivation, satisfaction and retention. There is a consensus on perceptions relating to workload and the working environment – most respondents agree that Lean improves the working environment but does not reduce workload. We provide some context to these summary responses in table 3 below.

Table 3 – How Lean impacts on HE employee working conditions and outcomes.

Soft factors and summary results	Leaders Perception:	Team Members perception
Employee motivation & satisfaction. 42 percent of respondents agreed that Lean had improved employee motivation as well as employee satisfaction but an equal proportion of respondents disagreed. The remaining 17 percent of respondents were unsure about Lean's impact on employee motivation in the projects they were involved in.	Despite some resistance to Lean adoption, 80 percent of managers agree that, in the long-term employees are generally more motivated because of Lean *"Staff report they feel more motivated, they feel that their work is more manageable and they feel that they are better aligned to their customers and they enjoy doing that... Staff enjoy their work more, they feel more under control of that work and more able to do the right thing for the customer".* *"...they [staff] are going to have the input, it is going to be their ideas, they themselves are going to be valued, respected. They are going to be something out of the ordinary day job, I think it is great for people."*	Only 14 percent of staff perceived that Lean had a positive impact on motivation. Staff noted that motivation is sometimes quelled when they are empowered in principle but not in action. *"Staff are empowered to come up with solutions which when put forward are sometimes undermined by senior managers. This becomes very challenging for those staff, very demotivating and disengages them with the institution".* *"... it's been a few of the things that we haven't been able to complete that have led to frustrations... we spent that time, we invested that time...and senior management are meant to have bought into it and accept it but sometimes that didn't happen..."*
Employee autonomy 50 percent of respondents agree that Lean improves employee autonomy, 42 percent disagree, while 8 percent were uncertain.	80 percent of managers agreed that Lean increases employee autonomy, as opposed to 20 percent who disagreed. The agreeing managers highlighted issues with building employee confidence to a level that will allow and support full autonomous working. *"So if I looked at the training I ran this morning, people provide feedback sheets and I looked at them all. One of the areas for feedback was about how confident they were in terms of ...making changes in their area, ..., using some of those Lean tools. Many people had indicated somewhere in the middle reasonably confident or lower."*	29 percent of staff agreed that Lean led to more staff autonomy while 57 percent disagreed. Staff who agreed noted that they are empowered to take more ownership of the work they do by implementing Lean techniques at the local level. *"...it makes me happy...I feel like I have a voice...doing something good within that role, and actually I have more ownership of the work I was doing. It means making changes for which you can see the benefits".*
Work-related stress 55 percent of respondents agree that Lean reduces job-related stress, 33 percent disagree and 17 percent were uncertain.	60 percent of managers perceived that Lean reduced work-related stress while 40 percent were uncertain. Mangers generally argued that the impact varies by individual staff (personality traits) and work involved. *"...Lean make things easier but it may raise stress in other areas because they [staff] might be thinking I have got to be thinking about something else, that is another process, we can improve. They*	43 percent of team members perceived a decline in work-related stress due to Lean while 57 percent believe this is not the case. In general, the respondents noted that Lean had brought a culture of continuous performance measurement through the setting of targets, and this raised employee stress levels. *"... previously it was stressful to see the number of books that were*

	might be a lot of stress around actually putting a new process in to place". *"Rapid improvement phase brings stress and anxiety as staff try to figure out how things should be done...Once the process is sorted. Stress levels go down as things improve".*	*waiting to be done. And now it might feel stressful to have certain targets to meet. So. I think probably the kind of stress levels are about the same but for different reasons".*
Workload 92 percent of respondents contended that Lean does not increase employee workload. In the sub-sample of managers, all managers (100 percent) agreed that Lean does not increase workload. Just 14 percent of team members thought workloads increased because of Lean.	All managers agreed that Lean does not reduce workloads. In general, they argue that, even though workload increases, staff now do more interesting work, using more efficient methods. The time saved by avoiding waste is generally redeployed in other useful areas. *"...if we stopped doing some of the things that we don't need to do because we stripped the waste out of the process, then the workload might go down. But what we are looking for is not to make the workload go down, we are looking to make sure we are doing the right thing...the workload of whoever is doing the wrong thing should go down. The actual workload itself would stay the same because in the time that they have saved...they can get on and do some other things."*	86 percent of team members also agreed that Lean does not lead to a reduction in work loads. 14 per cent perceived a reduction of their work load as a result of Lean. *"...I don't think it [Lean] would have affected my workload. Since we did Lean, I have taken on a supervisory role. Previously, I didn't have to look to meet targets and plan my work in the same way. Now that I have a supervisory role, I have to do more in terms of work planning and allocation."*
Psychological safety 50 percent of respondents thought Lean had a positive impact on psychological safety in the work place. The remaining 50 percent whether either uncertain or believed Lean had a negative impact on employee psychological safety.	The culture of measuring success in HE via positions in league tables and accreditations makes it difficult to convince stakeholders of the need for further efficiency in operations. 80 percent of managers agreed that Lean improved psychological safety while 20 percent were uncertain. One respondent recalls sustained efforts (including guarantees that Lean will not result in job losses) to dispel fear, suspicion and mistrust from employees when the Lean programme was initiated. *"...we have made Lean work quite successful in University [X] by providing an environment that is free from fear. People understand we are here primarily for process, we are here to give you tools and techniques, we are here to change culture but not about cutting costs, not about saving money, not about your job. It is about how can we make this university better than it is? And you know we need your help to go on that journey".*	29 percent of team agreed and 43 percent disagreed that Lean improves employee psychological safety. Lean improves employee psychological safety through better team building and strengthened personal relationships across functions. Employees become more aware of the role they play within the institution and how their contribution leads to overall success. They get to work with one another and begin to feel like an essential part of the whole institution. *"...people are going get to know you. Because you are stuck with them in a room for five days [rapid improvement events] you kind of get to know something about them. You are going to form those relationships...you don't know X from accounts, you might have head of him but you spend four days in a room with him you get to know him. You get to know a bit about how he thinks, what he does, what motivates him, he becomes a person to you".*
Working environment	Overall, all team leaders perceived a positive impact on the working environment due to Lean. There has been	86 percent of team members agreed that Lean led to improved working environment while no staff

	little change in physical working environment in most cases. Nonetheless, there have been substantial improvements in working relationships and communication since the implementation of Lean. There is a substantial reduction in silo mentality and blame culture which has improved the overall working environment.	disagreed. Working relationships have improved as people now work together on projects, communicate cross-departments and see upstream and downstream links with work done in other units.
None of the respondents perceived that Lean had a negative impact on the working environment. 92 percent of respondent contended that Lean positively impacted on the working environment.		

In additional analysis, we also explore whether the length of service affects the perception of team members with regards to the impact of Lean implementation but do not find any evidence that this is the case.

Discussion of survey results

Our results call into question the assertion that Lean positively impacts on employees (Womack et al, 1990; Brown and O'Rourke; 2007) and is consistent with studies such as Lewchuk and Robertson (1996), Sterling and Boxall (2013), Conti et al., (2006) which also finds that employee working conditions did not necessarily improve due to Lean implementation. Conti et al., (2006), for example, find that while Lean is not inherently stress inducing, but stress arises from how Lean implementation is managed. Our results complement Conti et al. (2006) by suggesting that the source of employee stress changes from stress of getting the job done to stress of meeting targets and deadlines. Our findings on workload – workload does not decrease due to Lean – support Lewchuk and Robertson (1996) who find that Lean led to faster work and increasing workloads. Consistent with Vidal (2007), our evidence does not support arguments that Lean leads to higher employee motivation and job satisfaction. Our results on disparities in Lean perceptions between team leaders and managers are new in the literature – hence our key contribution. This mirrors findings outside the Lean research area (Miles and Mangold, 2002; Cogliser et al. 2009). Our results suggest the, potential, existence of a communication gap or lack of appropriate feedback loops or mechanisms to address employee-related issues when Lean is implemented. Addressing this issue is clearly critical for Lean sustainability.

