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Evaluation and Comparison of Lean Manufacturing Practices in Britain and France: A Case Study of a Printing Solutions Organisation

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ABSTRACT

Purpose: The objective of this research is to investigate and analyse the implementation of Lean philosophy in two production plants SMEs –one in Britain and one in France- both belonging to the same global American printing solutions and technology services organısation. The aim of the study is to analyse the impact of lean practices on employees and on the organisation itself as well as the critical factors for a successful implementation.

Design/methodology/approach: Using a case study approach, the collection of primary data for this dissertation consisted of semi-structured face-to-face interviews – seven in Britain and five in France - as well as observations in both SMEs during the visits on-site.

Findings; The evaluation of Lean practices in both companies revealed significant similarities concerning the principal Lean practices implemented and a general agreement about the importance of Lean in the current work place. On the other hand, the study indicated differences in terms of cultural issues and internal barriers for a successful Lean adoption.

Research Limitations/Implications: The samples between both companies were different in terms of job position distribution. This study provides recommendations beneficial to other organisations adopting Lean.

Originality/Value: The novelty of this study stems from the exploration of workers' points of view in relation to Lean practices, their implementation and their value in the work environment. Although the investigation undertaken in this research is based on only two SMEs with different backgrounds, this study would recommend how SMEs can develop and improve their Lean practices in the working place.

Keywords: Lean, Case study investigation, employees' perceptions, UK, France

EXTENDED ABSTRACT

The industrial scenario has witnessed a radical change over the past two decades with globalisation, changing market conditions, customer expectations and emerging technologies. This context sets companies in a very perilous situation since they must operate in a very reactive manner and seek more effective operations at *all levels of the supply chain* (Achanga, Shehab, Roy, & Nelder, 2006; Doolen & Hacker, 2005).

In order to sustain growth in this competitive scenario, organisations have started the reorientation of their competencies by the adoption and implementation of new approaches (Vinodh & Joy, 2012). *The Lean Production practices* initially developed by Taiichi Ohno at Toyota in the 1990s has contrasted with the western traditional 'mass production' methods which have influenced production as well as logistics and supply chain activities all around the world (Bhasin & Burcher, 2006; Nasab, Bioki, & Zare 2012; Olivella, Cuatrecasas, & Gavilan, 2008). Lean is described as a revolutionary process. Primarily it was developed in the automobile sector, but the concept of Lean production is making inroads in other manufacturing industries and even service industries such as insurance companies, hospitals, government agencies with the same objectives (Black, 2007; Corbett, 2007; Doolen & Hacker, 2005; Hines, Holweg, & Rich, 2004; Karlsson & Åhlström, 1996; Losonci, Demeter, & Jenei, 2011; Mehri, 2006; Seppälä & Klemola, 2004; Warnecke & Hiiser, 1995; Wickramasinghe & Wickramasinghe, 2011). Lean's target is to improve the organisation's performance by eliminating unnecessary activities, by reducing the wasteful usage of resources, and by aiming to adopt a comprehensive approach with employees, suppliers and customers (Maleyeff, Arnheiter, & Venkateswaran, 2012; Pavnaskar, Gershenson, & Jambekar, 2003).

According to Wickramasinghe and Wickramasinghe (2011) and Vidal (2007), *employee involvement* does not inevitably imply job satisfaction. Similarly, the fundamental advancements of successful Lean organisations such as lower inventory and quicker lead times should be balanced with human-related performance obstacles (Brown & Mitchell, 1991).

The literature relates both positive and negative aspects of *Lean on workers' well-being and social climate* (Eswaramoorthi, Kathiresan, Prasad, & Mohanram, 2011; Seppälä & Klemola, 2004). For Seppälä and Klemola (2004), the extent to which negative or positive outcomes are perceived by employees is related to the management of change within the company and its consequences on

employment, job security and relationships at the workplace. The literature has identified that one of the main barriers in adopting Lean practices is the lack of awareness of the techniques or methods to use and how to employ them in the workplace (Achanga et al., 2006; Olivella et al., 2008). Indeed, misapplication of some practices may imply supplement of resources, money and time (Eswaramoorthi et al., 2011).

The objective of this research is to investigate and analyse *the implementation of Lean philosophy* in two production plants SMEs –one in Britain and one in France- both belonging to the same global American printing solutions and technology services organısation. The main aim of the study is to analyse *the impact of lean practices on employees and on the organisation itself* as well as the critical factors for a successful implementation. The novelty of this study stems from *the exploration of workers' points* of view in relation to Lean practices, their implementation and their value in the work environment. Although the investigation undertaken in this research is based on only two SMEs with different backgrounds, this study would recommend how SMEs can develop and improve their Lean practices in the working place.

Using a case study approach, the collection of primary data for this dissertation consisted of semi-structured face-to-face interviews – seven in Britain and five in France - as well as observations in both SMEs during the visits on-site.

The evaluation of Lean practices in both companies revealed *significant similarities* concerning the principal Lean practices implemented and a general agreement about the importance of Lean in the current work place. Both organisational cultures are involved in CI projects or Kaizen projects with cross-functional teams and leaders associated with the projects. Similar to the "quality circles" mentioned in the literature, these CI projects are mostly year-long projects and gather two or three employees at some point along the project. Standardisation was not the strong point of Lean practices in either of the two companies. In terms of housekeeping and cleanliness of the work environment, the 5S or 6S program is established or about to be established in the companies.

On the other hand, the study indicated *differences* in term of cultural issues and internal barriers for a successful Lean adoption. In terms of cultural difference, the most striking result to emerge from the data is that the English language is an essential determinant of people involvement in Lean. This difference also reflects the fact that English employees are more familiar with the concept of

Lean and its purpose of eliminating waste across the whole company and not from an individual point of view. Apart from the issue of language, the UK Company seems more invested in Lean as 5S audits, standards, suggestions and rewards systems are already in place whereas they are still only in progress for the French company.

INTRODUCTION

The industrial scenario has witnessed a radical change over the past two decades with globalisation, changing market conditions, customer expectations and emerging technologies. This context sets companies in a very perilous situation since they must operate in a very reactive manner and seek more effective operations at all levels of the supply chain (Achanga et al., 2006; Doolen & Hacker, 2005).

In order to sustain growth in this competitive scenario, organisations have started the reorientation of their competencies by the adoption and implementation of new approaches. (Vinodh & Joy, 2012). Lean production practices, initiated from the Toyota Production System (TPS) in the 1950's, is one of the initiatives that has attracted many organisations all around the globe (Nasab et al., 2012; Shah & Ward, 2003; Soderquist & Motwani, 1999). Further, some authors even argue that exercising Lean production thinking is one of the most important philosophies that helps businesses to achieve superior competitive advantage in the increasingly global market (Eswaramoorthi et al., 2011; Gurumurthy & Kodali, 2011; Losonci et al., 2011; Soderquist & Motwani, 1999).

With an operational focus, this study aims to identify the variances and similarities in Lean practices between two manufacturing SMEs, one in Britain and one France, both belonging to the same global American printing organisation, as the research question focuses on understanding how employees perceive and practice Lean within a real-life context. The primary data collection process involved two SMEs belonging to the same global organisation engaged in printing solutions and printer consumables. The originality of the work stems from the exploration of employees' points of view in relation to Lean practices, their implementation and their value in the work environment in contrast to many other studies. By exploring the workers' view in relation to Lean practices in two manufacturing SMEs, this study would analyse the impacts of Lean operations on employees' perceptions and on the organisation itself as well as on the critical factors that determine a successful implementation. In addition, this study would further evaluate to what extent the dimensions of Lean manufacturing are implemented within the two SMEs and the cultural or organisational differences. Then, based on the findings, this study would recommend how SMEs can develop and improve their Lean practices in the working place.

The content of the study is as follows. First, the literature review on Lean Production Practices from the employees' point of view. This literature review will be conducted in section 2 to identify the specific theories, frameworks and recent research related to Lean principles and practices in manufacturing plants. Second, the research methods employed in this study comprise an extensive literature review as well as visits to two SMEs, one in France and one in the UK. This will be shown in section 3. These two SMEs belonging to the same global organisation engaged in printing solutions and printer consumables will be the source of our primary data collection. Then, findings and policy implications will be evaluated in section 4. Finally, the conclusion will be given in section 5.

LITERATURE REVIEW ON THE EMPLOYEE PERCEPTION ON LEAN PRODUCTION

Lean Production practices initially developed by Taiichi Ohno at Toyota in the 1990s has contrasted with the western traditional 'mass production' methods which have influenced production as well as logistics and supply chain activities all around the world (Bhasin & Burcher, 2006; Nasab et al., 2012; Olivella et al., 2008). Lean is described as a revolutionary process[1]. Primarily it was developed in the automobile sector, but the concept of Lean production is making inroads in other manufacturing industries and even service industries such as insurance companies, hospitals, government agencies with the same objectives (Black, 2007; Corbett, 2007; Doolen & Hacker, 2005; Hines et al., 2004; Karlsson & Åhlström, 1996; Losonci et al., 2011; Mehri, 2006; Seppälä & Klemola, 2004; Warnecke & Hiiser, 1995; Wickramasinghe & Wickramasinghe, 2011). Lean's target is to improve the organisation's performance by eliminating unnecessary activities, by reducing the wasteful usage of resources and by aiming to adopt a comprehensive approach with employees, suppliers and customers (Maleyeff et al., 2012; Pavnaskar et al., 2003).

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1   The word "Lean" was originally adopted by Krafcik (1988) and disseminated by Womack et al. in the textbook "The Machine that changed the world" (1990). Then, various authors have identified Lean with the terms Toyota Production System (TPS), Toyota techniques, Just-In-time (JIT) or agile production (Biazzo & Panizzolo, 2000; Browning & Heath, 2009; Holweg, 2007; Shah & Ward, 2007; Womack, Jones, & Roos, 1990). However, while it is true that JIT or TPS are intrinsic of Lean manufacturing, it does not suffice to represent the Lean approach totally (Olivella et al., 2008; Sezen, Karakadilar, & Buyukozkan, 2012).

At the root of Lean manufacturing is a new and extended philosophy regarding Quality Management as opposed to the traditional mass production approach (Soderquist & Motwani, 1999). The literature generally describes Lean production from two points of view. While Shah and Ward (2003) and Li, Rao, Ragu-Nathan, and Ragu-Nathan (2005) define Lean from the **practical approach** -a collection of practices, tools, or techniques instantly witnessed in the work place-, the primitive literature regards the concept as **a philosophical mind set** associated with principles and underlying objectives (Bhasin, 2012; Womack & Jones, 1996), Nasab et al. (2012) define Lean production as a philosophy or strategy and Eswaramoorthi et al. (2011) as well as Shah and Ward (2007) consider it as a multi-dimensional approach. They all share the same idea of this concept. In the light of these two extreme meanings, Lean manufacturing can be defined as an alternative unified production system because it integrates various practices and strategies in R&D, supply management and operations management into a coherent whole.

The implementation of Lean methods such as teamwork, "Total Quality Management (TQM) and computer-based solutions can be considered mostly positive from the point of view of job content and the quality of work", according to Seppälä and Klemola (2004, p. 178). This positive consideration would be consistent with increased opportunities for employees for developing themselves at work through participation, worker control and training (Seppälä & Klemola, 2004; Wickramasinghe & Wickramasinghe, 2011). Even though few studies exist concerning the employees' experiences and perceptions about the introduction of new management ideas such as Lean production practices, the literature identifies various determinants of workers' perceptions (Losonci et al., 2011; Seppälä & Klemola, 2004).[2]

While traditional companies experience insufficient engagement and low work satisfaction, it has been argued that Lean manufacturing organisations present

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2 The degree and outcomes of the changes and the way the changes – training, job design, technology- are undertaken are essential factors. (Seppälä & Klemola, 2004). Losonci, Demeter, and Jenei (2011) state that communication also highly impacts the success of Lean implementation and the management of change, in particular, organisational communication concerning the vision, strategy, and results of the Lean conversion. The literature proceeds to advocate the importance of selling the Lean benefits to staff and a strong business rationale to adopt Lean. However, whilst the literature stresses that Lean aids competitiveness; it often appears that organisations are not convinced (Bhasin, 2012).

enhanced opportunities for people to participate in the workplace (Seppälä & Klemola, 2004; Wickramasinghe & Wickramasinghe, 2011). Thus, workers' involvement represents an essential and indispensable facet of a successful Lean implementation from two different perspectives.

On the one hand, advocates of the philosophy suggest that employees in Lean companies express more motivation, involvement in their job and are more productive than in traditional mass production companies, thus positively affecting operational outcomes and competitiveness (de Treville & Antonakis, 2006; Wickramasinghe & Wickramasinghe, 2011). On the other hand, the opposition suggests that it "places employees in highly limiting and alienating conditions" (de Treville & Antonakis, 2006; Wickramasinghe & Wickramasinghe, 2011, p. 818). Indeed, team work and empowerment of employees involve certain responsibilities that may be perceived as burdens rather than opportunities.

