

## Integration Model of ISO 14001 with Lean Principles

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### ABSTRACT

Lean principles and ISO 14001 are key business process strategies which are employed by companies to enhance their manufacturing performance and business efficiencies. The primary objective of the paper is to provide a conceptual framework through an effective integration of these two systems for enhanced business efficiency and productivity. The research methodology applied in the context of this study is based on preliminary literature review of ISO 14001 standards and Lean Principles. The findings contributed to the framing of new conceptual framework that combines the benefits of both Lean Principles and ISO 14001 principles for enhanced business efficiencies and continual improvement. This study concluded that the intergration of lean principles into ISO 14001 will serve practical methods for ISO 14001 to achieve the continual improvement.

**Keywords:** Conceptual Framework, Methodology Applied, Continual Improvement, Corporate Environmental Management, Toyota Production System (TPS)

### 1. INTRODUCTION

Currently, the world of business is facing different challenges and changes in both macro- and micro-environment. Development in technologies offers both challenges and opportunities for businesses. In the positive note, it had helped in order to lessen and remove the boundaries in the organization, particularly and specifically in the aspect of design and manufacturing (Sahay *et al.*, 2003). However, on the other hand, it also offers different challenges and threats, particularly in the aspect of those related to the environmental issues, which is becoming more and more popular in the global industry. Currently, individuals, government and non-government organizations are becoming more and more aware of the different environmental factors, particularly in the current issue of global warming. More and more organizations are applying procedures and processes, together with the aid of standards that will help them in

order to lessen the different environmental damage which they can cause towards the environment.

ISO 14001 sets the criteria for an EMS. This is important because it enables to management the EMS which dictates the requirements and needs for the structure of the organizations. Together with the responsibilities, practices, procedures, processes as well as resources, therefore the responsible corporate environmental management is considered as institutionalized inside the organization. ISO 14001 is important to sustain because it has the widest geographical as well as industry coverage of any certification system of an EMS. In general, the wider the application of the standard, the more flexible as well as less severe its requirements are. For instance, the EMAS requires that the environmental policy as well as programs must be made in public, while ISO 14001 only in need of disclosure of the environmental policy of the organization (Bansal and Bogner, 2002).

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## 2. MATERIALS AND METHODS

### 2.1. Literature Review

The literature review will focus on identifying the various aspects of Lean principles and ISO 14001 standards and integration of these two system.

Sustainable of ISO 14001: ISO 14001 is voluntary and there are no legal requirements to certify on this standard. Therefore, it does not set any standards regarding performance, but mainly pertains on the management process, rather than given environmental results and consequences. This is the main criticism thrown by the detractors of the said standard. But, there are different organizations which apply this standard can access a platform which will help to improve their systems and processes by enabling them to have minimum influence on the environment (Sambasivan and Fei, 2008). There are different studies and literature which question the advantages and sustainability of ISO 14001. There are authors who criticize the standard because of its weak focus on the actual environmental performance of a plant or an organization (Krut and Gleckman, 1998).

As a support, according to (Rondinelli and Vastag, 2000) the standard simply assumes that an organization which certifies its system has a management system place to focus effectively on its environmental influences. In addition, it have been mentioned that it is purely voluntary, thus, voluntary approach such as ISO 14001 commonly result in the developing goals and objectives that are mainly based on the consensus with an organization, which may be sub-optimal and implementation commonly dependent on the peer pressure and management incentives which, most often than not-ineffective (Krut and Gleckman, 1998). In addition, those organizations which adopt ISO 14001 commonly questioned the issue about the added-value of the standard. It is apparent that organizations have been sold the benefits of the system, which include the cost savings and when organization fails to materialize these, the organizations feel cheated (Hillary, 1999). As a result, source of irritation for organizations mainly focus on the process of development and certification (Goodchild, 1998), which is moderately attributed to the cost and quality of those consultants that are advising them. Therefore, it is obvious that some organizations have been misadvised and developed bureaucratic and ineffective and insufficient systems (Goodchild, 1998). Above all, most organizations found that more resources were in need of initial investments in terms of cost, time, effort and skills.

As a result, organizations commonly experienced implementation surprises which commonly result in unexpected influences on their resources. For example, new knowledge and skills that have been acquired or other advice from external entities which focus on the aspect of tracking and the influence of assessment (Lawrence *et al.*, 2002). With this, it is important to focus on the costs and efforts to be exerted in order to train new staffs, which will result in negative influence of time pressure and resistance to change (Goodchild, 1998).