5.0   Conclusions

Summary of results

The results from this research provide new insights into the how Lean adoption impacts, particularly, frontline staff, in the context of UK HE. As expected, Lean HE generally leads to improvements in employee autonomy, psychological safety, the quality of the non-physical working environment and employee satisfaction. The impact on employee motivation appears to be dependent on the extent to which employees are empowered to take responsibility and develop solutions for the work they do. Interestingly, while our research reveals that Lean HE has a limited impact on overall worker job stress, we find that the nature of job stress is altered from one type of stress (e.g., the stress associated with heavy workloads) to another (the stress of meeting targets) by Lean adoption. We also find that Lean does not decrease employee workload, as time saved through process improvements is redeployed into performing more useful tasks. Most importantly, we find several discrepancies between the perceptions of Lean team leaders and team members suggesting that the impact of Lean on the working conditions of frontline staff is, perhaps, not fully understood by deployment managers. In general, managers perceive that Lean has an overall positive impact on employee working conditions and outcomes but team members do not perceive that Lean has such an impact.

Concluding remarks

Lean HE has been posited as the path to efficiency improvement in the UK HE and hence, has gained significant traction over the last decade. Nonetheless, research on the state, impact and progress of Lean HE has lagged. To our knowledge, this is the first study exploring the impact of Lean on employee working conditions and outcomes in the UK HE setting. Further, this study explores the perceptions of two key groups of stakeholders directly involved in the deployment process. The study raises some concerns about differences in the perceptions of key stakeholders on the impact of Lean. Given the importance of communication in successful Lean implementation, this finding generates new questions about the nature of Lean deployment in this context. This research is vital as part of efforts to promote sustainability of continuous improvement initiatives in the UK HE sector.

Disparities in Lean leader-team member perceptions and Lean sustainability in the UK higher education setting.

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Keywords: Lean sustainability, Higher Education, Leader, Team member

Purpose

Evidence from the manufacturing sector (Womack and Jones, 1996; Chavez et al., 2013; Bhamu and Sangwan, 2014), as well as, the service and public sectors (Hadid and Mansouri, 2014; and Radnor et al., 2012) suggests that Lean adoption leads to increased efficiency and effectiveness at the operations and supply chain levels. The Global Financial Crises and resulting funding challenges in the UK has led to (1) a reduction in government funding for higher education institutions (HEIs), (2) higher tuition fees (3) rivalry between HEIs to attract students and boost revenues (4) a strong drive to increase efficiency and improve value within the education section. Lean Higher Education (HE), particularly in the UK, has emerged as one of the potential solutions to address the changing landscape of UK HE funding challenges, with several institutions looking to Lean as an efficiency improvement methodology. A number of surveys (e.g., Radnor and Bucci, 2011; Emiliani, 2005 and Fern, 2010) have consequently explored this with a focus on UK HE stakeholders' perception of Lean, the process of Lean implementation, as well as, the benefits and challenges of implementing Lean in this unique context.

This study contributes to this debate by exploring the impact of Lean adoption on employee working conditions and outcomes in the HE setting. The study explores Lean's impact on soft elements in the HE workplace including; employee autonomy, workload,

psychological safety, motivation, work-related stress, job satisfaction and retention. These softer issues have been largely ignored by the literature. The study addresses these issues in a comprehensive manner by exploring perceptions of both team leaders and team members. Finally, the study considers how, disparities in perceptions, if any impact on Lean sustainability within this environment.

Design/Methodology/Approach

We adopt an in-depth inductive case-study approach (Eisenhardt, 1989), collecting data through interviews with respondents from UK universities. The interviews were carried out in two phases. The first phase constituted a pilot study. Here, 12 interviews (50-80 minutes) were conducted with Lean professions at one University—an early adopter of Lean. The interviews explored Lean's impact on employee working conditions and outcomes. The second phase involved interviews (30-40 minutes) with 45 Lean professionals from 7 universities. The professionals in both phases included consultants, HR managers, change managers, funding managers, Lean leaders, team members and project managers, amongst others. The pilot study was critical in fine-tuning the interview protocol, as well as, identifying emerging themes for follow-up. The second phase focused on three key questions, the extent to which Lean has been adopted, how affects employee working conditions and outcomes indirectly by transforming work structures and processes and, how Lean affects employee outcomes directly independent of changes to work structures and processes. The interviews were recorded and later transcribed for analyses. Consistent with Braun and Clarke (2006), emerging themes were identified and explore by analysing narratives through the lens of Sociotechnical Systems Theory.

Findings

The study provides new insights into the how Lean adoption impacts, particularly, frontline staff, in the context of UK HE. As expected, Lean HE generally leads to improvements in autonomy, psychological safety, the quality of the non-physical working environment and employee satisfaction. The impact on motivation appears to be dependent on the extent to which employees are empowered to take responsibility and innovate. Interestingly, while Lean's impact on overall worker job stress is limited, Lean appears to alter the nature of job stress (i.e., from heavy workloads to meeting targets). Further, Lean does not decrease employee workload, as time saved through process improvements is redeployed into performing more useful tasks. Importantly, several discrepancies between the perceptions of team leaders and team members suggest that the impact of Lean on the working conditions of

frontline staff is, perhaps, not fully understood by deployment managers. These discrepancies are further explored in the second phase.

Relevance/Contributions

Lean has been posited as the path to efficiency improvement in the UK HE and hence, has gained significant traction over the last decade. Nonetheless, research on the state, impact and progress of Lean HE has lagged behind. This is, perhaps, the first study exploring the impact of Lean on employee working conditions and outcomes in the UK HE. Further, this study explores the perceptions of two key groups of stakeholders; leaders and members. The study raises some concerns about differences in the perceptions of key stakeholders on the impact of Lean. Given the importance of communication in successful Lean implementation, this finding generates new questions about the nature of HE Lean deployment. This research is vital in promoting sustainability of Lean in UK HE.

APPENDICES

Appendix A – Informed Consent forms

Cardiff Business School
Cardiff University

Ysgol Fusnes Caerdydd
Prifysgol Caerdydd

Informed Consent Declaration – For Research Participants

This study is being conducted by Nouf Alqurashi, PhD Student at Cardiff Business School and Cardiff University under the supervision of Dr. Maneesh Kumar (kumarm8@cardiff.ac.uk) and Dr Robert Mason (masonrj@cardiff.ac.uk) who can be contacted via their respective email addresses.

Participation in the research project will involve an interviewer administered face-to-face semi-structured interview attempting to explore Lean implementation in the context of UK higher education.

Participation in the study is entirely voluntary and participants can withdraw from the study at any time without giving a reason. Participants may also ask questions at any time and discuss any concerns with either the researcher (Alqurashiny@cardiff.ac.uk) or the supervisors as listed above.

The findings of the study will form part of Nouf's PhD thesis at the Cardiff Business School.

All information provided during the interview will be held anonymously so that it will not be possible to trace information or comments back to individual contributors. Information will be stored in accordance with the current Data Protection Act.

Participants can request information and feedback about the purpose and results of the study by applying directly to the researcher Alqurashiny@cardiff.ac.uk.

23rd July 2017
Researcher – Nouf Alqurashi, PhD Student
Cardiff Business School
Cardiff University

CARDIFF BUSINESS SCHOOL
RESEARCH ETHICS

Consent Form

This project aims to explore the current state of Lean implementation in UK higher education. The project also investigates how lean adoption impacts on employee working conditions (including employee autonomy, workload, psychological safety, motivation, work related stress, job satisfaction and retention). The findings will be presented in a final PhD thesis and disseminated through conference papers and published journal articles.

I understand that my participation in this project will involve a face-to-face interview (with open-ended questions) exploring my experience of lean at my current institution. The interview will require approximately 50 to 60 minutes of my time.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason.

I understand that I am free to ask any questions at any time. If for any reason I have second thoughts about my participation in this project, I am free to withdraw or discuss my concerns with Dr. Maneesh Kumar (kumarm8@cardiff.ac.uk) or Dr Robert Mason (masonrj@cardiff.ac.uk).

I understand that the information provided by me will be held confidentially and securely, such that only the researcher and her supervisors (Dr. Maneesh Kumar and Dr Robert Mason) can trace this information back to me individually. The information will be retained for up to one year and will then be anonymised, deleted or destroyed. I understand that if I withdraw my consent I can ask for the information I have provided to be anonymised/deleted/destroyed in accordance with the Data Protection Act 1998.