Moreover, according to Wickramasinghe and Wickramasinghe (2011) and Vidal (2007), employee involvement does not inevitably imply job satisfaction. Similarly, the fundamental advancements of successful Lean organisations such as lower inventory and quicker lead times should be balanced with human-related performance obstacles. In particular, JIT (just-in-time) systems make people highly dependent on other team workers thus creating a climate that limits workers in performing their job and where they perceive greater obstacles. (Brown & Mitchell, 1991).

The literature relates both positive and negative aspects of Lean on workers' well-being and social climate. (Eswaramoorthi et al., 2011; Seppälä & Klemola, 2004). For Seppälä and Klemola (2004), the extent to which negative or positive outcomes are perceived by employees is related to the management of change within the company and its consequences on employment, job security and relationships at the workplace.

Since being Lean aims at the elimination of waste in the company, it often requires the reduction of various resources such as reduction in space and in employees. In this context, Seppälä and Klemola (2004) suggest that for organisations trying to implement Lean, the outcome was often 'mean' instead of 'Lean' in terms of elimination of jobs, reduction of revenues and profits for customers and suppliers (Achanga et al.,

2006; de Treville & Antonakis, 2006). Wickramasinghe and Wickramasinghe (2011) also add that several opponents to Lean consider the system and the practices exploitative and involve time pressure and tension for the employees by alternating between identical repetitive activities and limited autonomy, which suggests multitasking rather than multi-skilling (Bhasin, 2012; Delbridge, Lowe, & Oliver, 2000; Seppälä & Klemola, 2004). On the other hand, Lean accentuates teamwork, polyvalence, job enlargement, innovation and collaboration considered as good work practices for employee development (Delbridge et al., 2000; Landsbergis, Cahill, & Schnall, 1999; Seppälä & Klemola, 2004).

The literature has identified that one of the main barriers in adopting the Lean practices is the lack of awareness of the techniques or methods to use and how to employ them in the workplace (Achanga et al., 2006; Olivella et al., 2008). Indeed, misapplication of some practices may imply supplement of resources, money and time. (Eswaramoorthi et al., 2011)

Furthermore, as Lean is constantly evolving, skills and expertise factors combine with employment and enrichment of employees and supply of training thus obtaining the potential benefits of Lean (Achanga et al., 2006; Bhasin, 2012; Olivella et al., 2008). These authors also suggest embracing several Lean tools rather than implementing only a few of them in isolation. (Eswaramoorthi et al., 2011). Correspondingly, employee engagement and involvement through empowerment and participation is another imperative element for Lean success. Black (2007) precisely states that at the heart of Lean are the people, and it is the employees' knowledge, expertise and willingness which guides companies to continuously improving their practices (Hines, Martins, & Beale, 2010; Olivella et al., 2008; Wickramasinghe & Wickramasinghe, 2011).

METHODOLOGY

As the research question focuses on understanding how employees perceive and practice Lean within a real-life context and with little control over events from the researcher, the case study method corresponds to the preferred method for this study.

The original use of case studies emerges from the motive to understand a complex social context with many variables and fulfilling different aims. Indeed, the case study strategy allows researchers to undertake an extensive and in-depth description of real-life events and interpretation in the precise context in which events are enacted (Yin, 2009; Zikmund, Babin, Carr, & Griffin, 2010). Regarding its primary purpose, the case study will explore the particularity and the uniqueness of the single case, i.e. the printing solutions organisation, and investigate multiple perspectives in carrying out case studies of the two organisations in France and in the UK (Simons, 2009; Zikmund et al., 2010).

In-depth interview is one of the main data collection methods in qualitative research as it is a powerful and flexible way to get a clear picture of people's perceptions, meanings and constructions of reality (Ghauri & Gronhaug, 2010; Yin, 2009). Among the wide variety of types of interview, those conducted through semi-structured form were selected over questionnaires to explore people's experience in Lean. Midway between structured and unstructured interviews, the subjects and problems, sample sizes, interviewees and questions are predetermined, but the respondents can use their own words and ways to answer (Ghauri & Gronhaug, 2010; Punch, 2005). Aware of the competency level necessary in such a type of data collection, the researcher had convenient access to the companies and decided to undertake individual face-to-face interviews considering these to be more appropriate when exploring opinions and experiences (see Appendix 1 for questions). Involving interaction between the researcher and the respondent on a specific topic, twelve in-depth interviews are conducted as the source of company case study data –seven from the British company and five from the French company. Participants employed in different departments and with direct experience about Lean applications were selected as the best sample of respondents for this research. Observations were recorded in the form of informal interviews and discussions and through a diary listing actions and activities, as well as the feelings and interpretations of others (Coates & Sloan, 2012).

To analyse the data a multi-method qualitative study was chosen using a non-numerical (qualitative) procedure. Specifically, the template analysis was adopted for this research. Organised in a meaningful and useful manner, the template analysis

provides the basis for the researcher's explanation or interpretation of data as well as the writing up of findings (Sullivan, 2012). Among the Qualitative Data Analysis (QDA) tools, template analysis refers to a diverse but associated group of approaches for organising and evaluating textual data in themes. The essence of template analysis is that the researcher develops a list of codes (templates) which can be single words or sentences generated from interviews questions. (Cassell & Symon, 2004; Collis & Hussey, 2009; Sullivan, 2012).

FINDINGS

It was found that the global organisation and the two companies have been displaying a growing interest in Lean implementation and Lean practices thus providing relevant and up-to-date information for the purpose of this research.

Respondents' profile

Seven interviewees in the UK Company and *five interviewees* in the French plant agree to participate in this research and provided in depth information concerning Lean practices as well as their perceptions or opinions related to the Lean philosophy. Focusing on the Lean enterprise, i.e. the implementation of Lean throughout the different departments and functions across the company, this research includes respondents from various fields as follows:

Table.1 Respondents' Profile

	British Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Gender	Male	Male	Male	Male	Female	Male	Male
Job Title	Engineer in Maintenance and CI	Planner Scheduler	Warehouse Supervisor	Logistics Manager	Customer Services Manager	Production Manager	Maintenance Engineer
Function / Activities / Responsibilities	Maintenance, Health and Safety issues, Quality, Risk assessment, CI	Schedule, Procurement, Logistics	Supervise warehouse for one type of product	Transport and warehouse functions	Customer services reclaim, supporting sales teams	Look after the team in the shop floor and machinery	Day to day maintenance, CI and health and safety aspects
Experience in the company	18 years	N.A.	19 years	1 year	N.A	19 years	10 years

	French Company				
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**
Gender	Male	Male	Male	Female	Female
Job Title	Operator	QSE and CI Coordinator	Operator	Telesales Manager	Supply Chain Manager
Function / Activities / Responsibilities	Run the machines on the slitting service	Quality (ISO 9001), environment and safety legal requirements, CI measures	Run the machines on the slitting service	Customers commands and potential new customers	Management of supplies, planning and raw materials
Experience in the company	7 years	1 year	7 years	20 years	16 years

Interviews questions

The thirtynine interview questions proposed by the researcher were divided into four main themes gathering general and specific questions, themselves breaking down in different subsections (see Appendix 1 for more detail) as follows:

Table 2. Themes and Sub-Themes for the Interviews Questions

Questions	Research Area
Q1 Awareness of Lean	
Q2 Manufacturing Management Leanness 　　　Q2.1 Continuous Improvement – Kaizen 　　　Q2.2 Standardisation 　　　Q2.3 Workplace Housekeeping – 5S 　　　Q2.4 Work flexibility – Multi-functionality and Cross training 　　　Q2.5 Visual Management 　　　Q2.6 Training 　　　Q2.7 Workforce Management – Employee Development	
Q3 Impacts of Lean on the employees and the organisation 　　　Q3.1 Organisation of Lean culture 　　　Q3.2 Work methods and practices 　　　Q3.3 Employee Feelings 　　　Q3.4 Benefits of Lean	
Q4 Critical Success Factors (CSF) 　　　Q4.1 Barriers and obstacles of Lean 　　　Q4.2 Critical Success Factors of Lean	

Analysis of Data

The answers collected from the twelve interviews and on-site observations are summarised below.

Characteristics of the investigated companies

The table below presents the characteristics of the two companies which participated in this research:

Table 3. Characteristics of the Investigated Companies

Characteristics	British Company	French Company
Size of the plant	SME - Around 40 employees	SME - 87 employees
Products - Type of Products	Paper rolls and other consumables – Printing and slitting activities	Paper rolls, thermal receipt/label products, ink and other consumables – Printing and slitting activities
Customers - Type of Customers	Distributors – End users – Products for cash registers and accounting systems	Temp agency, supermarkets, retailers, shops, haulage contractor; manufacturers.
Company's general "lean history"	• Always trying to improve but not necessarily using the term "Lean. • Started Lean in the late 90's (1994) for various different goals but not very successful until 2004/2006. • Since then, running smoothly with workout projects.	• Strong CI culture 10 years ago then decline • Kaizen method started 5/6 years ago but these initiatives stopped. Only one person, Quality manager, effectively involved in CI. • Started again since the arrival of a new plant manager. • Continuous improvement and Lean more highlighted. Involvement of all the employees.
Stated, long-term philosophy and strategy	Yes. Not detailed.	Yes. Strategy decided once a year. Four main projects: • Adjust lead times and plant interval. • Improve packaging management within ERP. • Adjust stock level to represent the reality. • Improve the productivity.
Motivations for lean implementation	• New strategy driven from the very top of the organisation. • Improve the organisation image when customers visit the company.	• Strategy from the top management team of the organisation. • Arrival of a new plant manager. • More financial resources.

Aspirations/Objectives in terms of Lean?	• The elimination of waste – Improve everyday work • Carry less stock.	• Improve the overall performance of the company. • Improve customer service.
Area lean applied	In the main departments of the organisation – Production, Sales, Logistics, Supply Chain	In the main departments of the organisation – Production, Sales, Logistics, Supply Chain, Telesales
People involved in Lean	Everybody in the company is involved in Lean.	N.A.
Geographical location	Peterborough	Nazelles

Size of the plant and cultural differences

Both belonging to the same global American printing solutions organisation, one plant was established in France and one in England. While French and English cultures are both part of Europe and are quite similar, the difference of language is worth noticing. Indeed, English is the main language in the UK Company and within the American global organisation, but French is used as the everyday language for the other plant investigated. In the latter, English is only spoken by the plant manager and most of the department managers. As for the other workers, they can understand basic English but are not competent and knowledgeable in the language. Secondly, in terms of plant size i.e. the number of employees, the two companies are different in that the UK Company has half the number of employees than the French plant. This also implies dissimilarities concerning the organisation chart and the organisation structure within the two companies.

Response to the Questions

Q1. Lean background (see Appendix 3 Table 4)

The British Company

The UK Company has always been trying to improve its processes and its activities while not necessarily saying that they are running a Lean manufacturing plant or employing the term 'Continuous Improvement'. The company attempted to introduce Lean in the late 90's, but the different strategies and goals changed and Lean was not successful until 2004/2006. From that point on, the strategy has had the full support of the whole organisation and everybody is 'getting serious about it'. (Respondent 1).

The French Company

The French company had a similar progress of change with a strong CI culture which then declined as only one person, the Quality manager, was effectively involved in CI. Finally, since the arrival of a new management style, Lean has been more prominent in the company's initiatives.

Both Companies

In addition , it can be observed that the motivation for Lean implementation in France was essentially based on changes in the new management team, while the UK employees seem be aware of the benefits of Lean at an individual level and to a greater extent than their French counterparts.

Surprisingly, two out of the twelve participants in the survey did not immediately seem to be familiar with the concept of Lean. Indeed, this first question revealed similarities and contrasts between the interviewees and companies: all the employees who were interviewed from the British plant showed an understanding of what being part of Lean meant, while for two French employees the concept of Lean was vague and they could hardly define the notion. The concepts of 'elimination of waste' and 'reduction of time', both central concepts in Lean literature, were adequately mentioned by four employees, principally British. However, the findings show that the employees interviewed mainly associate Lean with CI (Kaizen) projects, whereas in the literature this is only considered as one practice of Lean amongst others. While only one employee makes a reference to JIT, other systems such as Kanban, TQM, automation or 5S are cited by the other interviewees. Nonetheless, some employees, mostly in the French plant, define Lean in terms of 'Yellow Belt' and 'Green Belt' training.

Q2. Manufacturing Management Leanness (see Appendix 3 Table 5a to 5g))

In answer to the question regarding whether or not a continuous improvement culture was being established in the company, the twelve interviewees said that Kaizen projects and CI activities were undertaken within both companies. However, when it comes to their involvement in CI initiatives, the two French production operators

interviewed explained that they were of these types of project but were not involved in them. Notwithstanding, they add that they had been involved in brainstorming and improvements with the maintenance teams in the machines and their supervisors. These observations match the literature which shows that CI is established from top management to shop floor employees even if the latter are not familiar with the notion.