The study of Tan (2005) shows the 5 main clauses of ISO 14001, which include: Environmental policy, planning, implementation and operation, checking and corrective action and management review. It is pertinent at this occasion to discuss the focus of these factors. Environmental policy pertains on the current and possible environmental influences of the products, services and operations of the company (Pun *et al.*, 1998). Planning pertains on the process of identifying the controllable environmental aspects, legal requirements, objectives as well as the focus of the different environmental aspects of the management programs to achieve different environmental aspects, together with a management in achieving environmental objectives. On the other hand the implementation and operation pertains on the roles, responsibilities as well as the authorities of employees reviewing the performance of the EMS; training and awareness as well as capability; controlled documentation of core elements and reference to the related environmental documents; operational control as well as the emergency preparedness to handle accidents (Raines, 2002).

Benefits of the ISO 14001 adoption: There are different literatures which show the different advantages of adopting ISO 14001. For instance, businesses gain external recognition and different market benefits (Huxham and Vangen, 2000; Lefebvre *et al.*, 2003), quality systems in connection and combination with ISO 14001 are reported to have improved (Lawrence *et al.*, 2002); increase in overall quality of management (Pun *et al.*, 1998); and aspects that are commonly would not be under the direct examination and assessment of the managers which are subject to improvement and development (Hillary, 1999). Communication channels, skills, knowledge as well as knowledge and attitude can also be enhanced inside the organization upon the implementation of ISO 14001 (Rondinelli and Vastag, 2000). In addition, grounds for new interactions and relationship between the employees and the management can help in order to offer some intangible advantages, which include enhanced morale (Goodchild, 1998).

In addition, ISO 14001 can help in order to enhance the image of an organization. This is because, if the firm exceeds the expectations of the stakeholders and their satisfaction, which consequently help to enhance reputation and gain and maintain competitive advantage, therefore can help to secure higher financial returns than its competitors (Bansal and Bogner, 2002).

Integration with Lean: LEAN pertains on the approach of classifying and removing elements which do not add value to the process, which result in striving for perfection and customer-driven pull towards the process. According to NIST (2000), LEAN is a “systematic approach to identify and eliminate waste via continuous improvement, following the product at the pull of the customer in pursuit of perfection.” With this, it mainly focus on the process of ensuring that all of the procedures will focus on ensuring that the environment will be protected from the raw materials up to the final product. Efficiency is always important in the aspect of manufacturing. Thus, it can be observe in the early application of Toyota Production System (TPS) (Holweg, 2007).

It is important to take note that lean manufacturing mainly focus on the process of systematic removal of wastes from the operations of different organizations via set of synergistic work practices in order to produce products and services at the rate of demand (Simpson and Power, 2005; Shah and Ward, 2007). Those companies that have successfully lessen their internal waste via lean production methods also implement different practices related to better environment management (Sroufe, 2003; Montabon *et al.*, 2007). The said practices expand and improve the scope of waste reduction efforts beyond the effectiveness inside the organization (Zhu and Sarkis, 2004; Kleindorfer *et al.*, 2005). A diverse set of stakeholders, which include customers, shareholders, local communities as well as government regulators, affect the decision making process of the companies, including the corporate strategic practices (Buisse and Verbeke, 2003).

Environmental management covers the entire process from development of the product up to the final delivery and disposal of the product (Sroufe, 2003). It is important to take note that ISO 14001 standards are vital aspect of EMS, which enables companies to evaluate, manage, relate, coordinate and monitor the corporate environmental activities (Melnik *et al.*, 2003). Since the first conception of the assembly line and the succeeding development of the Toyota Production System (TPS), effectiveness has been considered as the vital objective of manufacturing process (Holweg, 2007). It is vital to

consider that lean manufacturing pertains on the systematic lessening of the wastes from the operations of the entire organization via a set of synergistic work practices in order to produce products and services at the given demand (Simpson and Power, 2005). In addition, lean manufacturing pertains on a multifaceted concept and aspect that can be categorized together as a separate and different bundles of organizational practices, which include JIT, total quality management, total preventive maintenance as well as human resource management, pull, flow, low setup, controlled processes, productive, maintenance and those involved employees (Shah and Ward, 2007).

It is important to take note that Lean and ISO 14001 can help in order to focus on manufacturing proactivity or the tendency of a firm to implement advanced technologies in order to improve the production and operations functions. For example, in the case of the human factor, the most advanced practices mainly focus on the significance of the training, development and empowerment, which mainly focus on enabling the people to have greater autonomy and offer them with the mechanism to take part in the decision making (Ichniowski *et al.*, 1997). On the other hand, in the case of the supply management, the cooperation and the trust in the relationship are vital in order to maintain competitive success (Vereecke and Muyvelle, 2006).