I, _____ (*NAME*) consent to participate in the study conducted by Nouf Alqurashi (Alqurashiny@cardiff.ac.uk, PhD student) of Cardiff Business School, Cardiff University, under the supervision of Dr. Maneesh Kumar and Dr Robert Mason. I also consent to the audio recording of the interview.

Signed:

Date:

Appendix B – Draft invitation to participate in research

Dear….

I am Nouf Alqurashi, a PhD student from the Cardiff Business School at Cardiff University. We met at the Lean Conference at Stirling in November 2016. I noted that I am researching on Lean Management and will like to document your experience of the application of Lean Management principles in Higher Education in the UK. My research is supervised by Dr. Kumah Maneesh (Reader in Service Operations, Cardiff University) and Dr. Robert Mason (Senior Lecturer in Logistics, Cardiff University). Given your position, interest and knowledge on the subject, I will very much like to have a short (about 50-60 mins) interview with you on this subject, as part of my PhD research project.

As noted earlier, my research is on Lean management in UK Higher Education. During the interview, I will be seeking responses to help me answer my two main research questions. My first research question is; What is the current state of Lean implementation in UK HE? Within this topical issue, I will be exploring (1) the background (& motivation) for Lean adoption at the University of   (2) your perceptions of Lean (3) the benefits of Lean at your institution, and (4) the challenges you face while implementing Lean.

My second research question is: How does Lean adoption impact on employee working conditions and outcomes? Here I will be exploring how Lean generally impacts on employee motivation, job satisfaction, workloads, retention, work-related stress, autonomy and the working-environment.

If you kindly agree to be interviewed, I am happy to schedule the interview at your earliest convenience and at a location and time which works for you. As part of my research focuses on the soft side of Lean implementation, I will be grateful if accorded the opportunity to talk to some of your staff who have been directly involved or affected by these projects. Noteworthy is the fact that all information obtained as part of this project (particularly your identity and that of your institution) will be anonymised and will remain confidential, only shared with my research supervisors.

Thank you very much for your help and I look forward to your response.

Kind regards,

Nouf Alqurashi

Appendix C – Pilot & Initial study: Interview protocol (leaders and managers)

Section A: Opening/Introduction

Thank you very much for agreeing to participate in this study. I am Nouf Alqurashi, a PhD student at Cardiff University. My PhD thesis is supervised Dr. Maneesh K and Dr Robert Mason, who have been in contact with you.

Just to recap on the background of the study – which I did include in the invitation letter. The study is on Lean management in UK Higher Education, which is arguably a very broad subject. My focus is really on the soft elements relating to Lean. Here, I am exploring how issues such as culture, values, customs, beliefs, motivation, job satisfaction, autonomy, workload, psychological safety, stress, knowledge and experience, amongst others, impact on Lean implementation efforts or are impacted by Lean implementation in the context of UK Higher education. Over the last couple of months, I have reviewed literature and cases of Lean adoption in UK HE. I came across the University X as one of the early adopters of Lean, and found that the University has adopted Lean across many different areas/projects, hence my interest in talking to you about this experience. This is really a pilot study, and my aim is to gather some information and gain some insight about your experience with Lean implementation at St Andrews. I am hoping this interview will go on for about an hour.

I would like to tape record it so that it can be transcribed for further analysis at a later stage. I can confirm full confidentiality and anonymity of your responses. For example, you will be referred to as Senior manager at University A, unless you prefer disclosure. Transcripts or recordings will not be passed on to any third party and will only be reviewed by my Supervisors and I. I will send you a copy of the transcript for you to make any corrections or add any information you may wish to further disclose. I will also send you a copy of the final report when it is written. Please, do feel free to end the interview at any time.

Please, sign the following document to confirm informed consent (i.e., you are happy with participating in this study) before we proceed.

[Interviewee will then be handed the consent form to read and sign]

Question 1:	I suppose the obvious place to start will about you and your background. Can you briefly tell me about yourself, your current job and your working experience?	
Section B: Background and Motivation for adopting Lean		
Question 2:	I have read on your website about the story behind Lean adoption at St Andrews. My question is why "Lean" why not, for example, "six sigma" or "TQM"?	Add on: Have you experimented with these other initiatives?
Question 3:	This university has been around for centuries. Why adopt Lean now? What were some of the motivations for focusing on continuous improvement?	Add on: Was there any particular critical incident that necessitated Lean adoption?
Section C: Objectives and challenges of Lean adoption		
Question 4:	In your view, what is Lean? What are its grounding principles or objectives and how do they translate to the business of University education?	Add on: Do you think Lean and Higher Education are a good fit?
Question 5:	On a broader scale, what are some of the key objectives of Lean adoption? Are these in response to any internal and external challenges faced by the University?	Add on: How is the initiative linked to the University's strategy or other initiatives?
Section D: Lean adoption strategy and scope		
Question 6:	From looking at your website, I understand the approach to Lean adoption here has been project-based, one project at a time. I think, in one of your presentations, you describe this as "The Organic Growth" as opposed "Management Led". What are some of the factors that motivated such an approach?	Add on: How are the projects selected?
Question 7:	Do you think there are some areas within the University for which Lean might be inappropriate or for which Lean is less suitable? Why?	Add on: Do you think other methods of process improvement might work best here?
Question 8:	From what you publish on your website, for example, my understanding is that there has been no adoption of Lean in the area of teaching and research? What do you see as some of the challenges of implementing Lean in the "classroom" i.e., teaching and research?	Add on: Do you ever see Lean being implemented in Teaching & Research?
Section E: Experience on individual Lean projects		
Question 9:	Just thinking about any of your Lean projects (e.g., Careers Student Survey or the Summer Rebuild of Classroom Equipment projects), besides process improvements enjoyed by the end customer, what improvements or benefits did staff experience?	
Question 10:	What were some of the challenges faced by staff when adopting Lean?	Add on: How did you deal with these?
Question 11:	In all these Lean implementation projects, did you experience any resistance from staff involved?	Add on: How did you manage these?
Question 12:	In one of your presentations, you highlight the importance of "changing culture in a positive way" for Lean to work. In your experience, what were some of the cultural impediments to Lean adoption?	Add on: How did you overcome these?
Section F: Soft elements relating to Lean		
I am keen to understand how Lean adoption directly or indirectly impacts on several soft elements in the work place and the channels through which this occurs.		
Question 13:	Reflecting on any of the Lean projects you have completed in the past, were there any noticeable or quantifiable effects, direct or indirect, on (1) staff retention, (2) employee job-related stress (3) employee job satisfaction (4) employee motivation (5) employee autonomy	To follow on with each of the following soft elements:

	(6) employee workload as a direct result of Lean adoption?	
Section G: Closing the interview		
Question 14:	Where do you see Lean at your university in the future?	Add on: do you see Lean going beyond University administration and operations management into areas such as teaching and research?
Question 15:	You have been at this university even before Lean initiatives were introduced. Can you say that there have been a cultural shift since Lean adoption? In what ways?	
Question 16:	In hindsight, do you think adopting Lean was the best course of action for this institution?	Add on: What tweaks would you have made if you could go back in time?
Thank you very much for your time. It has been a great learning experience for me. Are you okay for me to get back to you to seek clarifications by email?		

Appendix D – Pilot & Initial study: Interview protocol (team members)

Section A: Opening/Introduction

Thank you very much for agreeing to participate in this study. I am Nouf Alqurashi, a PhD student at Cardiff University. My PhD thesis is supervised Dr. Maneesh K and XX, who have been in contact with you.

Just to recap on the background of the study – which I did include in the invitation letter. The study is on Lean management in UK Higher Education, which is arguably a very broad subject. My focus is really on the soft elements relating to Lean. Here, I am exploring how issues such as culture, values, customs, beliefs, motivation, job satisfaction, autonomy, workload, psychological safety, stress, knowledge and experience, amongst others, impact on Lean implementation efforts or are impacted by Lean implementation in the context of UK Higher education. Over the last couple of months, I have reviewed literature and cases of Lean adoption in UK HE. I came across the University X as one of the early adopters of Lean, and found that the University has adopted Lean across many different areas/projects, hence my interest in talking to you about this experience. This is really a pilot study, and my aim is to gather some information and gain some insight about your experience with Lean implementation at St Andrews. I am hoping this interview will go on for about an hour.