While most of the managers explain running between one or two CI projects similar to "quality circles", often in relation with their training certification, Respondents 7 and 5 do not mention a specific project as they consider being involved in CI as being part of their everyday work but not in the form of an official project (Maleyeff et al., 2012; Soderquist & Motwani, 1999). This observation is similar on the French side.

Concerning the type of improvements implemented or problems solved, the French employees mainly referred to the four principal projects decided in the management review. Indeed, the English company seems more focused on the processes and the material flow within the factory whereas in France, the priority is given to the adjustment of the information management within ERP.

Both companies make use of a Lean toolbox software conceived by the global American organisation. This software, called 'Quality Companion', gathers various Lean tools and templates essential to the Lean philosophy. During the interviews, three English and three French employees stated that they used this software for the CI projects. The fishbone tool, 5S templates, DMAIC project template or Value Stream Mapping (VSM) are amongst the most popular tools used by the interviewees in the British company. For the three managers who use Quality Companion, two of them continued working with it only for the Green Belt and Yellow Belt certification.

Although the researcher was not able to get answers from all the employees interviewed on this topic, the findings show that almost half of the respondents affirmed the absence of work standard forms. Respondent 10 explains that setup and work procedures used to exist in the French company whereas Respondent 6 in the UK states that standardised forms are part of a future project to reduce the setup times. Further, the CI coordinator in France confides a willingness to standardise the documentation with the UK plant in the near future.

For the most part, these forms are available and displayed in the working place so that employees can refer to them. Concerning support functions such as sales and supply chain, the work standard documents are mostly in the form of electronic documents. The interviewees were clear about this section: while there is a 5S program audited on a regular basis in the British company, this kind of program does not exist in the French plant. Indeed, the company in Peterborough has been running a 5S program for the last four or five years and decided to launch a new 6S program taking a different approach - the sixth "S" representing the security aspect. Instead of the plant manager doing the audits, twenty-seven people from the production area offices have been trained to undertake these audits. However, surprisingly, none of the interviewees mentioned displaying the results of 5S or 6S audits in the work place. One possible explanation could come from the fact that the new program has been launched recently and may not have provided significant results until now or may not be totally in place.

Conversely, the French company had not yet implemented 5S audits within the work environment. Respondent 9, the CI coordinator, explained that a 5S program was planned to be introduced in France in collaboration with the UK plant to develop new audit sheets and standardise this process within both companies. In addition to the audits program not being in place, the process of eliminating waste through 5S process is not established either since Respondent 10, 11 and 12 admit that the 5S program is not regularly undertaken in the offices.

Of interest regarding the question concerning employees' perception of the workplace is the variety of answers. These observations are well explained by Respondent 8 who argues that the cleanliness and order of the workplace depends on the employee who works on the machine as no standards are available to dictate the right methods (Saurin, Marodin, & Ribeiro, 2011).

All the interviewees who answered this question agreed on the existence of interchangeability within the company. However, it is essential to notice that this interchangeability of work is mainly undertaken within a team performing the same function and not among departments as suggested by Biazzo and Panizzolo (2000) and Olivella et al.(2008). The two exceptions are in Britain. Nevertheless, even though

they claim to be able to work in these different departments, no training is regularly undertaken as they consider that the process and work has not changed over the years.

As for employees in the production area in the UK, they are fully trained on a range of machines from the slitting to the printing area, and cells rotations are often undertaken. By contrast, the French operators (Respondents 8 and 10) talked of being able to work only on some of the machinery. Thus, as respondent 9 explains there is not a total and complete flexibility within the production area.

In France, in other departments such as sales and SC, interchange is fully implemented and flexibility is possible between people in the given department. A formal control over the competences of each employee has existed on the form of a skill matrix in the production area in France since 2011 and in the warehouse area in UK. Surprisingly, the matrix was not mentioned in other departments in Britain and France even though the Lean philosophy recommends its application in all the different functions within a company (Bamber & Dale, 2000; Olivella et al., 2008).

Cross-functional teams are intensively used within both companies for the CI projects which included at least two persons from two different departments as mentioned earlier. A significant difference exists between the French and the UK Company when it comes to visual management.

For the British plant, most of the visual management in place displays information in the area about the corrective actions plan and the respective people responsible for these improvements. The researcher's on-site observations conclude that a list of suggestions for improvement is also displayed on the shop floor along with the name of the employee and the potential solution. Visual management is mainly also used in relation with the 6S program displaying colours and labels in the workstation. In terms of Lean performance measures, the main interest of the company is in 6S results displayed for each area as well as in the form of a master one for the whole plant.

The French company has taken a different approach displaying information concerning productivity and efficiency of the area with the respective results and

indicators. Respondent 10 mentions that information concerning new projects and new implementations are displayed on the notice board available on the shop floor. However, the results and the progress of the different projects are not communicated to the employees and no respondent mentioned the presentation of Lean performance measures within the company.

In response to the question about training, all employees from both companies immediately mentioned the Green Belt and Yellow Belt Lean training certification, with Yellow Belt training being in less depth than Green Belt. Indeed, both companies intend to get most people Green Belt or Yellow Belt certified. At the same time, no Black Belt person (the most advanced qualification in Lean 6 Sigma) was on any of the two sites since one Black Belt person is available in Scotland to answer potential employee's questions.

Moreover, employees are trained concerning the 6S audits only in the UK since it has not yet been established in France. Some 'refreshing' training or continuing training, essential for Lean practitioners, exist within the British company as explained by Respondent 6 (Bamber & Dale, 2000; Black, 2007).

In keeping with the Lean literature which suggests training opportunities from the shop floor to the top management, the British company seems in a good position. Concerning the French plant, the two production operators claim that they know of Green Belt and Yellow Belt training within the company but they have not yet been invited to undertake such training. The reason might be that the priority is given to the managers or that the training has not yet been adapted for them.

Learning 'by doing' was observed in France through the initial internal training for operators during the first three months after a new employee's arrival in the company. However, the continuity of training in Lean practices and the evolution of this are not always regularly considered.

Participants mentioned fairly good communication within the UK Company with KPI meetings every week which improve the top-down communication between management teams and employees. Regular shift meetings also exist with the

employees and the teams. In addition to that, committee meetings allow discussion of actions from previous meetings with members from each department. They also provide for issues to be reported.

However, in the French plant, employees in the production area feel a lack of top-down communication from the management team while communication between employees through day-to-day instructions is running smoothly. According to Respondent 10, the notice board, the function of which was to communicate information from the management team, gathered too much information which prevented an adequate information exchange resulting in communication which was not in keeping with the information-givers' intentions. In addition to that, the weekly staff meetings held on the shop floor giving information about present and future actions (mentioned by Respondent 9) seem not to be regularly conducted. The CI coordinator also adds that no regular meetings exist concerning the progress of the CI projects, but that more informal follow up is pursued, an idea also stressed by managers.

As suggested in the literature, a suggestions scheme was established in the British plant where employees come up with improvement suggestions related to quality, safety or process issues. The management team then selects the workable suggestions once a month for an in-depth investigation in order to decide whether to implement or reject the idea. Respondent 1 insists that feedback is always given to the employee and that this system has been very successful. The same system existed in France a few years ago and is about to be introduced again instead of the actual system where employees make suggestions verbally.

The company reward system in the UK consists of a system of points which are then turned into loans or vouchers for use in the organisation online store which awards people who have made good suggestions. Incentives are also awarded for people involved in cross training in the warehouse area. The same scheme has existed in the French company for one or two years. However, the French company now mostly gives these rewards for employees' productivity or performance rather than for suggestions. Moreover, the CI coordinator, Respondent 9, argues that rewards for a production record will change from an individual basis to a team basis and that the

reward scheme is about to include new items such as 5S compliance, suggestions for improvement and solution of a complex problem. Thus, this proposition would be more in harmony with Olivella et al. (2008) and Liker (2004) considerations of Lean practices.

Q3. Impacts of Lean on employees and the organisation (see Appendix 3 Table 6a and Table 6c)

Both companies agree that a Lean culture has existed in the organisation for four or five years in the UK plant and for a few years for the French company. Employees perceive that the company is more and more involved in CI and that a real change has been implemented, in particular in France, even though respondent 10 did not feel very affected by this.

Communication of the company vision and objectives has partially been carried out within the British company. Though employees are aware of the focus of the organisation on CI and the implementation of the new 6S programme, there is no clear information about the overall strategy in place in terms of Lean.

At the same time in France, the decision concerning the company's Lean strategy and CI projects was decided on following a vote during a management committee meeting. These remarks show the willingness of the company to communicate its Lean objectives and vision with the managers. Nevertheless, communication of CI projects, and 5S programs in particular, is not communicated to the workers on the shop floor. For the 5S there is an unwillingness on the part of the management team to use the names of Lean concepts such as 5S or Kaizen as they consider that employees on the shop floor would be reluctant to undertake such projects since they were implemented years ago. For shop floor employees, communication between colleagues and word-of-mouth communication is often the main way to be made aware of the new projects implemented. Management engagement and commitment to Lean was perceived by all the employees interviewed by this project in France and Britain. Respondents understand that leadership is behind the CI strategy. In particular, in both plants, the plant manager supports CI activities.

The Black Belt representative also supports CI activities of the employees, and is available anytime during the projects being very supportive to the CI manager. As respondent 3 in the UK explains, 'management is always pushing for CI' and the support from the management team comes also with financial resources accepted for the actions undertaken. This contrasts with Respondent 8 in France who mentioned a lack of listening on the part of the management team and commented that the improvement projects only came from the management team.

According to Respondent 1, CI projects represent supplemental activities at the start of the project and a couple hours a week as well as additional responsibilities. However, most of the respondents identify Lean production implementation as part of their everyday work and 'people naturally get involved in improving in their daily work' (Respondent 12) and it is not seen as a 'burden' as stated by Wickramasinghe and Wickramasinghe (2011) or de Treville and Antonakis (2006).

Concerning the tools used in the company such as the software Quality Companion, Respondent 1 and 2 indicate that the software provides very good tools, many types of data analysis and is very accommodating.

This opinion is not necessarily shared by the French employees. Even though Respondent 12 considers the software very useful for presentations or flow charts, Respondents 9, 11 and 12 consider the software and tools complicated and the formalisation difficult. It offers a complete set of tools but with 'poor quality and limited tools' (Respondent 9).

Training received by Green Belt and Yellow Belt through a week of very intense training received good feedback in the UK. The availability of the Black Belt and his regular visits or courses provide employees with an on-going mentoring by a trainer very experienced in Lean tools. However, two respondents in the UK factory stated that training is beneficial only if you practise what you have just been taught straight afterwards.

In the French company, people who received the Yellow Belt training in French gave very good feedback and would extent the Lean training in the different services and

throughout the whole team. The main drawback observed by employees is seen in the difficulty to apply and adapt the concepts and the training received in the reality of the job context which corroborates with the British feedback. Moreover, the training received in English during a whole week was too theoretical and too detailed. As a result, employees all agreed that 'refreshing' in Lean training or in other skills would be necessary to go back into the basics and be more efficient in using the different tools.

The interviewees understood that Lean is important in the interest of everyone and that CI impacts all the departments. Respondents 3, 9 and 11 noted that Lean, and especially 5S, is essential for the good image of the company towards customers. In addition, they felt that Lean is an advantage in their work in terms of flexibility, interest of the individual in their everyday work, and in a clean environment. However, Respondent 9 explained that employees often consider Lean as another discipline in the same way they would consider quality. In this context, blue collar workers sometimes consider Lean to be something far from their own priority.

As far as the managers interviewed in the UK and French plant are concerned, they are all involved in CI projects and are willing to be part of them. An essential point is the willingness of workers in the production area to be involved in CI projects (5S for instance) and to learn new things in the work place which is one of the key aspects of Lean as argued by Wickramasinghe and Wickramasinghe (2011).

The social climate in the Lean environment is based on teamwork since employees are autonomous in their work. While employees consider Lean to be a motivating factor for their work and give good feedback concerning 6S audits in particular, Respondent 6 observes that improving and speeding up the process might mean a reduction in the workforce for some people, thus implying worse career prospects or insecurity in their jobs. This observation corresponds with the statements made by Delbridge et al. (2000) and Landsbergis et al. (1999). French employees do not perceive Lean in a negative way at a personal level but point out the difficulty and reluctance of employees to change. In addition, Lean projects might represent more pressure at work due to lack of human resources.