## 2.2. Research Methodology

The methodology used in this study is based on preliminary literature review of ISO 14001 standards and Lean Principles as well as certain case reports from various proponents and authors of ISO 14001 and Lean as noted in various articles and journals and some books.

## 3. RESULTS AND DISCUSSION

The research findings **Fig. 1** shows the framework which shows the framework of integration of Lean and ISO 14001. It shows that the basic principles and methodology of the ISO and Lean do match with each other. The proposed framework requires the organisations to identify the various parameters that have a direct or indirect impact on the environmental aspects. The effectiveness of integrating the two systems can be realized by adopting processes and procedures designed to eliminate waste and create an economically sustainable work environment. The framework proposed here help to simplify work processes and develop new guidelines for implementation.

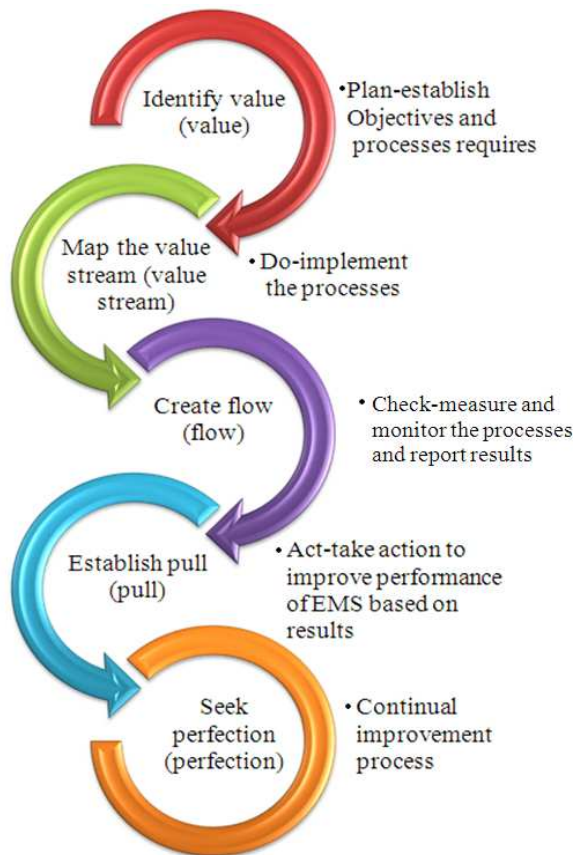


Fig. 1. Lean and ISO 14001 integration framework

ISO 14001 is part of the ISO 14000 standards which is used in order to guide companies to lessen their negative influence on the environment. Unlike other standards, this is not an EMS, thus it does not absolutely dictate the environmental performance requirements, but it is use as a framework in order to guide organizations to develop their own EMS. Thus, it can be used in order to focus on the different management functions that are related in order to achieve environmental and financial goals and objectives. The lean thinking can be applied in ISO 14000 by focusing on its goals and strategies, which are to focus on improvement of the quality and to eliminate waste. Improvement of the quality focus on understanding the demands and needs of the customers and the procedures that are needed to be done in order to meet them, while the elimination of waste mainly focus on lessening those activities that consumes time and other important resources, which do not add any value towards the products and services being offered by the company.

#### 4. CONCLUSION

After analyzing different researches and literatures related to the topic, it was found out that most of the authors and literatures mainly focus on individual topic of Lean principles and ISO 14001. In addition, most of the researches and literatures mainly focus on the individual advantages and disadvantages of ISO 14001 and Lean principles, in the aspect of manufacturing and the overall performance and production procedures of the organization. As a result, there are limited, if none, studies which focus on the important connection or relationship between the two similar and connected factors. With this, the research will enable to open new exploration regarding the relationship and connection of the two standards, with the same objectives, goals and use. These two factors are vital because of the current changes and development in the business and manufacturing procedures, particularly in the aspect of cost efficiency and effectiveness and the issue about the environment. In addition, it will also help in order to focus on the different factors and aspects that might be added or included in ISO 14001 in order to improve its current disadvantages and drawbacks. Future research studies can expand on the correlation between lean principles and ISO 14001, future study can better integrate both and upgrade the organization or company in terms of efficiency as well as continuous improvement of the ISO 14001.

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