I would like to tape record it so that it can be transcribed for further analysis at a later stage. I can confirm full confidentiality and anonymity of your responses. For example, you will be referred to as Project participant at University A, unless you prefer disclosure. Transcripts or recordings will not be passed on to any third party and will only be reviewed by my Supervisors and I. I will send you a copy of the transcript for you to make any corrections or add any information you may wish to further disclose. I will also send you a copy of the final report when it is written. Please, do feel free to end the interview at any time.

Please, sign the following document to confirm informed consent (i.e., you are happy with participating in this study) before we proceed.

[Interviewee will then be handed the consent form to read and sign]

Question 1:	I suppose the obvious place to start will about you and your background. Can you briefly tell me about yourself, your current job and your working experience?	
Question 2:	Can you tell me in what capacity you were involved in Lean projects at this University? i.e., what was your role?	Add on: What did these projects involve? How long did they take?
Question 3:	How as your involvement in this project initiated?	Add on: Was it compulsory for you to become involved as part of your job or was it a choice?
Question 4:	Does this affect your perception of the whole process of Lean implementation?	
Question 5:	Just thinking back to the time what the project was initiated, did you have any major concerns about the adoption of Lean in your department?	Add on: What were these?
Question 6:	Do you think your concerns were shared by other staff?	
Question 7:	Has the adoption of Lean impacted on your decision to stay at this job?	Add on: Are you more likely to stay at this job since the implementation of the Lean project?
Question 8:	How has the adoption of Lean affected your workload?	
Question 9:	How has the implementation of Lean affected the amount of autonomy you get in your work?	
Question 10:	How has the adoption of Lean affected the stress levels relating to your job?	
Question 11:	How has the implementation of Lean affected how satisfied you are with your work?	
Question 12:	How has the implementation of Lean affected your working environment?	
Question 13:	Have you noticed any significant changes in the behaviour of people you work with since the implementation of Lean?	
Question 14:	Are your colleagues more likely to be absent, ill or go on unpaid leave since the implementation of Lean?	
Question 15:	How has the working relationships in teams been affected by the implementation of Lean?	
Question 16:	Can you tell me about any noticeable benefits to you have experienced since the implementation of Lean?	
Question 17:	Can you think of any ways in which the implementation of Lean has negatively impacted on the work you and your colleagues do at the University?	
Thank you very much for your time. It has been a great learning experience for me. Are you okay for me to get back to you to seek clarifications by email?		

Appendix E - Main study

Email to main contact

Dear Mr/Mrs _____,

I am Nouf Alqurashi, a PhD student from the Cardiff Business School at Cardiff University. My research is supervised by Dr. Maneesh Kumar (Reader in Service Operations, Cardiff University) and Dr. Robert Mason (Senior Lecturer in Logistics, Cardiff University). Thank you for kindly agreeing to be interviewed as part of my research. My research is on Lean management in UK Higher Education.

During the interviewing, I will be seeking responses to help me answer my two main research questions. My first research question is; What is the current state of Lean implementation in UK HE? Within this topical issue, I will be exploring (1) the background (& motivation) for Lean adoption at your University (2) your perceptions of Lean (3) the benefits of Lean at your institution, and (4) the challenges you face while implementing Lean. My second research question is: How does Lean adoption impact on employee working conditions and outcomes? Here I will be exploring how Lean generally impacts on employee motivation, job satisfaction, workloads, retention, work-related stress, autonomy and the working-environment from the perspective of team leaders (managers) as well as team members.

I am happy to schedule the interview at your earliest convenience and at a location and time which works for you. I will appreciate any further assistance you can offer such granting me access to some of your Lean project meetings, access to observe parts of ongoing Lean implementation projects and internal Lean project documentations. As part of my research focuses on the soft side of Lean implementation, I would also be grateful if accorded the opportunity to talk to some of your staff who have been directly involved or affected by these projects. Noteworthy is the fact that all information obtained as part of this project will be anonymised and will remain confidential, only shared with my research supervisors.

Thank you very much for your help and I look forward to your response.

Kind regards,

Nouf Alqurashi

Email to interviewees

Dear Mr/Mrs

I am Nouf Alqurashi, a PhD student from the Cardiff Business School at Cardiff University. My research is supervised by Dr. Maneesh Kumar (Reader in Service Operations, Cardiff University) and Dr. Robert Mason (Senior Lecturer in Logistics, Cardiff University). Thank you for kindly agreeing to be interviewed as part of my research. My research is on Lean management in UK Higher Education.

During the interview, I will be seeking responses to help me answer my two main research questions. My first research question is; What is the current state of Lean implementation in UK HE? Within this topical issue, I will be exploring (1) the background (& motivation) for Lean adoption at your University (2) your perceptions of Lean (3) the benefits of Lean at your institution, and (4) the challenges you face while implementing Lean. My second research question is: How does Lean adoption impact on employee working conditions and outcomes? Here I will be exploring how Lean generally impacts on employee motivation, job satisfaction, workloads, retention, work-related stress, autonomy and the working-environment from the perspective of team leaders (managers) as well as team members.

I am happy to schedule the interview at your earliest convenience and at a location and time which works for you. The interview will last about one hour and you are free to stop the interview at any point if you choose to. I can confirm that all information obtained as part of this project will be anonymised and will remain confidential, only shared with my research supervisors.

Thank you very much for your help and I look forward to your response.

Kind regards,

Nouf Alqurashi

Interview protocol – Managers and Lean Leaders

SECTION A: OPENING/INTRODUCTION

[Note: At the start of each interview, this will be read out to the interviewee at the start of the interview and the interviewee will be asked to sign the consent form.]

Thank you very much for agreeing to participate in this study. I am Nouf Alqurashi, a PhD student at Cardiff University. My PhD thesis is supervised Dr. Maneesh Kumar and Dr. Robert Mason, both at Cardiff University.

Just to give you a background. The study is on Lean management in UK Higher Education, which is arguably a very broad subject. My focus is on the soft elements (such as its impact on employees) relating to Lean. Here, I am exploring how issues such as motivation, job satisfaction, autonomy, workload, psychological safety, stress, knowledge and experience, amongst others, impact on Lean implementation efforts or are impacted by Lean implementation in the context of UK Higher education. I am hoping this interview will go on for about an hour.

I would like to tape record it so that it can be transcribed for further analysis at a later stage. I can confirm full confidentiality and anonymity of your responses. That is, neither you nor your institution will be identifiable in the research output. For example, you will be referred to as Senior manager at University A or Team member at University Y, unless you prefer disclosure. Transcripts or recordings will not be passed on to any third party and will only be reviewed by my dissertation supervisors and me. Once the interview is transcribed, a transcript of the full interview will be sent to you for review and amendments.

Please, do feel free to decline to answer any questions or end this interview at any time.

Please, sign the following document to confirm informed consent (i.e., you are happy with participating in this study) before we proceed.

Question 1: Introduction	I suppose the obvious place to start will about you and your background. Can you briefly tell me about yourself, your current job and your working experience? Can you tell me about your experience with Lean projects? • How long have you been involved in Lean projects? • Can you give me an estimate of the number of Lean projects you have completed at your current university? • Would you say you have been involved in Lean projects as (1) leader/manager, (2) a team member, (3) both a leader and a team member? *[Notes: I would expect the respondent to confirm that they have been involved as (1) a team leader or manager. If respondent selects (3), then I will consider them as a Lean manager and continue with the current protocol.]*	*[Notes: The purpose of the first question is to get some background information, establish level of Lean experience, get some indication (perception-based) of whether the institution has been successful or unsuccessful at Lean implementation. This will allow me to identify two groups – failed and successful Lean/projects – and to explore perception of managers and employees in failed versus successful Lean. Information on length of Lean service (LOLS) will be useful to exploring whether LOLS moderates perception.]*
	• On a scale from 1 to 10, with 10 being the highest, how successful would you say your institution (University X) has been at implementing Lean? • Can you justify this success rating by providing me with some further information?	