Respondent 1 clearly points out that employees need variety in their work and argue that for this reason the management decided to launch a new 5S or 6S program. Lean offers a variety of work to employees through their involvement in training and audits as well as in asking for their feedback in the programs launched. Managers have opportunities to develop themselves at work with Lean and CI projects which are always different. At the same time, the autonomy given to employees on the shop floor encourages them to explain and solve problems by themselves. This feeling is also present in the French factory as people are satisfied when using a file or tool they produce themselves as part of a CI project.

'Lean is important for everything' (Respondent 1). This sentence summarises the opinion and perception of Lean for most of the employees interviewed. According to the UK employees, Lean is essential for the performance and efficiency of the company by keeping the business competitive in minimising cost. In this way, Respondent 2 feels that Lean makes their job more secure and represents a certain sense of fulfilment when they see the results and what they contribute to. In the French company, respondents regard Lean implementation as a solution for saving time and realise it makes their everyday work easier.

The only negative opinion is from Respondent 10 who reports that, even though there is a need for more frequent maintenance actions there are not many opportunities to the improve the quality of the machine work and, and that 5S or 6S do not represent improvements.

Q4. Barriers and obstacles towards Lean adoption or expansion (see Appendix 4 Table 7)

While not mentioned in the literature, insufficient time to adopt or expand Lean is the main obstacle cited by employees from both companies. Employees do agree that it is difficult to find the balance between every day's work and time to conduct and complete CI projects with the team.

The second obstacle is the money and investment issue to get the best equipment for improvement. This is directly related to another barrier raised by respondents, namely

insufficient workforce, in particular for French employees. Another factor is the difficulty on the part of the employees to understand and accept the long-term benefits of Lean.

Almost unanimously, interviewees agreed that leadership engagement and commitment in Lean and CI projects is the main Critical Success Factor (CSF). Alongside this, regular communication and meetings reflect the importance of top management support for a successful Lean adoption. In addition, time, workforce and financial resources also represent an important factor to consider in order to implement successful change. This corroborates with the barriers stated previously.

CONCLUSION

While numerous frameworks or assessment measurement tools exist in order to evaluate the implementation of Lean in organisations, the theoretical framework described in the literature review chapter has been a powerful and effective tool to investigate Lean practices and employees' perceptions of this operational concept.

Among the richness of practices undertaken by companies, the literature shows that JIT and Continuous Improvement projects are the main tool. Moreover, we can notice that the literature mainly focusses on Lean practices in the production area and on the shop floor level.

Key findings are as follows;

Investigation in the two case studies

The interviews revealed that managers were familiar with the concept of Lean but employees on the shop floor were unaware of the purpose of this philosophy even though they had heard the name. Moreover, the interviews showed that employees mainly associate Lean with *Continuous Improvement* projects or with their training certification. In that sense, the concept seems understood from a personal point of view rather than from an overall consideration of the root and purpose of the philosophy. *The basis and origin of this way of thinking should be clearly explained and*

described to employees throughout the company. By going back to the origins of TPS, the recommendation for companies is to develop and communicate their strategy from top management teams, to managers and employees on the shop floor.

Both organisational cultures are involved in CI projects or Kaizen projects with cross-functional teams and leaders associated with the projects. Similar to the "quality circles" mentioned in the literature, these CI projects are mostly year-long projects and gather two or three employees at some point along the project. *Closer to what Lean suggests, these Kaizen events could be in the form of 'Mini Point Kaizen' with groups or teams of six and undertake improvement workshop affecting their collective work with one or two day activities.*

Standardisation was not the strong point of Lean practices in either of the two companies. Indeed, documented work standard forms are principally used electronically within the sales department for customers' purposes and few respondents mentioned the use of standard forms in their everyday work. However, standard work is a pillar of Lean philosophy in that it is the basis for CI showing what the best way to do a given task is. *Standards should include information about work time, work sequence and standard work-in-progress according to Bicheno (2004). Management should use the operator standard as a check that the proper process is being followed and therefore there is minimal risk of waste or rejects or poor service.*

In terms of housekeeping and cleanliness of the work environment, the 5S or 6S program is established or about to be established in both the companies. Integrating Safety separately as the sixth 'S' of this method may be confusing for Bicheno (2009) who argues that safety should rather be included in aspects of each of the five stages. The audits system regularly undertaken in the British company is in keeping with the Lean best practice. *One possible recommendation for manufacturing companies would be to display the results for all areas systematically on a board showing comparisons with the last period. One tip could also be to include 5S project into the company's Lean strategy and institute 5S in their individual objectives as part of their overall performance.*

Interchange ability is an existing practice within the two companies' case study. Most often undertaken within a same function or team, some employees stated that they

were able to work in another department for the UK plant. Indeed, cross-training workers contribute to job flexibility in case of holidays, breaks or sick leave. Even though a new rotation provides a renewed view of the workplace, people need to be trained into the new position. The visibility and update of employees' competences through a cross-training matrix are, however, a practice only mentioned in the UK warehouse. *This matrix should be developed across the company and present the different employee alongside their skills and competences in the area and their actual level of training. The matrix would allow supervisors and team leaders to decide the assignment of a worker as well as track the training plan.*

As the interviews results show, Visual Management is often an area that people shy away from. While the UK Company principally displays corrective action plans and suggestions, the French company prefers general company information based on productivity and efficiency. *In that sense, both companies have to develop their implication in this practice and some of the information displayed by companies could also include professional signage, colour coding, floor marking, visual procedures or shadow boards.*

A consistent training for individuals and teams to work within the Lean philosophy is essential to achieve exceptional results. Training concerning the Lean six sigma philosophy, known as Green Belt, Yellow Belt or Black Belt, are/is the principal training schemes in the industry and undertaken in both companies. This special infrastructure of "Champions" leads and implements the Lean approach. Nevertheless, the results revealed that no Black Belt existed on-site (only remotely) in either of the two companies, despite being essential to guide Lean philosophy and the projects undertaken. Moreover, the lack of training on the shop floor also shows the lack of involvement of shop floor workers in Lean. It is also apparent that training in general is not undertaken on a continuous basis as proposed by Lean proponents.

Regular meetings between top management teams and department managers are the reasons for the good top-down communication mentioned by interviewees. However, employees on the shop floor, in particular in the French company, do not share the same point of view regarding oral communication and written information on the board.

The suggestion scheme and reward system are practices known by both companies. Using a system of points within the organisation online store, they reward suggestions, cross-training as well as production record, 5S compliance or resolution of problems. The reward system is different in both companies and does not seem exactly and clearly developed: it is essential to have a well-defined program on an individual or team basis.

Impacts of Lean on employees' perceptions and on the organisation

The establishment of a long-term strategy with fixed goals and objectives is essential and should be communicated to the overall company and even to the extended enterprise with suppliers and customers. While this practice exists in the French company, the possible recommendation is always to get all employees from shop floor to the management involved in CI projects and Lean practices. At the same time, the findings show the engagement, commitment and support of the management teams within both companies for the satisfaction of the employees. Yet, the opportunity to have a Black Belt employee on-site would be beneficial in order to implement the Lean strategy across the company and have close support from someone experienced in the area. *The latter would also be very helpful for the management of change which can present some difficulties, in particular with experienced employees.*

The Lean toolbox available to employees through the Quality Companion software represents an interesting solution to make Lean tools, such as DMAIC and VSM, available to employees. As far as this practice is concerned, employees were divided in the effectiveness and usefulness of this software. In addition to the issue of practicality, Lean philosophy advocates that people need to be familiar with these practices and trained to effectively and easily use them. In this context, training is supposed to be founded on comprehension of the basic principles of Lean thinking and a continuing, regular training in the different tools and practices associated with it. *More practical, regular, pragmatic training would then be beneficial for both the company and its employees.*

Developing yourself at work, having a good teamwork climate and greater involvement of people are some of the benefits of Lean on people and on the company that we

identified in both companies. *This positive feedback remains essential and should be to communicated to employees, especially shop floor employees, who may not be familiar with top management decisions.* Further, it is important for Lean culture survival that workers consider Lean in association with security of job, better career prospects and better work conditions (Delbridge et al., 2000; Landsbergis et al., 1999; Seppälä & Klemola, 2004).

Critical Success Factor of Lean adoption

This research has identified the Critical Success Factors (CSF) for a Lean implementation by interviewing employees in two manufacturing companies. The identified CSF provides useful insight for the overall improvement of companies into successfully adopting a Lean approach.

The results show that management commitment and involvement are the principal elements in a successful Lean change. This commitment from the leadership team is essential to counterbalance the insufficient resources of time and funding identified as the main barriers. Indeed, these obstacles prevent companies from properly being involved in CI projects and from dedicating time to Lean thinking. Insufficient financial resources also inhibit Lean practices, such as training, which represent an essential element in employees' involvement according to de Treville and Antonakis (2006).

Finally, in contrast to Achanga et al. (2006), this study points out that organisations are aware of the potential benefits of Lean but the main limitation is the participation of employees at all levels and across the company. Too often, Lean activities are undertaken at the managerial level and to a lesser extent at shop floor level.

Cultural or organisational differences

In terms of cultural difference, the most striking result to emerge from the data is that language is an essential determinant of people involvement in Lean. As English is the official language in the parent company (US), training in Lean tools software as well as

in the 6 sigma (Belt training) are undertaken in English in all the subsidiaries. It does not represent a problem in the British company but may raise some issues in the French company. Even though the plant manager and most of the managers speak English, most of the employees are not familiar with this language.

Apart from the issue of language, the UK Company seems more invested in Lean as 5S audits, standards, suggestions and rewards systems are already implemented whereas they are still in progress for the French company. These dissimilarities might be explained by the fact that the change in Lean approach within the French company was mainly implemented after the arrival of the new plant manager one year ago and the CI coordinator one and a half years ago. Thus, it is understandable that the progress and the practices implemented remain in the state of development as Lean is an on-going and incremental system.

This difference also reflects the fact that English employees are more familiar with the concept of Lean and its purpose of eliminating waste across the whole company and not just from an individual point of view. This, however, contradicts with Sezen et al. (2012) who argue that Lean practices are more commonly practiced by large organisations with a higher number of employers.

Finally, even though the two companies belong to the same global American organisation thus following the same Lean strategy decided by the top management teams, this research demonstrates that the plant manager and the management style as well as the employees largely influence the level of implementation of Lean within the company. *With the same resources and the same way of working, internal determinants play a critical part in Lean adoption*.

Research limitations

This research is in part based on a comparison of Lean approach between one manufacturing plant in the UK and one manufacturing plant in France. Even though they both belong to the same global organisation, the two companies differ in their size and thus in their organisational structure. In this context, the samples between both companies were different in terms of job position distribution. The production

area was represented in both samples but was represented by a production manager in UK and two shop floor employees in France. At the same time, representatives from the logistics and the warehouse sections were not covered in the French sample. Thus, these dissimilarities may have affected the results. Furthermore, the findings gathered from these two manufacturing companies should be considered with attention. With a limited number of interviews in only two companies being investigated, the conclusions may not represent a reliable picture of the current practices within every company and therefore we cannot generalise this finding for all. An accurate picture would have been possible by interviewing all the employees within both organisations. Nevertheless, time and financial restraints limited this possibility.

References

Achanga, P., Shehab, E., Roy, R., & Nelder, G. (2006). Critical success factors for lean implementation within SMEs. *Journal of Manufacturing Technology Management, 17*(4), 460–471. http://dx.doi.org/10.1108/17410380610662889

Ahlstrom, P. (1998). Sequences in the implementation of lean production. *European Management Journal, 16*(3), 327–334.

Atkinson, P. (2010). 'Lean' is a cultural issue. *Management Services, 54*(2), 35–42.

Bamber, L., & Dale, B. G. (2000). Lean production: A study of application in a traditional manufacturing environment. *Production Planning and Control, 11*(3), 291–298.

Bhasin, S. (2012). An appropriate change strategy for lean success. *Management Decision, 50*(3), 439–458. http://dx.doi.org/10.1108/00251741211216223

Bhasin, S. (2012). Prominent obstacles to lean. *International Journal of Productivity and Performance Management, 61*(4), 403–425. http://dx.doi.org/10.1108/17410401211212661

Bhasin, S., & Burcher, P. (2006). Lean viewed as a philosophy. *Journal of Manufacturing Technology Management, 17*(1), 56–72. http://dx.doi.org/10.1108/17410380610639506

Biazzo, S., & Panizzolo, R. (2000). The assessment of work organization in lean production: The relevance of the worker's perspective. *Integrated Manufacturing System, 11*(1), 6–15.

Bicheno, J. (2004). *The new lean toolbox - towards fast, flexible flow.* Buckingham, UK: PICSIE Books.

Bicheno, J., & Holweg, M. (2009). *The lean toolbox - the essential guide to lean transformation.* Buckingham, UK: PICSIE Books.

