



Performing audits in a service company which is implementing Lean and ISO 9001 principles. A case study from Italy

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Abstract

The main objective of this paper is to investigate how a company belonging to service industry, which is committed to process improvement by means of Lean and ISO 9001, has developed an audit pattern for improving the efficiency and effectiveness of processes. Interesting findings show a precise audit pattern based on six categories. The categories describe the processes that should be audited and key elements related. Furthermore, the categories are related to auditors' skills, management of check-lists and scheduling, internal communication and reporting to management. This pattern is compared with the more formal audit pattern used for evaluating compliance with the ISO 9001 standard. The found pattern is particularly suitable for quality consultants and managers who want to improve the efficiency and effectiveness of processes as well as audit managers.

Keywords: service industry; audit; Lean, ISO 9001, SME

Introduction

Service organizations have been implementing management systems to improve both the effectiveness and the efficiency of processes and to reduce costs. The systems most applied are TQM and Lean Production (Womack *et al.*, 1990; Ohno, 1988; Dahlgaard and Dahlgaard-Park, 2006).

Whether service organizations implement a quality management system according to the ISO 9001 standard or implement a management system to reduce costs (such as Lean), they have to deal with internal auditing in order to monitor and measure shop-floor processes. This constitutes one of the pillars of Business Process Improvement (Eden and Moriah, 1996; Vagnoni and Maran, 2008; Smith, 2012; Nwabueze, 2012). This kind of audit is different from the typical internal one, which is mainly used to evaluate compliance with standard requirements such as ISO 9001 and typically based on ISO 19011 guidelines (ISO, 2018). Process auditing service industry should be less formal, quicker and focused on improvement of the performance in terms of both efficiency and effectiveness. Consequently it should be led through a different pattern.

The main objectives of this paper are:

- to investigate how a service industry dedicated to industrial maintenance, which is very committed to improve process performance, has developed a pattern in order to lead a more efficient audit;
- to identify the stages, the processes and the methods inside the pattern, comparing them with the more formal pattern described in the ISO 19011 guideline;
- to discuss practical implications of the pattern and future research about it.

Leading audit

The ISO 19011 standard provides no description of an audit combining ISO 9001 and Lean for service industry. ISO 19011 intends to be a standard for professional auditors, such as auditors who have to formalize the findings of an audit for the customers or third-party bodies. It implies a precise planning of audit activities, auditors with certified skills, formal communication with the audited people and a formal final report. In particular, the audit flow described in ISO 19011 is structured according to the main following sections and sub-sections (ISO 19011, 2018):

- Establishing the audit program objectives.
- Selecting the audit team members and assigning responsibilities.
- Performing document review in preparation for the audit.
- Preparing the audit plan.
- Assigning work to the audit team.
- Preparing work documents.
- Conducting the opening meeting.
- Communicating during the audit.
- Collecting and verifying information.
- Generating audit findings.
- Preparing audit conclusions and the report.
- Conducting the closing meeting.
- Conducting audit follow-up.

Lean originates from the Japanese Toyota Production System (Ohno, 1988) and helps companies to find and eliminate seven types of waste that increase product costs: overproduction, inventory, extra processing steps, motion, defects, waiting, and transportation. These wastes also increase process lead time and reduce value-added for customers (Hines and Rich, 1997). In order to implement Lean, service organizations normally use teams called 'Kaizen teams' (the English translation is 'continuous improvement' teams) during 'Kaizen events' or workshops (Manos, 2007). Specific tools invented in Japanese industries help the teams to improve efficiency. Lean Production is particularly based on the Japanese principle of standard work and Visual Control. Activities and situations on the shop floor have to be visible and quickly managed by the operators and managers (Andrews *et al.*, 2011).

According to Otley (2001), performance measurement systems are recognized both as tools to support wide-range changes, and as mechanisms that are to be adapted if other changes initiatives are to be successful. Performance measurement systems are connected to the organization process change and to the strategy implementation. Ramly *et al.* (2007) underlined how manufacturing process audit is one of the many quality tools to assess the effectiveness and efficiency of processes and quality performance.

In a book for practitioners, Smith (2012) tried to develop a strategic system for auditing a quality management system and Lean at the same time. The author made some criticisms of ISO 19011 professional auditors who typically try just to check the compliance of shop-floor processes with standards such as ISO 9001. The author underlined that on the shop floor it is important to audit the implementation of Lean tools and the results in terms of improvement.