SECTION B: BACKGROUND AND MOTIVATION FOR ADOPTING LEAN

[Note: This question is only relevant to Lean managers and consultants. The objective here is to understand some of the key factors that led to the adoption of Lean at the institution.]

Question 2	What were some of the motivations for adopting Lean at your University? Was there any critical incident that necessitated Lean adoption?	
Question 3	Why "Lean" why not, for example, "six-sigma" or "TQM"?	Add on: Have you experimented with these other initiatives (six-sigma, TQM)?

SECTION C: OBJECTIVES AND CHALLENGES OF LEAN ADOPTION

[Notes: This question is only relevant for managers and Lean consultants. Objective here is to get a sense of the respondent's understanding of Lean and its guiding principles as applied to the institution. Further, I want to explore whether organisation structure and culture can act as facilitators or inhibitors of successful Lean implementation.]

Question 4	In your view, what is Lean and what are its key objectives as applied in your institution?	Add on: Do you think Lean and Higher Education are a good fit?
Question 5	How has the organisational structure of your university facilitated or inhibited successful Lean implementation?	
Question 6	How has the organisational culture of your university facilitated or inhibited successful Lean implementation?	Add on: by organisational culture, I mean widely held beliefs or shared values.

SECTION D: LEAN ADOPTION STRATEGY AND SCOPE

[Notes: This question is only relevant for managers and Lean consultants. Here, I start to explore the strategy for implementing Lean change. Archival data will be used to supplement this analysis. The objective here is to get an overview

of how projects are selected (if project-based), how projects link together (i.e., whether there is a focus on sequencing), how teams are put together, how Lean is sustained and institutionalized]		
Question 6	• What has been the approach to Lean implementation at your University?	Add on: • How was initial training conducted? Who was involved in the training and project delivery? • How are the projects selected? Are there any links to prior projects? • How are Lean implementation teams selected? • How is organisational learning from past Lean projects ensured? • Is there a mechanism to spread or sustain Lean? • How is Lean institutionalized at your University?

SECTION E: EMPLOYEES' EXPERIENCE ON INDIVIDUAL LEAN PROJECTS – BENEFITS AND CHALLENGES

[Notes: This question is relevant for both team leaders and team managers. Objective here is to get a sense of how Lean benefits employees and what challenges employees face due to Lean implementation.]

Question 7	Just thinking about any of your Lean projects, what improvements or benefits did staff experience?	
Question 8	What were some of the challenges faced by staff when adopting Lean?	Add on: How did you deal with these?

SECTION F: SOFT ELEMENTS RELATING TO LEAN

[Notes: The objective of this question is to explore how Lean impacts on several soft elements. "Impact" here is two-way. It refers to whether (1) these elements facilitate or inhibit Lean adoption as well as whether (2) Lean adoption leads to improvements or deterioration of these soft elements.]

I am keen to understand how Lean adoption directly or indirectly impacts on several soft elements in the workplace and the channels through which this occurs.

[Note: The first question is employee motivation. Then follow-on questions explore other soft elements. May need to provide a brief explanation (1 sentence) of the meaning of each of these soft elements to ensure full understanding of respondent.]

Question 9	Reflecting on any of the Lean projects you have completed in the past, and citing any examples, were there any effects, direct or indirect, on:	
	(1) employee motivation, as a direct result of Lean adoption?	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(2) employee job satisfaction	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(3) employee retention	*Add on: What was done to improve this? Or what could have been done to make this better?*

	(4) employee autonomy	*Add on: What was done to improve this (if at all it is important)? Or what could have been done to make this better?*
	(5) employee work-related stress	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(6) employee workload	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(7) employee psychological safety (employees feeling accepted and respected by team members, supporting interpersonal risk taking.)	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(8) working environment (refers to physical environment such as quality of office space and emotional environment such as general feelings of malaise or enthusiasm that may be rippling through employees.)	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(9) Employee organisational commitment	*Add on: What was done to improve this? Or what could have been done to make this better?*
	[*The pilot study identified differences in perceptions between leaders and followers which may be due to poor communication and feedback mechanisms in terms of how Lean impacts on employees. So, the issue of communication k is further explored here.*]	
	(10) Team member to team member Communication	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(11) Team member to Lean manager Communication	*Add on: What was done to improve this? Or what could have been done to make this better?*
	(12) Lean manager to team member Communication	*Add on: What was done to improve this? Or what could have been done to make this better?*

SECTION G: LEARNING FROM LEAN – INSTITUTIONALIZATION & SUSTAINABILITY.

[Notes: The objective of this section is to explore mechanisms (if any) by which Lean is institutionalized and sustained. The pilot study also identified differences in perceptions between leaders and followers which may be due to poor communication and feedback mechanisms in terms of how Lean impacts on employees. So, the issue of communication and feedback is further explored here

Question 10	Do you think Lean at your institution will survive if Lean leaders and/or the current team left your institution?	*[Notes: The question tries to explore whether Lean was dependent on people or the institution – Lean is imbedded in processes and systems]*
Question 11	How is Lean being locked-in or institutionalized (i.e., so it does not depend on individuals – e.g., potentially using standard operating procedures (SOPs) generated after Lean projects and disseminated University-wide)?	
Question 12	What happens once Lean projects are completed?	*Add on:* • How is information shared? How are lessons learned recorded and disseminated? • How is feedback collected? What kind of feedback is collected?

		• Is there any sort of assessment of the impact of Lean on employees (team members)?
SECTION H: CLOSING THE INTERVIEW		
Question 13	Are there any other issues which you deem are important to this research but I might have missed?	
Thank you very much for your time. It has been a great learning experience for me. Are you okay for me to get back to you with follow up questions or to seek clarifications by email?		

Interview protocol – Lean team members

SECTION A: OPENING/INTRODUCTION

[Note: At the start of each interview, this will be read out to the interviewee at the start of the interview and the interviewee will be asked to sign the consent form.]

Thank you very much for agreeing to participate in this study. I am Nouf Alqurashi, a PhD student at Cardiff University. My PhD thesis is supervised Dr. Maneesh Kumar and Dr. Robert Mason, both at Cardiff University.

Just to give you a background. The study is on Lean management in UK Higher Education, which is arguably a very broad subject. My focus is on the soft elements (such as its impact on employees) relating to Lean. Here, I am exploring how issues such as motivation, job satisfaction, autonomy, workload, psychological safety, stress, knowledge and experience, amongst others, impact on Lean implementation efforts or are impacted by Lean implementation in the context of UK Higher education. I am hoping this interview will go on for about an hour.

I would like to tape record it so that it can be transcribed for further analysis at a later stage. I can confirm full confidentiality and anonymity of your responses. For example, you will be referred to as Senior manager at University A or Team member at University Y, unless you prefer disclosure. Transcripts or recordings will not be passed on to any third party and will only be reviewed by my dissertation supervisors and me. Once the interview is transcribed, a transcript of the full interview will be sent to you for review and amendments.

Please, do feel free to decline to answer any questions or end the interview at any time.

Please, sign the following document to confirm informed consent (i.e., you are happy with participating in this study) before we proceed.

Question 1: Introduction	I suppose the obvious place to start will about you and your background. Can you briefly tell me about yourself, your current job and your working experience? Can you tell me about your experience with Lean projects? • How long have you been involved in Lean projects? How were you initially introduced to Lean methodology, e.g. attending workshop, introduced by line manager, etc? • Were you consulted or informed as to why your department/school need to implement Lean? How were employees communicated regarding the decision to implement Lean? • Can you give me an estimate of the number of Lean projects you have completed at your current university? • Would you say you have been involved in Lean projects as (1) leader/manager, (2) a team member, (3) both a leader and a team member? *[Notes: I would expect the respondent to confirm that they have been involved as a team member. If the respondent selects (3), I will consider them as a manager and default to the first interview protocol.]*	*[Notes: The purpose of the first question is to get some background information, establish level of Lean experience, get some indication (perception-based) of whether the institution has been successful or unsuccessful at Lean implementation. This will allow me to identify two groups – failed and successful Lean/projects – and to explore perception of managers and employees in failed versus successful Lean. Information on length of Lean service (LOLS) will be useful to exploring whether LOLS moderates perception.]*
	On a scale from 1 to 10, with 10 being the highest, how successful would you say your **department** has been at implementing Lean? Can you justify this success rating by providing me with some further information or examples?	*[Note: Once respondent acknowledges that they have been involved as a member of a Lean team, e.g., Lean has been implemented in their work area, the focus will be on the department, not University]*

SECTION B: BACKGROUND AND MOTIVATION FOR ADOPTING LEAN

[Notes: This section is not relevant to Lean team members. Section kept to facilitate comparisons of responses from different respondents.]