Black, J. (2007). Design rules for implementing the Toyota production system. *International Journal of Production Research, 45*(16), 3639–3664. http://dx.doi.org/10.1080/00207540701223469

Brown, K. A., & Mitchell, T. R. (1991). A comparison of JIT and batch manufacturing: The role of performance obstacles. *The Academy of Management Journal, 34*(4), 906–917.

Browning, T. R., & Heath, R. D. (2009). Reconceptualizing the effects of lean on production costs with evidence from the F-22 program. *Journal of Operations Management*, 23–44. http://dx.doi.org/10.1016/j.jom.2008.03.009

Cassell, C., & Symon, G. (2004). *Essential guide to qualitative methods in organizational research.* London, UK: SAGE Publications Ltd.

Coates, N., & Sloan, D. (2012). *The Newcastle Business School Masters Dissertation.* Harlow, UK: Pearson.

Collis, J., & Hussey, R. (2009). *Business Research: A practical guide for undergraduate and postgraduate students.* Basingstoke, UK: Palgrave Macmillan.

Corbett, S. (2007). Beyond manufacturing: The evolution of lean production. *The McKinsey Quarterly*, *3*, 95–105.

de Treville, S., & Antonakis, J. (2006). Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues. *Journal of Operations Management*, *24*(2), 99–123. http://dx.doi.org/10.1016/j.jom.2005.04.001

Delbridge, R., Lowe, J., & Oliver, N. (2000). Shopfloor responsibilities under lean teamworking. *Human Relations, 53*(11), 1459–1479.

Doolen, T. L., & Hacker, M. E. (2005). A Review of Lean Assessment in Organizations An Exploratory Study of Lean Practices by Electronics Manufacturers. *Journal of Manufacturing Systems, 24*(1), 55–67.

Eswaramoorthi, M., Kathiresan, G. R., Prasad, P., & Mohanram, P. (2011). A survey on lean practices in Indian machine tool industries. *International Journal of Advanced Manufacturing Technology*, *52*(9–12), 1091–1101.

Ghauri, P., & Gronhaug, K. (2010). *Research methods in business studies.* Harlow,UK: Pearson.

Gurumurthy, A., & Kodali, R. (2011). Design of lean manufacturing systems using value stream mapping with simulation a case study. *Journal of Manufacturing Technology Management, 22*(4), 444–473.

Hines, P., Holweg, M., & Rich, N. (2004). Learning to evolve A review of contemporary lean thinking. *International Journal of Operations & Production Management, 24*(10), 994–1011.

Hines, P., Martins, A. L., & Beale, J. (2010). Testing the boundaries of lean thinking: Observations from the legal public sector. *Public Money & Management, 28*(1), 35–40. http://dx.doi.org/10.1111/j.1467-9302.2008.00616.x

Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management*, *25*(2), 420–437.

Jayaraman, K., Kee, T. L., & Soh, K. L. (2012). The perceptions and perspectives of Lean Six Sigma (LSS) practitioners an empirical study in Malaysia. *The TQM Journal, 24*(5), 433–446.

Jha, S., Noori, H., & Michela, J. L. (1996). The dynamics of continuous improvement - aligning organizational attributes and activities for quality and productivity. *International Journal of Quality, 1*(1), 19–47.

Karlsson, C., & Åhlström, P. (1996). Assessing changes towards lean production. *International Journal of Operations & Production Management, 16*(2), 24–41.

Krafcik, J. F. (1988). Triumph of the lean production system. *Sloan Management Review, 30*(1), 41–52.

Landsbergis, P. A., Cahill, J., & Schnall, P. (1999). The impact of Lean production and related new systems of work organisation on worker health. *Journal of Occupational Health Psychology, 4*(2), 108–130.

Li, S., Rao, S. S., Ragu-Nathan, T. S., & Ragu-Nathan, B. (2005). Development and validation of a measurement instrument for studying supply chain management practices. *Journal of Operations Management*, *23*(6), 618–641. http://dx.doi.org/10.1016/j.jom.2005.01.002

Liker, J. K. (2004). *The Toyota way: 14 Management principles from the world's greatest manufacturer.* New York, NY: McGraw-Hill.

Losonci, D., Demeter, K., & Jenei, I. (2011). Factors influencing employee perceptions in lean transformations. *International Journal of Production Economics*, *131*(1), 30–43.

Maleyeff, J., Arnheiter, E. A., & Venkateswaran, V. (2012). The continuing evolution of Lean Six Sigma. *The TQM Journal, 24*(6), 542–555.

Mehri, D. (2006). The darker side of lean: An insider's perspective on the realities of the Toyota production system. *Academy of Management Perspectives*, *20*(2), 21–42.

Meiling, J., Backlund, F., & Johnsson, H. (2012). Managing for continuous improvement in off-site construction Evaluation of lean management principles. *Engineering, Construction and Architectural Management, 19*(2), 141–158.

Nasab, H. H., Bioki, A. T., & Zare, K. H. (2012). Finding a probabilistic approach to analyze lean manufacturing. *Journal of Cleaner Production, 29*(30), 73–81.

Olivella, J., Cuatrecasas, L., & Gavilan, N. (2008). Work organisation practices for lean production. *Journal of Manufacturing Technology Management, 19*(7), 798–811.

Pavnaskar, S. J., Gershenson, J. K., & Jambekar, A. B. (2003). Classification scheme for lean manufacturing tools. *International Journal of Production Research, 41*(13), 3075–3090.

Perez, M. P., & Sanchez, A. M. (2000). Lean production and supplier relations: A survey of practices in the Aragonese automotive industry. *Technovation*, *20*(2), 665–676.

Pettersen, J. (2009). Defining lean production: some conceptual and practical issues. *The TQM Journal, 21*(2), 127–142.

Punch, K. F. (2005). *Introduction to Social Research: Quantitative and Qualitative approaches.* London, UK: Sage.

Salem, O., Solomon, J., Genaidy, A., & Minkarah, I. (2006). Lean construction: From theory to implementation. *Journal of Management of Engineering*, *22*(4), 168–175.

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students.* Edingurgh, UK: Pearson Education Limited.

Saurin, T. A., Marodin, G. A., & Ribeiro, J. L. (2011). A framework for assessing the use of lean production practices in manufacturing cells. *International Journal of Production Research, 49*(11), 3211–3230.

Scherrer-Rathje, M., Boyle, T. A., & Deflorin, P. (2009). Lean, take two! Reflections from the second attempt at lean implementation. *Business Horizons*, *52*(1), 79–88. http://dx.doi.org/10.1016/j.bushor.2008.08.004

Sekaran, U., & Bougie, R. (2010). *Research methods for business: A skill building approach.* Chichester, UK: John Wiley and Sons.

Seppälä, P., & Klemola, S. (2004). How do employees perceive their organization and job when companies adopt principles of lean production? *Human Factors and Ergonomics in Manufacturing, 14*(2), 157–180.

Sezen, B., Karakadilar, I. S., & Buyukozkan, G. (2012). Proposition of a model for measuring adherence to lean practices: Applied to Turkish automotive part suppliers. *International Journal of Production Research, 50*(14), 3878–3894. http://dx.doi.org/10.1080/00207543.2011.603372

Shah, R., & Ward, P. T. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management*, *21*(2), 129–149.

Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management*, *25*(4), 785–805. http://dx.doi.org/10.1016/j.jom.2007.01.019

Sim, K. L., & Rogers, J. W. (2009). Implementing lean production systems: Barriers to change. *Management Research News, 32*(1), 37–49. http://dx.doi.org/10.1108/01409170910922014

Simons, H. (2009). *Case study research in practice.* London, UK: Sage.

Soderquist, K., & Motwani, J. (1999). Quality issues in lean production implementation: A case study of a French automotive supplier. *Total Quality Management, 10*(8), 1107–1122. doi:0954-4127/99/081107-16

Sullivan, D. (2012). *Exploring text with qualitative data analysis: Using a dialogical approach.* London, UK: Sage.

Vidal, M. (2007). Lean production, worker empowerment, and job satisfaction: A qualitative analysis and critique. *Critical Sociology*, *33*(1–2), 247–278.

Vinodh, S., & Chintha, S. K. (2011). Leanness assessment using multi-grade fuzzy approach. *International Journal of Production Research, 49*(2), 431–445. http://dx.doi.org/10.1080/00207540903471494

Vinodh, S., & Joy, D. (2012). Structural Equation Modelling of lean manufacturing practices. *International Journal of Production Research, 50*(6), 1598–1607.

Warnecke, H. J., & Hiiser, M. (1995). Lean production. *International Journal of Production Economics*, *41*, 37–43.

Wickramasinghe, D., & Wickramasinghe, V. (2011). Perceived organisational support, job involvement and turnover intention in lean production in Sri Lanka. *International Journal of Advanced Manufacturing Technology, 55*, 817–830. http://dx.doi.org/10.1007/s00170-010-3099-z

Womack, J. P., & Jones, D. T. (1996). *Lean thinking - banish waste and create wealth in your corporation.* London, UK: Simon & Schuster UK Ltd.

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world.* New York, NY: Rawson Associates.

Woodside, A. G. (2010). *Case study research: Theory - methods - practice.* Bingley,UK: Emerald Group Publishing Limited.

Yin, R. K. (2009). *Case study research - design and methods.* London, UK: Sage.

Yin, R. K. (2011). *Qualitative Research from start to finish.* New York, NY: The Guilford Press.

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2010). *Business research methods.* Mason,Ohio: South Western Cengage Learning.

Appendix 1: **Semi-structured Interview Questions**

Introduction

- Presentation of the dissertation topic and purpose
- Anonymity and Confidentiality issues
- Filling of the consent form
- Any questions before starting?

The interviewee – Personal questions

- Years of experience in the company
- Department
- Function
- Job Title
- Activities / Responsibilities

Characteristics of the investigated company – General Question

** Only for the Lean manager / Plant Manager**

Characteristics
Number of employees (Size of the plant i.e. SME …)
Products - Type of Products
Customers - Type of Customers
Organisational structure
Annual turnover (£) millions
Volume of production
Worker attributes: Age, Gender
Geographical location
Age of the organisation

Table G - Characteristics of the investigated companies: Interviews

Lean Strategy

** Only for the Lean manager / Plant Manager**

- Does the organisation have a settled long-term philosophy and objectives?

If yes, what is this strategy?

If no, why?

- Why was Lean primarily adopted by the company? What has motivated the plant to implement Lean production?

- What are your aspirations / your objectives in terms of Lean Manufacturing? And what do you expect from it?

- Can you tell me more about the company's general "lean history": What are your current and previous lean initiatives? Where has it been implemented? Which area?

- How many employees participate in Lean activities? Who is responsible for lean efforts?

1. **AWARENESS OF LEAN**

   1.1. Are you familiar with the concept of Lean or Lean Manufacturing / Lean Production?

   1.2. If no, are you familiar with the following concepts: Six Sigma – 5S – Black Belt – Continuous Improvement – Kaizen – JIT….?

   1.3. If yes, what is your definition of Lean manufacturing? How can you define Lean philosophy?

2. **MANUFACTURING MANAGEMENT LEANNESS**

   2.1. Continuous Improvement - Kaizen

   2.1.1. Is the continuous improvement culture established in your company and are you involved in continuous improvement initiatives (Kaizen groups)? How often?

   2.1.2. If yes, what kind of improvements / problem solving? What frequency?

   2.1.3. Do you use some problem-solving tools such as: Root cause analysis/Cause and Effect diagram / 5 Why? Value Stream Mapping (VSM)? What frequency?

   2.2. Standardisation

   2.2.1. Do you use documented work standard forms?

   2.2.2. If yes, what information is included in the forms?

   2.2.3. If no, is that a decision from the company?

   2.2.4. Are the standard forms displayed for supervisors and auditors of the compliance with standards (or only in computers)?

   2.2.5. Are the standards updated on a regular basis? What frequency?

2.2.6. Are there audits to check compliance with work standards on a regular basis? What frequency?

2.3. Workplace housekeeping - 5S

2.3.1. Is there a 5S program audited on a regular basis? What frequency?

2.3.2. If yes, are the results of 5S audits posted in the cell?

2.3.3. How is the work place in general?

2.4. Work flexibility – Multi functionality and Cross training

2.4.1. Is interchange ability of personnel possible from one section to the other? Is cross-training fully implemented? What frequency?

2.4.2. For the manager: Do you have any means of formal control over the skills of each worker in this cell, such as a skills matrix?

2.4.3. Are there cross-functional teams to solve problems?

2.5. Visual management

2.5.1. Do you have visual management in place in order to share information in the company? If yes, what kind of information is presented?

2.5.2. Are Lean performance measures displayed and presented?

2.6. Training: What training, if any, do you undertake? What frequency? How is it undertaken?

2.7. Workforce Management – Employee Development

2.7.1. Is the information exchange / communication running smoothly and clearly visible?

2.7.2. Is there any employee suggestion system where workers are encouraging to bring problems?

2.7.3. What kind, if any, formal reward / pay for performance system exists in your company?

3. IMPACTS OF LEAN ON EMPLOYEES AND THE ORGANISATION

3.1. Organisation Lean Culture

3.1.1. According to you, is there a Lean culture in your company?

3.1.2. Are you aware of where and how the Lean production is implemented? Communication of the company vision and objectives?