Methodology

A semi-structured interview was used. An interviewer guide was developed before interviewing the manager in charge of leading audits inside a small sized service organization dedicated to industrial maintenance. The interview lasted about one hour. The interviewer guide contains some open questions that explore specific areas of interest. The theoretical underpinning of the interview protocol is mainly based on the possibility of finding a pattern for leading an audit when ISO 9001 and Lean are implemented at the same time. In particular, the goals of the interviews were to understand and determine the best audit processes to improve efficiency and effectiveness. The interviewer guide was based on these issues:

- *Key elements inside the processes usually audited*
- *the team of auditors and their skills*
- *the use of a guideline or a check-list*
- *the management reviewing process of the results*

The interviews produced much data, and the practice of coding qualitative data (Lofland and Lofland, 1995) was used to assign labels to classify and assign meaning to parts of the information. An initial coding generated several categories from the responses. A second coding known as focused coding was used to reduce the number of initial coded categories by eliminating the less useful ones.

At the end of the process, four categories were used to represent the common pattern for auditing a service organization where ISO 9001 and Lean are implemented.

Results

Key elements for a shop-floor audit

According to the respondent, auditors have to audit processes related to quality management, Lean Production, TQM, as well as health and safety management. But what are the most important elements of the processes that have to be audited? Looking at the answers and the coding it can be noted that these elements can be classified as:

- Quick problem solving by operators and supervisors. It is fundamental to audit how and if operators and their supervisors are able to solve quality non-conformities right away, without wasting time that can lead to an expansion of the problem.
- Awareness and management of service critical characteristics. Each operator must know what the critical characteristics of the service are in terms of safety and quality for the customer. For instance, an operator must know that if he or she does not tighten a screw inside a machine with the right tightening torque, he or she can cause an accident to someone.
- Awareness of following procedures and work instructions content.
- Problem solving by means of Lean tools

Taking into consideration the processes related to Lean Production, the respondent recommended that the following key elements have to be audited:

- Order and cleanliness of the workplace. This is probably the most important element that has to be audited. It is unavoidable and typically based on the 5S tool (Womack and Jones, 1994). Tools, equipment, instruments and anything that is used during the daily work activities must be kept in order and the workplace or machine utterly cleaned.
- Material flow around the process. According to all the respondents, material around the workplace should also be put in the right positions. These latter are usually spaces marked off on the shop floor by means of painted lines. Material must not be put on the pathways or close to escape routes.
- Capacity of managing day-by-day or day-by-the hour indicators. For instance, indicators related to claims, non-conformities, productivity and injuries. The auditors should check whether the indicators are visible on using displays, noticeboard, boards and other friendly-to-use systems. Furthermore, the indicators should be updated each day, each hour or even in real time.

Auditors' skills and communication

The audit should be led also by operators and supervisors with knowledge about Lean Production and quality systems. A professional auditor such as an ISO 19011 qualified auditor is not necessary for a process where Lean is implemented. Indeed, according to the respondent, a more operative auditor has to know Lean Production, quality management and the processes of the service. Of interest, our respondent considered an ISO 19011 auditor too formal and not appropriate for understanding a service and dynamic organizational context. For instance it is very important the way he or she communicates to employees and managers.

Auditors should use standardized check-list

All the respondents claimed that is quite impossible to lead an audit without having a check-list. This latter should be customized for the type of process, service, or customer. The check-list has to remind the auditor of all the elements that have to be audited. In particular, according to the respondents, check-lists have to contain the key elements discussed above.

Results of the audit for the managers

All the respondents suggested that trends of the audit can be summarized monthly or quarterly for the management who can launch longer-term plans for improving the processes. According to the respondent, auditors should also audit whether the managers are carrying out these long-term plans.

Conclusions

This research has been conducted with a small sized service industry dedicated to industrial maintenance which is implementing ISO 9001 and Lean.

As a result, four categories emerged which represent a novel pattern for leading an audit for improving efficiency and effectiveness at the same time in service industry. Therefore this research has shown that an interview and coding-based process can be useful in extracting a pattern of business process improvement.

There was majority agreement on the systems and processes on a shop floor that should be audited and, in particular, the interviewee emphasized that the processes of quality and excellence systems (e.g. TQM, and Lean Production) should be included in an audit along with the fundamental health and safety processes.

Furthermore, there was broad agreement on the style of audit (i.e. informal, quick resolution of findings, audit team and skills, internal communication) and on the key elements that have to be audited. The general agreement on points indicates that the extracted pattern for a shop-floor audit could be generalized across other manufacturing companies.

Implications and agenda for future research

The results of this research have several implications for academics and practitioners.

First of all, a precise pattern for auditing such a context has been depicted. This implies that managers and consultants can try to implement such a pattern inside their companies. The pattern offers to practitioners a new way for improving the efficiency and effectiveness of processes. The pattern could be enriched by new elements found during its application.

The pattern found is limited to just one company and this opens an interesting academic debate as well. Surely other companies have been managing similar patterns as the literature review has demonstrated, even if they are limited to particular situations. To contribute to the scientific community, other authors should do research in order to understand what the limitations of this research are. Is it actually extendable to all service companies? Is it applicable just to SMEs? What are the differences?

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