SECTION C: OBJECTIVES AND CHALLENGES OF LEAN ADOPTION

[Notes: This section is not relevant to Lean team members. Section kept to facilitate comparisons of responses from different respondents.]

SECTION D: LEAN ADOPTION STRATEGY AND SCOPE

[Notes: This section is not relevant to Lean team members. Section kept to facilitate comparisons of responses from different respondents.]

SECTION E: EMPLOYEES' EXPERIENCE ON INDIVIDUAL LEAN PROJECTS – BENEFITS AND CHALLENGES

[Notes: This question is relevant for both team leaders and team managers. Objective here is to get a sense of how Lean benefits employees and what challenges employees face due to Lean implementation.]

Question 7	Just thinking about any of your Lean projects, what improvements or benefits did staff experience?	
Question 8	What were some of the challenges faced by staff when adopting Lean? Add on: How did you deal with these?	

SECTION F: SOFT ELEMENTS RELATING TO LEAN

[Notes: The objective of this question is to explore how Lean impacts on several soft elements. "Impact" here is two-way. It refers to whether (1) these elements facilitate or inhibit Lean adoption as well as whether (2) Lean adoption leads to improvements or deterioration of these soft elements.]

	I am keen to understand how Lean adoption directly or indirectly impacts on several soft elements in the workplace and the channels through which this occurs.		
Question 9	Reflecting on any of the Lean projects you have completed in the past, and citing any examples, were there any effects, direct or indirect, on:	
	(1) employee motivation, as a direct result of Lean adoption?	*Add on: What could have been done to make this better?* *[Note: The first question is employee motivation. Then follow-on questions explore other soft elements. May need to provide a brief explanation (1 sentence) of the meaning of each of these soft elements to ensure full understanding of respondent.]*
	(2) employee job satisfaction	*Add on: What could have been done to make this better?*
	(3) employee retention	*Add on: What could have been done to make this better?*
	(4) employee autonomy	*Add on: What could have been done to make this better?*
	(5) employee work-related stress	*Add on: What could have been done to make this better?*
	(6) employee workload	*Add on: What could have been done to make this better?*
	(7) employee psychological safety (employees feeling accepted and respected by team members, supporting interpersonal risk taking)	*Add on: What could have been done to make this better?*
	(8) working environment (refers to physical environment such as quality of office space and emotional environment such as general feelings of malaise or enthusiasm that may be rippling through employees.)	*Add on: What could have been done to make this better?*
	(9) Employee organisational commitment	*Add on: What could have been done to make this better?* *[The pilot study identified differences in perceptions between leaders and followers which may be due to poor communication and feedback mechanisms in terms of how Lean impacts on employees. So, the issue of communication k is further explored here.]*
	(10) Team member to team member Communication	*Add on: What could have been done to make this better?*
	(11) Team member to Lean manager Communication	*Add on: What could have been done to make this better?*

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	(12) Lean manager to team member Communication	*Add on: What could have been done to make this better?*

SECTION G: LEARNING FROM LEAN – INSTITUTIONALIZATION & SUSTAINABILITY

[Notes: The objective of this section is to explore mechanisms (if any) by which Lean is institutionalized and sustained. The pilot study also identified differences in perceptions between leaders and followers which may be due to poor communication and feedback mechanisms in terms of how Lean impacts on employees. So, the issue of communication and feedback is further explored here.]

Question 10	Do you think Lean at your institution will survive if Lean leaders and/or the current team left your institution?	*[Notes: The question tries to explore whether Lean was dependent on people or the institution – Lean is imbedded in processes and systems.]*
Question 11	How is Lean being locked-in or institutionalized (i.e., so it does not depend on individuals – e.g., potentially using standard operating procedures (SOPs) generated after Lean projects and disseminated University-wide)?	*[Clarification: How is Lean sustained, so that it becomes a method of operation?]*
Question 12	What happens once Lean projects are completed?	- How is information shared? How are lessons learned recorded and disseminated? - How is feedback collected? What kind of feedback is collected? - Is there any sort of assessment of the impact of Lean on employees (team members)?

SECTION H: CLOSING THE INTERVIEW

Question 13	Are there any other issues which you deem are important to this research but I might have missed?	

Thank you very much for your time. It has been a great learning experience for me.

Are you okay for me to get back to you with follow up questions or to seek clarifications by email?

Appendix F– Similarities and differences in the views of stakeholders

Soft element	Case	Team leaders (Narratives)	Team members (Narratives)
Motivation Leaders: Positive Members: Positive	B	"I don't know if there have been any effects on employee motivation because we've not reviewed the changes that we've made" (B2) "… a number of the individuals we have worked with, have seen the way we work as a positive influence and kind of try to adopt those techniques" (B3) "…there have been positive things that have happened as a result of it… not necessarily always the change of results, but sometimes just the process that people go through to make the change." (B6)	"I think generally just doing the Lean project, it's a good motivator because I feel like this process wasn't working and we're actually doing something to try and improve it" (B1) "In a positive way. For example, when we did improve our contracts, master drafts were uploaded to the system. You can then download with the new employee details and you just have to change something slightly…. Which saved us time and really helped with motivation because when you think, I had to do this contract I was going to take an hour and now it only takes four or five minutes, that sort of thing really helps you with the motivation of doing the next thing and getting along and taking on the next challenge so that was a positive thing" (B4) "Well it increases motivation as it usually reduces some of the more tedious aspects of the job. For instance, in the printing of exam papers, we were more heavily involved, but through the Lean process, we worked out that we could actually outsource some of that because it was actually more efficient to do that. So, that encourages staff to think that this is quite a good thing because it reduces some of the more tedious elements of the job." (B5)
Motivation	C	"I think they were highly motivated because they felt in control of the change and they felt like they contributed to it.	"…hard to say. I probably say yes, but some people felt more motivated to suggest changes in their areas" (C2)

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Leaders: Positive Members: Unsure		So there-there was really good buy-in for change." (C1) "…employees feel very motivated and we see that from the survey we do right after a rapid improvement event….because they felt listened to and they felt it allowed them to put their ideas across" (C3) "I'll say that employees are motivated and quite excited about introducing a new process that is much improved" (C5) "…sometimes the effects are negative because employees think they might be losing their jobs or whatever but then they realize they were just make things better so that they can do more" (C6) "I'm responsible for large groups of people in different areas and some of the things that we've done, have improved my employees' motivation by simplifying processes where people have been frustrated with processes and actually showing that we can improve things and do things better and quicker and clearer and I think that's really helped some people" (C7)	"I think so yeah… It increased it [employee motivation]" (C4)
Motivation Leaders: Positive Members: Positive	F	"Yes… the way that we work which is to create the teams and enable them to identify and make the improvements that need to be made and to implement those solutions themselves, that they have been motivated by doing that work" (F1) "…sometimes it can have the opposite effect of motivating	"I would say for myself, I felt more motivated. I felt that, over the years, I've been working in this university for [] years, and sometimes in the past when I was getting overloaded with work, our line manager would say, "You need to work smarter, not more." They never said what smarter was. And it seems to me that the Lean methodology gives you a way of working smarter." (F2)

		people because people assume whenever you're trying to become leaner you're trying to cut out steps and possibly people. So, it's difficult for people to be motivated. …were involved in motivating people to say, we can become more efficient, we can possibly bring in more programs because we are adopting new policies" (F4)	"…biggest one which is the [] project and that's currently on hold. I invested a lot into it, I had to. I was told to invest a lot of time in it and, you know, when that's put on hold, it does it does have a demotivating effect because you've had so much input to it and then whether the institution is just not ready to actually implement and then you feel it's time wasted, it's demotivating" (F3)
			"I think where things have gone well and if it's [Lean] used appropriately I feel that people across different levels of the institution can really input into improvement and then when they see that being implemented, that's really helpful" (F3)
			"…overall I think that that does help… you can maybe be further down in the organisation and actually have an impact and see what's happening and make an improvement…it can generally be a way of empowering people that would normally not be heard at a higher level" (F3)
			"…my own motivation has greatly increased. I hated having to open up the email box and see what was in there and now there's this a completely different kettle of fish. Everything runs so smoothly now. There's hardly any problems and if any, we can identify them and fix them quickly because there's complete transparency now throughout the whole process. We moved it from being a kind of paper-based or a mainly manual process on to an [electronic] system" (F6)
Job satisfaction Leaders: Positive	B	"if the process is carried out a bit slicker and a bit better, the employee would happier than before" (B2)	"Yeah it improves satisfaction. The fixed term contract process is going to make my job easier. I can free up time to do other things." (B1)