3.1.3. Management engagement and commitment: Do you think that management's attitude is appropriate for Lean?

3.1.4. Management of change: How does your organisation undertake the changes at your workplace?

3.2. Work methods and practices

3.2.1. Since the lean production was implemented, do you have the feeling that you have had to do more supplemental activities?

3.2.2. What do you think about the Lean tools used in the company?

3.2.3. Training: Do you think that an appropriate training is provided to operate Lean?

3.3. Employee feelings

3.3.1. Belief: Do you believe in the importance of Lean?

3.3.2. Commitment / Involvement: Are you involved in Lean / Solving problem groups? Are you ready to do more than expected?

3.3.3. Social climate and group work: How do you perceive Lean on a personal level? Your feelings in the work place since Lean was implemented?

3.3.4. Do you have opportunities for developing yourself at work with Lean?

3.4. Do you think that the implementation of Lean in your company increases the overall performance of the company / your performance?

4. CRITICAL SUCCESS FACTORS

4.1. According to you, what are the main barriers/obstacles towards lean adoption or expansion?

4.2. What are the critical success factors i.e. the essential factors that allow a successful Lean / change adoption?

Appendix 2: **Interview Transcript: Respondent 6**

"X" replaces the organisation's name in order to protect its anonymity and confidentiality.

START

First. Could you tell me more about yourself? What kind of activities do you do? What kind of responsibilities do you have? Okay. So I've been in X 19 years. I started on the shop floor; work through, 5 years later went into the customer department. And after that, I've been in the accounting department.

Oh, you've been everywhere (laugh) Then I had to go back onto the shop floor, and now I'm the production manager. So I started on the shop floor and then back onto the shop floor. So many years of experience of what we do, … a lot of people leave and go, I live in …, hum…my involvement with Lean, is obviously being a production manager, I'm always looking at continuous improvement to eliminate waste, that's my main priority, whether it'd be waste in materials, waste in the process, waste in time. There are the key things that I'm looking at. I did a Yellow Belt 6 sigma in 2000 and I did a Respondent 6's Interview Transcript. , and from that hopefully I will get a certification on Kaizen leading.

Because you did the training and then you got the certification. Yeah it's training, and then certification on completion of a project. You have to facilitate or co-officer a project. That's a bit of it. I will have, following this one; there are two main goals this year. There's setup reduction in the printing department, so there's two main presses there. Hum….reducing the setup time on them. And then also when that is completing I will go back into the sitting … of it, and look at the setup reduction on their two main machines. Obviously setups are…

So the two projects are on setting up machines? Yes, reducing the setup times. That's purely a cost to X, customers pay for setup, and hum…it's what we call obviously a non-value added task.

That's right. And are you the one who started the project? Or are you just part of this project? Who is the main leader of the project? Me.

You are the leader. For both projects? Yes. So one was for the first part, one was for this quarter, hum…the setup reduction in print and then following that in Q3, it's where the target, it's the start of the setup reduction into the other two machines.

Okay. Good. Have you done some…I know you changed the way you did the audits for the 6S. Have you done one recently? Yeah, I've done about three so far.

All right. Good. And what can you tell me about it? Do you think it's useful? What do you think of the new one? It's definitely more useful, we hum…on the other audits, we were kind of depending on somebody else, coming to do the audit, and unfortunately if that somebody else was […], his workload demands that don't have time to do that, so I think we have one in…, and we'll probably have one in October. And now…and also, that one audit I think there was something like 60/70 questions.

60, 70? Oh my God, yeah it's a lot. Such big questions. And then, they were very very vague and it was more open to opinions, what… what scores, he makes it as a 1 and then my choice is 5 etc Now with the new scheme, it's 14 questions; it's quite simply a poor/average/good well excellent and it's quite easy to get at the systems results. And the aim is to have it every two weeks, that way, you're going to get, the major me is going to get actions, have two weeks to turn it around and then the more audits, the higher score he has to get. So now instead of having, we might have an audit in 3 months, we know at any one point, announced we can have an audit in 2 weeks.

All right. You…you don't know before... No. No.

You just say, okay, let's start now and… The only time I will know is if the person who has been selected to do the audit, has requested my support. So because it's, we're all kind of new in the process, or some people are kind of new, if it's somebody let's say from the office has been selected to do this to the shop floor, they have no experience in that. So trying to get the form to work for an office and; so on the formulas it says …. We're not going to get that in an office. So it's just going through the different machines and then giving them a little bit, if they say to me, I'm going to do an audit, anytime in the next three days, give me a … of a view, yes I have this… But I have said to the team that I'm not going out to them. Because if I wanted to be self-funding, they need and they also have their own objectives, that it is heavily weighted around 6S.

And okay…and do you think it's useful? Or do you think it's boring or annoying to do…like to keep the workplace clean everyday…perfect? Hum, it has to be great for business. Because if you went into a supermarket and it was *fissy* and messy, you're not going to want to buy from that supermarket. So we are all, we are all about what the customer wants. So we do have quite a few

visits from customers here where we are trying to get obviously new business or retain business etc. And first impressions are …. and if you look and you come across a tidy organised building, they're going to expect a tidy organised product. So that's what I aim, […]

So for you it's part of the job? Absolutely.

So you enjoy doing, maybe not enjoy but you understand why you have to do it? Absolutely.

And what do you think about the shop, about the other employees? Do they tell you about this? Do they give you some bad feelings or bad impressions? I would say that, as I've been here 19 years, and a lot of other people on the shop floor have also been here that 19 years so we, a lot of people are cultured. And you can say for the first 15 years of everybody's life on the shop floor, it was producing products, goods at the door, at the customer, reducing costs. There's a visit coming, we tidy up. Then that's the only sort of rules that we had. And then the last 4/5 years, we've heavily going to the 6S, Lean manufacturing approach and all of them would say they prefer it, they like working in a clean tidy place but sometimes, it has a small effect on them, because if they're cleaning then they may not be running the machine, they may not be earning any money. As in bonus. […] So we try to accommodate that by increasing the bonus percentage. We've…they all have [..] not affecting whatsoever, euh..financially. But some people don't like cleaning, some people do like cleaning. That's, that's…and so, I don't get, no negative feedback regarding it but I won't necessarily I get too much positive either. I have had some good comments about the new form. And now, as I said, I've got 12 people in the slitting side and 3 people in the printing side and then, 'cause they are all having a, 'cause they are all engaged, if they are happy with this one, roughly one person […]. So... so I think it's been very good, the new launch.

And do you some, like hum, some standard form to say…I don't know exactly what they really do one the machines, but there are some standards to say "ok if you have to setup the machine, you have to do this first and make sure that this is done", do you have some standard forms, like posted in the area or …? Hum, not in terms of that. As I said, they're all…most of them have an experience of 19 years. They have training plans let's say they are skilled and they've completed all aspects of setting up the machine. Hum…what I might…one of the projects we're looking for this year, as you say, there're may be 20 steps to do a setup which is where the setup reduction is going to get. And some people go in random different orders. And...you want everybody to do 1, 2, 3, 4 … so that would be part of the setup reduction hum…

But at the moment you don't have something like that? No.

But, you've only got, as visual management, you've only got some labels around the bins, for example, colour…I saw some colour? Yeah.

So for your projects that you're working on, do you use some tools like, I know that you have like a software Company…Quality Companion. Do you use some tools from this software or do you use…? Hum, no. The first thing we did is we did a brainstorm. So there were 3 of us involved in the project. Hum…and…we have used previous examples of, there was a Kaizen done in very similar, ten years ago, and we managed to find some of the notes on that. Hum…and we did a…a spaghetti diagram as well, we watched a setup, wrote all the defects down, so all of that is recorded and saved somewhere on the computer or on the….

But you haven't done that? It's not you… Yeah, I have done that.

You've done that. So you've done, you've put the data in the computer? Yeah and then I…as I said, look all the defects, look all the things that came out of that, sating down again, went through the opportunities from those hum…the errors that appeared or the loss of waste of … that appeared, we did another setup, hum…following the new way, reduced that time and then did that another two times so then we reduced our overall setup by 25% of time. Hum…now, we're at the control and sustain part, which is always the hardest part, sustaining. Hum…that's where we are. The whole project has not come together to be completed yet, but there is lots of work in progress that just needs to be collected and…

So when do you think it's going to be finished? Hum….the whole project would probably take about another month because of things going to do onto the other press.

It's similar work? Same, same concept. When we learned a couple things from the first one, then we might do different the second time. Hum…we did it on the machine that has the less capacity at the moment 'cause they allowed us to do that. The other machine is full to capacity so the stop and do a Kaizen properly, will take a lot of time. Hum…that we noted it, it's got to be done, 'cause if that's the busiest machine, it's where the biggest opportunity is.

Are you…so you've worked in different place and in different departments but do you…do you have some job rotations? Like some people work in a press and then they work on another

press just to learn. If someone got sick for example, he can just go and get this job for the moment. Do you have some job rotation and cross training? Hum…not necessarily rotation. Hum…I am a cross cover for the costing persons, so Li is in costing. When he, through the year, he's got 30 days' vacation, I will cross cover that role. And also I will support the scheduling role. There's two guys are currently jobs that have been doing the scheduling so I support them when one of those is off.

But, you are trained for this or it's just because you know the job? Trained on the costing, yes I did that. Hum…15 years ago.

How often? Well, he has.

You did that a long time ago, yeah…I mean, a lot of things in that is still exactly the same. But hum…we'll have a handover, we'll go through anything is different. Hum…sort of […] managers' inbox. And then we actively need it. But in terms of me, no I am…my job is the production manager, I've been doing that for probably the last 8 years so it's not necessarily to…

But, for the people that have some training in all the machines? Hum yes they rotate, so that we've got in the slitting department, there's 3 teams so they work 3 shifts, 2 weeks of that, but that shift stay together. And then those 4 people are responsible for 3 machines but one charge them but that charge then…if there is work on one the other team machines, then they will run on them as well. So they could be running 4 machines or they could be running 3. So the charge then is very much a […] person. Hum…I mean there's two, obviously helping on the setup that helps reduce that time as well. They all, depending on that skills level, rotate on different machines. So majority of the people are fully trained on a mix, 3 of them change so they can rotate. And that's pretty much the same in the printing department and then again they can swop around machines while they run.

But you are…you told me that you are the production manager but it's just the press machines but also the printing..? Both.

Both. Everything. Yeah.

Everything in the shop floor it's your… Apart from the warehouse. The warehouse and the engineering team. It's two different teams..but …yeah. This side and the printing side.

Hum…so about training, do you think it's enough what you get from the training or do you think it will be more efficient if you got training, I don't know, like twice a week, twice a year or…? Yeah , I always think the hardest thing of the training is, they are very good at the time but unless you practice what you've just been taught straight afterwards, hum…you don't get the full benefit. So as I said I did a Kaizen leadership, I think…October last year and now this year, I'm doing the project. So 8 months later, I'm doing a project on what I was taught 8 months ago. If I had done the project November, December, I might have been…not waste in mind; I would have seen more waste.

More efficient maybe. Correct. And I wouldn't have to read back all the lessons. So it's not quite instaured in the brain or it would have been if I had done it straight away. And that's very similar to some the guys in the shop floor. They've had yellow belt training, hum…but then they won't necessarily have a project four minimum afterwards. So that's everything. Training was very good hum…

Where did you train? It was here. So Steve Casey, who is…

Black Belt? Yeah. A very good trainer. Hum…I've a number, few courses here…very very good trainer. Hum…

And you can contact him if you have any…? Yeah, yeah, yeah, you can…yeah, he's available to us, any point, I know he does a lot of travelling, a lot of courses etc but he is always available on emails and being supportive.

Ok. So do you…I think there is a meeting every Tuesday about everything that going on on the company like…do you, do you. Are you involved in this? Yes, just the KPI meeting you refer to.

Yeah. Okay. So, I think..do you think it's…yeah…here again is it useful or do you think…what do you think? The communication about it is enough, do you think it would be better to communicate with the other employees better, or do you give the information to them or how do you…? That meeting there, I think it's very high level. And…some of the stuff on there, so we talk about revenue, revenue and margin, hum…I can't control revenue so…so it is what it is. Hum…it's meant to be a half hour, very high level, that's why I told you..that's what we are here in terms of

revenue, that's what our margin…[…], that's how our customer ship the information, that's our error rate, hum..number of projects. So it's very high level. We don't really go to details of that.

But do you talk about your project for example, do you have…I don't know maybe you can talk about your projects or do you have something like that? Hum..what….Steve will ask for feedbacks, we have to report..so every project will have a savings target. And then we have to fill in a tracketer, a tracker on the web. Hum…on a monthly basis. And then Steve has to discuss those projects with his manager on a monthly basis.

So you don't talk about this…your project during this meeting? No. No. Otherwise. There is quite a few, I think on-going in this plant, there's probably 20 projects. Not but just me, so….you know and meetings…and meetings obviously overrun many times. So…waste.

Yeah I understand. So you usually talk about your project once a month? Well, I have a bi weekly meeting with Steve to discuss everything in general. And opening table sort of things, issues that you've got, what..etc. And then we would discuss it then [..] progress updates sort of things and what is your next step.

So In terms of support, do you think it's…you have enough support to compete your project? Or do you think it would be better to…I don't know… something else? Every person […] say, I could do it with more time. Hum...we do fail compared to others that we are quite low in …, covering multiple roles, so…we could always do with more time.

All right. Okay. So you've been here for a long time now…hum…when do you think a lean culture was set up? I mean was implemented in the company? Do you think…was like…do you feel it's been a long time that lean is incorporated in your company or do you think it's just recently, few years ago? I think that…from the start when we joined this, it was probably in 1994. I think we've always been a company that's trying to improve but not necessarily said that we are running a lean manufacturing plant or the continuous improvement. And then through the leadership above coming with, govern by US management team, from ever all over direction of the time […]. So a lot of things we spent 10 years ago, it was all cost reduction. Hum…and then another one said he wanted the revenue growth, he wanted another direction, hum…as I said, it's the last five years where we have said, I went to a seminar with Steve where they advertised lean manufacturing. And then from that point, we have improves, improved, improved. For example,

hum…when I joined this company, we produced 25 million rolls a year and we had 34 people on the shop floor, just in the slitting team, we now produce 34 million rolls, 9 million rolls more and now we have 12 people.

Absolutely.

So, yes we've invested in better technology with better machinery etc. But through being Lean, and reducing costs and everything that we've done, and the reductions, we all have seen a massive difference.

And then you said before what do you think it's more efficient? What did you get more from this? Lean, yeah, yeah.

It helps for the performance of the company but do you think it helps also for your working conditions in the shop floor, do you think it's better for you since Lean was implemented or I don't know…what is the main advantage? It's very…It's quite difficult because everyone has different views on Lean so ultimately the…the smarter you make the process on eliminate waste, you're gonna naturally…if your volumes stay, you're gonna actually reduce your head count. Because you'll be more efficient. So that, in my mind, has [..] to affect your workforce because one of them might not be required. And also, the quicker that you are and the more efficient you are during the week, might not then require them all the time. So some people will look at that as a bad thing. And that's hard to manage because it could have a cost on them. So, but ultimately, for the company, and for the customer that [..] I need to make, I need to be Lean to be able to react to their needs. Otherwise, if we stand still we will go back to the competitors. […]

Yeah. So, what do you think are the main obstacles or barriers to the Lean implementation? What do you think…what is the main hum, yeah obstacles to implement Lean? I don't know… how to rephrase it…what do you think it's difficult in Lean to implement? Or is it about time, is it about hum…I don't know resources, like financial resources or…is it about something else? People changing and it's difficult to make people change their way of working? Hum…I would…first what I would say is to do with time. Hum…we're quite a seasonal business, so…maybe in that…the more people shop, the more receipts they're gonna use. So, in the last half the year when people start doing Christmas shop and things like that, we've become a busier plant. When you're extremely busy, and you're full capacity hum…for the last 3 years, we have run 24/7 for the

last 6/7 months of the year. When you're that full capacity, trying to involve in projects, hum…is very difficult. Because, as I say…one might you want to try to improve something 'cause you know you'll get the benefit long term. But at what point do you make that decision.

It's a trade-off between… Absolutely. So I might accept that customer now, but eventually I doubt customer might be happier. […] So time I'd say is the hardest constraint.

Appendix 3. Tables

	British Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q1.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Q1.3	• CI • Maintenance • 5S	• Working in JIT • Eliminate waste (of time)	• Yellow Belt Project • CI and improvement of productivity	• CI projects • Cross training	• Sharing of information • Avoid waste of time • Manage customer requirements	• CI • Eliminate waste (in process, materials, time)	• Solving problems • Improvement • Health and Safety issues

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q1.1	No	Yes	No	Yes	Yes	• Set of practices, tools, or techniques (JIT, Kanban, Quality systems) • Eliminate source of waste as to reduce time and cost from customer order to delivery (Bhasin & Burcher, 2006; Scherrer-Rathje, Boyle, & Deflorin, 2009; Shah & Ward, 2007; Vinodh & Chintha, 2011; Womack et al., 1990)
Q1.2	Vague for the materials/ machine where I work	N.A.	N.A.	N.A	N.A.	
Q1.3	N.A.	• CI (Kaizen) projects • Improve the efficiency	• Yellow Belt and Green Belt training • Not concerned as an operator	• CI projects • Elimination of unnecessary tasks • Optimisation of practices • Satisfy customer needs	• CI projects • Green Belt certification	

Table 4 – Table of Analysis: Awareness of Lean

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.1.1	• Yes. Projects for support teams and report back to them.	• Exist projects schedule • Running one project on my own - 2 hours a week	• Yes. Yellow belt project.	• Yes.	• Not exactly • Improvements but not write down	• CI part of everyday job. • Projects on one machine each quarter.	• Yes. Part of everyday work.
Q2.1.2	• Setup times • Manage and reduce waste (recycling, energy)	• Reduce inventory • Fasten production line • Correlated reduction with card boxes	• Pick and pack area effectiveness	• Streamline warehouse process • Solution for the supply of raw materials	• Standardisation of reports into a global system	• Setup times reduction	• Solutions to increase productivity • Improve the performance of the machinery
Q2.1.3	• Software Quality Companion • DMAIC project. • Templates loaded in, including VSM	• Quality companion tool • Fishbone • DMAIC • VSM	N.A.	N.A.	N.A.	• Brainstorming • Spaghetti diagram	• Fishbone • Kaizen • 5S

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.1.1	• Not involved • Only improvement with the maintenance team	• Yes, support of the projects not leader • In addition to everyday work • Long term project	• Not involved	• Yes. • Issues raised in everyday work (daily) • CI regular meetings	• Green Belt • 2 projects with 2 different persons • Meetings but not regular	• CI at all levels, everyone has a role from top management to shop floor employees • Quality circles or Kaizen events • Process, materials, supply, documentation improvements • Root Cause Analysis / Diagrams • 5 Why • VSM (Meiling, Backlund, & Johnsson, 2012) (Jha, Noori, & Michela, 1996 ;Karlsson & Åhlström, 1996; Maleyeff et al., 2012; Salem et al., 2006; Shah & Ward, 2003)
Q2.1.2	N.A.	• 4 main CI projects (cf Table 4.3.1)	• Corrective maintenance.	• Packing process • Share of information in a hardware • Packaging	• Stock levels • Products characteristics within ERP and delays	
Q2.1.3	• Never heard of Quality Companion. No use of this software and tools.	• Quality Companion software • Planning tool • Kaizen	N.A.	• Software occasionally used (certification)	• Used for the Green Belt certification • Flow Chart	

Table 5a - Table of Analysis: Continuous Improvement

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.2.1	Yes	Not mentioned.	N.A.	Yes	Standard reports for customers purposes	No	Yes
Q2.2.2	In relation to 5S program	N.A.	N.A.	Work sequence and procedures	N.A.	N.A.	Procedure.
Q2.2.3	N.A	N.A.	N.A.	N.A	N.A.	• People experience • Part of future project (setup times)	N.A.
Q2.2.4	No	N.A.	N.A.	Forms displayed	Electronically.	N.A.	Not displayed.
Q2.2.5	Audits 5S	N.A.	N.A.	No	No audits	N.A.	No audits.

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.2.1	Yes	No	No	Yes	Yes. Partially.	
Q2.2.2	Machines procedures, process	N.A.	N.A.	Documents/ forms for customers	Procedures to train remote people.	• Standards include information on takt time, cycle times, assembly sequence, standard inventories, and cell layout.
Q2.2.3	N.A.	Willing of a standardised documentation with the UK	Years ago, exist setup procedures	N.A.	N.A.	• Displayed to team leader or auditors • Standards updated on a regular basis.
Q2.2.4	Displayed in the working place or checklist in file.	N.A.	N.A.	Available electronically, common hard disk	Mostly electronic	• Audits to check compliance • • (Doolen & Hacker, 2005; Olivella et al., 2008; Saurin et al., 2011)
Q2.2.5	No audits.	N.A.	N.A.	Updates when needed. Some on a regular basis.	N.A.	

Table 5b – Table of Analysis: Standardisation

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.3.1	• Yes. Just launched new 6S program. Audits everywhere	• Yes. First audit done 2 weeks ago.	• Yes. Personally do 6S audits.	• Yes.	• Yes. 5S audits in office.	• Yes. 3 audits done. Regular basis (1 every 2 weeks)	• Yes.
Q2.3.2	• Results in database, populate reports. Not displayed yet.	• No results posted in the office.	N.A.	• No evidence of results	N.A.	N.A.	N.A.
Q2.3.3	• Recycling bins • Machine properly guarded • Everything's got a place • Area labelled.	• No use of 6S in office • Area not labelled	• Nothing on the floor. • Everything clean.	N.A.	N.A.	• Place clean and tidy. • Ready for potential customer's visit.	• Work place is organised, labelled and colours used

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.3.1	• No. 5S started in one machine. No audits program.	• No. 5S program just started in one machine. No audits.	• No. Unfamiliar with 5S.	• No. 5S program when moving in new offices but no audits.	• No audits. 5S not regularly done.	• 5S program audited on a regular basis. • Results of audits displayed in the workplace. • Cell clean and equipped with only indispensable objects. • Standard place, easily and visually identified for each item. (Bicheno & Holweg, 2009; Liker, 2004; Saurin et al., 2011)
Q2.3.2	N.A.	N.A.	N.A.	N.A.	N.A.	
Q2.3.3	• Clean. • No standard forms for 5S or place for every object.	• Work station not tidy and clean. • No standard place for every object. • No visual devices.	• Clean, tidy. • Floor markings.	• Place tidy, organised • Workplace layout more pleasant since 5S.	• Closet and files labelled • Colour to organise documents.	

Table 5c – Table of Analysis: 5S

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.4.1	N.A.	• Yes. For 3 weeks, rotation within the department. • Same in production, engineering and warehouse	• Yes. • Personally fully trained in machines.	• Yes. • Cross training people within the warehouse.	• Only trained in sales. • Possibility to be replaced remotely	• Cross cover for costing and scheduling • Rotation of operators on mix of machines	• Possible with the other engineer.
Q2.4.2	N.A.	N.A.	N.A.	• Skills matrix • Review scores every month.	N.A.	N.A.	N.A.
Q2.4.3	Yes. For CI projects.	• Project with plant manager, sales and purchasing.	N.A.	Yes. Team work with other departments.	N.A.	No. Principally work in production.	Yes. Work with production, warehouse.

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.4.1	Work in slitting or labelling machine possible.	Not total flexibility of operators on machines	Almost – Possible on 1 machine only	Yes - Interchange fully implemented - No training necessary	Yes - For scheduling and SC - Training in progress - Mostly manager multi-functional	• People able to perform multiple tasks. Handle more than one machine simultaneously; • Frequent rotation among work-stations; • Use of flexibility matrix. (Ahlstrom, 1998; Bamber & Dale, 2000; Olivella et al., 2008; Losonci, Demeter, & Jenei, 2011)
Q2.4.2	N.A	Skills matrix exist, used and updated since 2011	N.A.	Not mentioned	Not mentioned	
Q2.4.3	No.	Yes. Support for CI projects throughout the company.	Actions done with maintenance team.	Yes. Kaizen projects (with SC)	Yes. CI projects with sales.	

Table 5d – Table of Analysis: Work flexibility, Multi-functionality

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.5.1	• Yes. Checklist, proposal for improvement • 6S displayed • Action plan.	N.A.	• Action plan displayed in the area	• Results in the area • Action plan	• Shipping time evolution	• Colours and labelling in the workstation (mostly for 6S)	• Colours and labelling in the workstation (mostly for 6S)
Q2.5.2	• 6S results per area and a master one List of improvements suggestions and potential solution.	N.A.	• No.	N.A.	• Charts with 6S • No display of Lean results	N.A.	N.A.