Members: Positive		"Some employees will have gained a higher job satisfaction by doing that and some perhaps not just because they are averse to change and they don't agree with the change" (B6)	"I guess that just links into the motivation because I'm satisfied in my job and if I'm motivated, I feel I am satisfied as I am motivated" (B4)

"I think if you're working with a better process, then it does increase job satisfaction and the other thing is that previously, we work longer hours to produce the same thing, but because of the efficiency savings, we're spending less time." (B5) |
| **Job satisfaction**

Leaders: Positive

Members: Positive | C | "Satisfaction surveys tend to show an improvement and also we do get a lot of repeat customers" (C3)

"yes definitely" (C5)

"Once we've got over the huddle and then once the projects are successful, then people are quite proud of what they've done" (C6) | "I think we've seen that in a number of our areas, people's work is now much more efficient. So, they feel more satisfied. We are getting more work done" (C2)

"I think it's increased that as well" (C4) |
| **Job satisfaction**

Leaders: Positive

Members: Positive | F | "Yes, in some areas the satisfaction has increased because they are now operating in a better process and that they have been part of the journey to make that process better." (F1)

"Staff feel better equipped to work across departments because they had a better understanding and knowledge of what we were dealing with in our department" (F4) | "The example I gave you about the [specific Lean project] people who were then working with the past system were more satisfied that they weren't spending a huge amounts of time doing repetitive tasks,... they were able to do a thing once, and it was done." (F2)

"Well absolutely, I enjoy my job so much better since we've been through this whole process and I've learnt so much from this as well. I really enjoyed going through the whole process mapping...it's really interesting" (F6)

"if you can see that your input has made a difference, I think that does lead to satisfaction" (F3) |
| **Retention** | B | "Probably has a negative impact on employee retention. Certainly, that has been the case for several people who have | "Yeah it's hard to say what effect the [specific Lean project] process will |

Leaders: Negative Members: Unsure		"worked within the Lean team as they've taken those skills and moved on to other organisations using those skills" (B3) "It's a difficult one because employee retention is based on so many things other than Lean. And we've only been doing it a year directly, so it's quite a difficult thing to quantify." (B6)	have on employee retention at this stage." (B1) "That's hard to say because employees leave jobs for all sorts of reasons, not particularly anything to do with this." (B5)
Retention Leaders: Negative Members: Unsure	C	"They want to things to remain the same, so in terms of retention, no there wasn't more retention. They were resistant to change and, whether it was Lean or something else, I think they would've gone anyway" (C1) "That's not something we've ever measured. I've never seen staff leave as a result of this or heard of staff leaving but we haven't got a measure for it" (C3) "well if people enjoy the work and feel that they contributing, I think people are less likely to move on" (C5) "I don't think the Lean projects have a definite impact on retention" (C6)	"Hard to say, haven't measured yet." (C1) "I'm not sure that has made any difference to that" (C4)
Retention Leaders: Unsure Members: Unsure	F	"I couldn't comment on that because we don't track it" (F1) "I don't think that was relevant in our case" (F4)	"I don't know if it had an effect on employee retention." (F2)
Autonomy Leaders: Positive Members: Positive	B	"The employees have been involved a bit more but there was quite a lot of autonomy for managers is within the process already" (B2) "That's certainly our aim. We don't want a central team to exist or everybody to come to us	"Yes, I think in the [specific Lean project] project we're giving managers the guidance right at the start so they know exactly what they need to do instead of relying on us" (B1)

		to do the improvement. We want people to feel empowered to make small changes in the own area of work" (B3) "We do try and increase the employee autonomy. So, we try and make the decision making or the decision making ability, as low a point as possible. So, it's close to the activity." (B6)	
Autonomy Leaders: Positive Members: Positive	C	"Usually that's improved because they should have been empowered in the event to make these changes. We always try and make sure when we do our control plan that certain staff members are in control of making small changes to embed that continuous improvement but again it does vary between projects and managers" (C3) "I think it's made it better within the team" (C6)	"Probably improved it a little bit but not significantly. Yeah I think people feel slightly more empowered." (C4)
Autonomy Leaders: Positive Members: Positive	F	"Yes, because the ideas for improvements are coming from the staff themselves and they have the autonomy to implement those improvements." (F1) "It's very difficult to have employee autonomy when you're working within the educational environment and within departments because you are in a way governed by the head of faculty" (F4)	"They've got a set of guidelines to work to. They don't have to keep asking somebody. And I think that's really quite satisfying and it is good." (F2) "It gives them an ownership if they've been involved in the projects. It gives them an ownership of wherever the output is" (F3)
Work-related stress Leaders: Unsure Members: Both	B	"Hopefully there should be a positive effect on employees because they're more involved in that process. I don't think that [Lean] impacts on managers [work-related stress] actually" (B2)	"During every month, before the payroll runs I'll be contacting my users to see what's happening with people's contracts because it just haven't come back to me and that can be quite a stressful time and also can be stressful for the person themselves, the person whose contract is ending because the

		"The phrase that's often used is there's too much change here and people fear the change because of stress. I'm not convinced… it's the requirement for improving processes" (B3) "There's more than just Lean in relation to that and that's a very difficult one to quantify." (B6)	manager maybe hasn't done what they should have done or the person who's really unsure about what's happening with their contract. I suppose that can be quite stressful so yeah I think that [through specific Lean project] we'll have reduced that stress." (B1) "stress has been very high for a long period so I guess …there was a positive and a negative impact on stress" (B4)
Work-related stress Leaders: Unsure Members: Positive	C	"The early Lean project that I did, I think it reduced the stress. I think the more current one that I'm working on, which I don't think it will be as successful as the first one, I think it in-in-increased the stress." (C1) "It's not a key measure we take but again we hope by removing those problems, processing issues have reduced." (C3) "I think it has relieved stress because people are more understanding of what we're trying to do and we help give them a way of doing it better" (C5)	"I kind of think it's probably improved that as well" (C4)
Work-related stress Leaders: Negative Members: Unsure	F	"Again, I couldn't comment but I don't think." (F1) "I think it was stressful for staff because they feel vulnerable in terms of having to justify the jobs and the possibility of streamlining and cutting area aspects of job" (F4)	"I've not been aware of anybody being either more or less stressed because of Lean." (F2) "I think going through it [Lean] might add to it [stress] because we don't carve out space in people's working lives to do the projects. Quite often it's a on top of your workload" (F3)
Workload Leaders: Negative Members: Positive	B	"I think a lot of the time, improvement work and Lean projects are seen as additional work on top of people's day job. I think there's needs to be a more of a change in culture to see that change and improvement is part	"Yes, so that will definitely have an impact on both my workload, the workload of HR assistants and the workload of managers as well because they won't have to do some of the forms that we're asking them to do. They won't need to do that anymore.