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.5.1	• No visual management yet.	• Daily productivity/ efficiency • Production indicators • Reports and indicators for each department	On the notice board on the shop floor: • Productivity/ Efficiency graphs on the notice board on the shop floor • CHSCT information • New projects, implementations	• Results (% of the target) • Organisation chart • Results of contest • 6S concept	• Results • Projects progress not displayed	• Production control board, schedules, corrective actions, quality/maintenance info. • Lead time, rework and scrap rates, standard inventory versus actual inventory, takt time (Bicheno & Holweg, 2009; Eswaramoorthi et al., 2011; Vinodh & Joy, 2012).
Q2.5.2	N.A.	N.A	N.A	• 6S	N.A	

Table 5e - Table of analysis: Visual Management

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.6	• Yellow Belt training. • No Black Belt on site • 3 Green Belts certified and quite a lot of Yellow Belt	• Green Belt training on the inventory reduction project • Trained 3 years ago	• Yellow Belt project • Regular for cross-training	• Training on the 6S audits • Green Belt certification from previous company	• Everyone trained (Green or Yellow Belt) • Respondent Yellow Belt • Same training for everyone	• Yellow Belt 6 sigma in 2000 • Yellow Belt "refreshing" in 2012 • Kaizen leadership training in 2012	• People not trained in the aspects of health and safety

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q2.6	• Not personally trained • Just heard about Green/ Yellow Belt • Refreshing training on process • Internal training between operators and new employee	• 5 Yellow Belt • Re-launch of Green Belt training this year • Training on machines done internally during 3 months	• Internal training on the machine • No other training in production • Supervisors trained for management skills	• Yellow Belt training • Done in French in Paris during 1 day	• Green Belt training 3 years ago, in English during 5 days • Training based on Quality Companion and Lean concepts • Refreshing on Green Belt last year	• Training from the shop floor to the top management. • Initial and continuous training • Experience i.e. learning-by-doing. • Training concerning interpersonal skills. (Bamber & Dale, 2000; Black, 2007; Olivella et al., 2008)

Table 5f - Table of Analysis: Training

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q2.7.1	• Good communication • Meetings every 6 weeks • Committee corrective actions all departments • Regular shift meeting • Quarterly leadership meeting	• KPI meeting every week: top-down communication • Regular meetings	• Daily meeting with the team	• Weekly KPI meetings • Periodical, meetings on suggestion schemes • Regular meetings with plant manager • Cross training checking every month	• KPI meetings • Good top-down communication	• KPI meeting every week • Feedbacks to CI projects on a monthly basis • Weekly meeting with plant manager	N.A.
Q2.7.2	• Suggestion scheme in place • Selection once a month • Very successful.	• Suggestion box	N.A.	N.A.	N.A.	• Yes.	Suggestions from operators.
Q2.7.3	• Reward system: points turned into loans or vouchers. • Award for good suggestions.	• Recognition system (emails) • Rewards with points score within website corporation • Recognition for every work including suggestion box.	N.A.	• Incentives for people involved in cross training	N.A.	N.A.	N.A.
	French Company					Literature	
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**		
Q2.7.1	• Communication between employees but no top-down communication • Day-to-day communication for instructions between operators	• Strategy communicated • No regular meetings for CI projects (more informal) • Reintroduction of staff meeting every week	• No top-down communication • Too much information on notice board • Annual meeting with the manager • Weekly meeting in shop floor not regularly maintained	• Communication though emails along the week • Communication for on-going projects • Good communication with the team	• Projects meeting with managers every month • Quality meetings every week • Consistent communication between departments • Lots of informal communication	• Consistent information and communication • Timely information constantly, straight in the workplace and among the departments • Oral information • Skill-based compensation • Reward learning, multi-skilling and teamwork • Individual rewards for worker's ideas • Collective rewards for team-work activities	
Q2.7.2	• Implemented before • Now suggestions proposed verbally	• Not in place at the moment	• Before	N.A.	N.A.		
Q2.7.3	• Exist for production record, innovation idea • In place for 1 or 2 years	• Score points turned into money of gifts org. store • Difficult to implement • For prod. record, 5S compliance, suggestions, solution of a complex problem	• Vouchers for good deed or new idea • Mostly for employee performance/ productivity	N.A	N.A.	Black, 2007; Karlsson & Åhlström, 1996; Liker, 2004; Olivella et al., 2008).	

Table 5g - Table of Analysis: Workforce Management and Employee Development

UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q3.1.1	• Yes - CI is all our responsibility.	• Yes - Everyone focused on CI	• Yes. Several on-going projects.	• Culture of change • Willing to do things differently and better	• Yes. Lean culture	• Lean culture for 4/5 years	• Aware of recycling, safety issue • Careful of any potential improvement
Q3.1.2	• Good communication. • People fully update • Strategy driven from top of the organisation	• Inventory target to achieve • Aware of the new 6S programme • Strategy focused on CI since new top management	N.A.	• Aware of new 6S program • Issues related to his department	• Aware of 6S program • Improvements for sales department	• Communication of projects by plant manager	N.A.
Q3.1.3	• Leadership behind CI strategy.	• Black Belt available anytime • CI manager support	• Management always pushing for CI • Investments accepted • Good support from top management • Support from teammates	• Support of the management team • Investments	N.A.	• Black Belt available at any point, very supportive	N.A.
Q3.1.4	N.A.	• Difficult to get people to change	• Start from scratch since new team	• Difficulty to change habits	• Feedback asked from respondent before implementing change	• Control and sustain part is the hardest part	• Try to make it interesting

French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Q3.1.1	• Lean more highlighted than before	• Yes. Lean culture before, now continuity.	• Company involved in Lean but not affected in production	• Yes. Improvements come from daily observations.	• Real change • Lean culture	
Q3.1.2	• No communication new and on-going projects • Communication only between employees	• Communication concerning projects but avoiding naming the Lean concepts	• Word-of-mouth communication • Exchange of company's projects/vision (preventive maintenance)	• Aware of the on-going projects	• Vote to select CI during committee meeting	• Determinants of change: extent and outcomes and the way changes – training, job design, technology- undertaken (Lasonci et al., 2011; Seppälä & Klemola, 2004). • Top management assumes responsibilities; attach importance to Lean, substitution of missing workers, management visits in workplace (Sim & Rogers, 2009). • Organisational communication concerning vision, strategy, and results of the Lean conversion essential for management of change (Seppälä & Klemola, 2004). • Importance of selling Lean benefits to staff (Bhasin, 2012).
Q3.1.3	• Projects from management team • Lack of listening • No feedback when suggesting ideas	• Good support from plant Manager • US top management less comprehensive • CI manager available for ideas • Black Belt available but still long distance	• Support of management team • Plant manager in the shop floor during 5S project	N.A.	• Engagement and support of management team	
Q3.1.4	• Sustainable stage not maintained • Difficulty to change old habits • Necessity of monitoring	• Name "5S" or "Lean" not mentioned • Willing to be simple and practical to launch CI projects • Employees more receptive	• Not very affected in production	• Training for only 2 people of team • People more involved than others	• Projects according to the function • Not regular check-up	

Table 6a - Table of Analysis: Organisational Culture

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q3.3.1	• Lean important for everything	• Lean gives the flexibility • Give operators more interest • CI impacts all departments	• Workplace clean • Facilitate work • Essential for the company's image • Cross training for flexibility	• Yes. No doubt that Lean works	• Important in everyday work	• Understand importance of Lean • Reduce costs • Benefits of 5S/6S but also waste of money	Yes.
Q3.3.2	• Responsibilities • But keeps everybody involved. • The more you get into CI, the more you are trying. • Very interesting and motivating.	• Willing to be part of CI projects if it helps and improves	N.A.	• Directly involved in 3 projects • Willing to find the best solution	• Willing to become more efficient	• Understanding of the benefits	• Enjoy inventing and creating solutions
Q3.3.3	• People like new • Good for individual development • People motivated working with different ideas.	• Better work condition	• Good team climate	• Better autonomy of the employees	• Assistance if needed • Facilitate work	• Lean improves efficiency but also job less secure • Balanced feedbacks	N.A.
Q3.3.4	• New 6S program to avoid monotony • Feedbacks asked to participants	• Variety of work with Lean	• More autonomy • Solve problems by yourself when possible	• Lack of promotion opportunities • Shop floor employees involved in explaining/ solving problems	N.A.	• Mutual aid in doing audits	• Variety of work • Use of knowledge to try new solutions
	French Company					Literature	
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**		
Q3.3.1	• Good things done with Lean • More attracted to work in a tidy environment	• Misunderstanding from employees that they are the actors of the CI • Belief in the importance of Lean • Blue collars consider Lean far from them	• Changes made beneficial to the employees	• Importance of Lean • Customers is the priority	• CI and change in the interest of everyone	• Belief of employees in the importance of Lean • Increased opportunities for developing themselves at work through participation, worker control and training (Seppälä & Klemola, 2004; (Wickramasinghe & Wickramasinghe, 2011). • Employee job involvement and commitment. Motivation (de Treville & Antonakis, 2006; Wickramasinghe & Wickramasinghe, 2011). • Better relations with work mates at the workplace. • Job more secure, better career prospects and better work conditions (Delbridge, Lowe, & Oliver, 2000; Landsbergis, Cahill, & Schnall, 1999; Seppälä & Klemola, 2004).	
Q3.3.2	• Willing to be more involved in projects	• Commitment after training but difficulty slow down enthusiasm • People not involved with words "Lean" and "CI"	• Willing to be involved in CI projects but never proposed • Willing to learn new things	• Team involved • People with experience more reluctant to change	• People involved in Lean and CI since new management		
Q3.3.3	• Not oppressing but might bother some people • Flexibility but may imply insufficient quality and performance	• Better career prospects for operators and projects' leaders	• Proposition of improvements from employees accepted • Insecurity of job • More pressure	• Pressure since insufficient workforce • Aftersales considered as non-productive activity	• Difficulty of change • Collegiale choice of CI projects		
Q3.3.4	• Encourage to try new solutions with maintenance	N.A.	• Opportunity to work in another machine	• Extensive learning when training	• People satisfying when using a file/tool they produce		

Table 6b- Table of Analysis: Employees' feelings

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Q3.4	• Lean is important for everything.	• Important for the overall performance of the company: implies job secure • Personal fulfilment when see results/savings	• Company more structured	• Keep business competitive by minimising cost • No doubt that Lean works	• Whole business considerations • Helps efficiency	• Helps to react to customers' needs • Beat competition – Being • Improve productivity and reduce cost	N.A.

	French Company				
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**
Q3.4	• Improve company performance • Improve working conditions	• Yes. Lean essential. Purpose of my job.	• Maintenance actions then less machines stoppage • General improvements • 5S/6S not improvements for respondent	• Saving time on a daily basis • Satisfy customer's needs the quickest possible	• Facilitates every day's work • Important time savings • Help across the company

Table 6c – Table of Analysis: Benefits of Lean

	UK Company						
	Respondent 1	**Respondent 2**	**Respondent 3**	**Respondent 4**	**Respondent 5**	**Respondent 6**	**Respondent 7**
Barriers and Obstacles of Lean							
Q4.1	• Workload • Gather the team • Investments on equipment	• Gather CI projects teams • Insufficient time	• Financial resources	• Getting started • Lack of understanding of Lean benefits • Insufficient skilled workforce • Fear of global change • Lack of resources (IT)	• Cultural and time-related	• Time: seasonal business	
Critical Success Factors CSF of Lean							
Q4.2	• Leadership engagement and commitment • Investment in training	• Management engagement and commitment • Regularity of meetings	• Make Lean part of everyday job. Regular follow up.	• Communication of results and project success story	• Trust	N.A.	• Management engagement and commitment

	French Company					Literature
	Respondent 8	**Respondent 9**	**Respondent 10**	**Respondent 11**	**Respondent 12**	
Barriers and Obstacles of Lean						• Insufficient supervisory/ management/workforce skills • Employee attitudes/resistance to chance • Insufficient understanding of the potential benefits • Cost of the investment (Bhasin, 2012) (Achanga, Shehab, Roy, & Nelder, 2006) (Olivella, Cuatrecasas, & Gavilan, 2008) (Bhasin, 2012)
Q4.1	• Insufficient resources of time and money	• Language barrier in particular for operators • Administrative procedures • Competition between division	• Time • Insufficient workforce	• Time • Insufficient workforce • Formalise and apply training	• Time to conduct long-term projects • Cost of some investments	
Critical Success Factors CSF of Lean						• Management engagement and commitment • Reward and recognition system • Competency of master Black Belt/ Black Belt • Company financial capability • Frequent communication and assessment • Project prioritization, selection, reviews and tracking • Project success stories, best practices sharing and benchmarking • Effective Lean training program (Jayaraman, Kee, & Soh, 2012) (Bhasin, 2012) (Achanga, Shehab, Roy, & Nelder, 2006) (Olivella, Cuatrecasas, & Gavilan, 2008)
Q4.2	•	• Management engagement and commitment into Lean and CI	• Management engagement and commitment in CI projects	• Company financial capability and human resources • Prioritise the big projects and dedicate time to them	• Management commitment and engagement in Lean	

Table 7 - Table of Analysis: Barriers and CSF