		of your day job. Everybody should have that in their job description." (B3) "Sometimes we've done things and it's actually increased the workload. But, what we're doing is we're part way through an ongoing program, at the end of which, we're hoping we'll free up and provide capacity to allow them either to have that breathing space to do other things and develop other things that need to be done. But we're not quite there yet." (B6)	A lot of the emails that were sending out are all going to be automated from the HR system, so that'll reduce our workload as well" (B1) "Because workload has been so high for a very long time, it didn't really help the workload. it makes it may be easier" (B4) "The workload is sometimes reduced by these projects, although not initially" (B5)
Workload Leaders: Positive Members: Unsure	C	"I think the first one, what we did is we negotiated some timeout of running the service to implement the changes. I think that was crucial to reducing the workload, whereas this current one there has been no time allowed to have to implement and I think that that's increased the employee's workload." (C1) "Yeah it's definitely improved employee workload" (C5) "yes…where the work is repetitive, if we can make that more electronic and automatic and take away the manual input, it has benefited" (C6)	"That's pretty much decrease, because we've made things more efficient." (C2) "Probably not made a huge difference. I guess what it has done in some cases is make it more visible the amount of work people have to do, while things were hidden before" (C4)
Workload Leaders: Negative Members: Positive	F	"It's been difficult for people to find the time to work through the Lean projects that they have been involved in. So that suggests that it has been an increase in their workload because they have to do their day job exactly as they are required." (F1) "We did try to manage workload through this." (F4)	"it helps with the employee workload in that people are doing more responsible work… they're probably not doing less work, but they're doing less work of the routine kind. The work they're having to do is more high-value work." (F2)

Psychological safety Leaders: Unsure Members: Positive	B	"It depends on the attitude of the individual employee in relation to what we're trying to do." (B6)	"I think that managers will feel like they have more knowledge about what they're supposed to be doing and they won't feel as though HR is kind of policing them and telling them what they need to" (B1) "I think I've always felt supported and those projects more like increased that supportiveness because in the project sometimes we work with different team members from the other end of the office and that actually helps [] feel more accepted and respected" (B4)
Psychological safety Leaders: Unsure Members: Positive	C	"On the first one, that [psychological safety] was very high, because I think it got people talking in a way that they had not thought. The more recent one, it's a lot lower because I don't think people did feel accepted because you're talking about a merging of different services, so I think the stress is higher. But, in the first one, they felt accepted and it strengthen the team actually, the working relationships between them." (C1) "I wouldn't be able to comment on that" (C3) "Yeah...it's difficult when people move from one way of doing things to another and at first, they don't believe that it can be done. So, there's some scepticism but then once were through that barrier, yeah we feel proud of what they've done and can try other things" (C6)	"Risk taking has been supportive because it's a way of encouraging people to suggest a change" (C2) "I think that is increasing but slowly" (C4)
Psychological safety Leaders: Positive	F	"Absolutely I think that's one of the things that we are doing. Helping staff be empowered and be able to share their opinions,	"I've seen, on a Lean project, there is that mutual respect within the team. But whether that translates into, you

Members: Unsure		their experiences and be part of the solution" (F1)	know, when they go back to the day job, I just don't know." (F2)
Working environment Leaders: Positive Members: Positive	B	"Hopefully it has had a positive effect on that [working environment] because it's meant that the employees know a lot more about what is happening" (B2) "I don't think Lean has any had any impact on the physical environment" (B3) "We've not been involved in projects to change that" (B6)	"yes, I suppose for employees if they're if they are clear on what's happening" (B1)
Working environment Leaders: Positive Members: No effect	C	"The first one [Lean project] actually massively improved the working environment, we did up spaces in our workplace that were sort of dead spaces and actually we utilize the spaces far more so I think we increase it [quality of the working environment]. (C1) "…certainly, seems to improve their working environment by just providing them with the equipment they really needed to do the job which they didn't have originally" (C3) "we looked at storage which then released space because we realized we didn't have to buy in all this equipment and store it" (C5) "yes with [specific Lean project] we are already seeing benefits because we had a mountain of paper before and now we've got more space because we don't need as much filing cabinets" (C6)	"I won't say that's changed. Enthusiasm might have increased." (C2) "Nothing on working environment so far" (C4)
Working environment	F	"There are some instances where that has improved through the likes of	"I'm not aware of any direct impact on working environment" (F3)

Leaders: No effect Members: No effect		"implementing 5S for example" (F1) "that really didn't have any impact for us at all" (F4)	
Organisational commitment Leaders: Positive Members: Positive	B	"hopefully this will have a positive effect because it might mean that they [employees] might change roles within the university" (B2) "I think it depends on the individual employee, but if they start to see that we are listening and trying to do something to help them, their commitment to get involved in these activities is increased and their enthusiasm is increased." (B6)	"We have been given the time out of the office to actually go away and improve something. It means that you feel as though you're being supported by the University and supported by your employer to make things better… so I think that it does make you feel more committed because you feel that your employer is working with you." (B1) "I think you do find that staff who work in universities are here because we kind of want to be. So, they are usually quite committed to their job anyway." (B5)
Organisational commitment Leaders: Unsure Members: Unsure	C	"It's not something we've measured but you would hope to see that with greater than employee autonomy less stress better workload you would see better commitment" (C3) "I think so because you're getting people to come into what you've improved" (C5)	"Nothing that I'm aware of" (C4)
Organisational commitment Leaders: Positive Members: Positive	F	"Yes, that has had an impact on organisational commitment because the employees are willing to be part of the projects and are willing to complete the projects. Ultimately leading to achieving the strategic goals of the organisation. So that is related to how committed they are to the organisation" (F1) "Most of the staff that I work with have been in the university for quite a long time so they are committed" (F4)	"The people who got involved were basically saying, "I care about this organisation. I'm committed to this organisation. I want to make it better." So, you know, the participation itself signaled the commitment." (F2) "any time you're involved in redesigning a process and you can see a positive impact on your work on the process…I think that always makes you feel more committed" (F3)

Communication			
Communication Leaders: Positive Members: Positive	B	"That's better, isn't it? Because people obviously get a chance to see one another in a different context and talk about something." (B6)	"When a query comes in you can go and check to see if it has been responded to before… So, it makes it [communication] easier. It cuts down on us all having conversations about how to answer it [the query] really because we already know what someone's done before. We can also be really consistent in the advice were giving." (B1) "That was probably improved I would think. Again, this gives you more of an appreciation of what your other colleagues in other departments do in a process which we may not have known before." (B5)
Communication Leaders: Positive Members: Positive	C	"That was instrumental to that. So, things like whiteboard, enables me to see what's happening in the service. We had a sort of snagging list as we were going through the project, which also was helpful to anticipate some of the difficulties." (C1) "It's definitely improved. I feel after projects, particularly, those that are run by workshops and mapping improvement events… see each other as real people and seeing the process as a whole …I think it's really important" (C3) "yes, much improved" (C5) "At the beginning there's not enough communication with team members that are not part of the project team and there's a bit of uncertainty but once we've been through the first project, communication was vital so we made sure that that happened" (C6)	"I think that has most definitely improved" (C4)

Communication Leaders: Positive Members: Positive	F	"I would say yes it has improved communication often the team members are from completely different departments or completely different areas of the university. So, it has immediately increased the amount and types of communication that we have with each other through the projects" (F1) "We have with fairly robust set procedures in terms of making sure that everyone is involved in the communication process. So, we had an open door policy and that everyone within the team was included in discussions so that everyone felt part of it and everyone knew what was going on" (F4)	"People are respectful towards each other, they're willing to listen. They try to understand the other person's perspective. And I guess once you've done that in any kind of team, then you bring it back into the other relationships that you have." (F2) "Team communication is strong.… communicating on a regular basis and whether it's through electronic means or face to face, it is quite an intense process and it tends to be done in a reasonably short timeframe, so there's quite a high level of contact at that time." (F3)

Appendix G – Ethical Approval

Cardiff Business School
Ysgol Busnes Caerdydd

Alqurashi, Nouf
Cardiff Business School

17 July 2017

Dear Nouf:

Ethics Approval Reference: 1617034
Project Title: Lean management in UK Higher Education

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you both the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Debbie Foster
Chair of the ethics sub-committee
Email: CARBSResearchOffice@cardiff.ac.uk