

Can Lean values contribute to Sustainable Development?

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En investering för framtiden



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Abstract

Purpose – The aim of this paper was to study interactions between Sustainable Development and Lean values by comparing two organizations, one with Technical Communication in-house and one with Technical Communication partly outsourced.

Methodology/approach – A literature study with focus on Lean and Sustainable Development values was carried out. Interviews with companies that provide Technical Communication have been conducted to identify Lean categories. The identified categories have been compared to the findings in Lean and Sustainable Development values.

Findings – The literature study and our results indicate that presence of Lean values support Sustainable Development, but it requires that organizations focus on the culture and values. The result indicates that if Technical Communication has a low status the company put low value on Sustainable Development. If Technical Communication is produced in-house customer involvement might be easier to achieve.

Practical implications – The identification of Lean values can be a starting point for organizations to work with Sustainable Development as it helps the organizations to focus on significant areas.

Keywords – Sustainable Development, Lean, Quality Management, Values, Technical Communication

Paper type – Case study

Introduction

There are many reasons to work with Quality Management (QM) initiatives; one is that it can support Sustainable Development (SD). The definition of SD is open to interpretation: it has developed considerably and is still developing (Hopwood et al. 2005). The most frequently used definitions is that from Our common future (WCED, 1987): “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. This definition has been developed to include the whole system, namely the interlinkages between economic and environmental factors and society and all external influences. In this paper the term Sustainable Development (SD) will be used to refer to an incorporation of all three dimensions of economic, environmental and social aspects. The concept of SD has a strong connection to QM and its various specializations. Deming (1986) who is well known as the founder of the fourteen points of Quality Management, argues for the importance of the system, because it has the biggest influence on the outcome. According to Senge (1990), a balance in the system would then be achieved: what you put into the system is what you get out. Consequently, a system view is necessary. Sapru & Schuchard (2011) argue that a lack of quality in organizations has shown itself to be harmful to environmental and social performance. More recent studies have shown the effect on an organization’s outcome of applying a QM initiative and how, when it is combined with environmental initiatives, see e.g. Wiengarten et al. (2013), there are higher performance benefits in terms of cost, flexibility and delivery performance and according to Lindsey (2011) also reduced waste and thereby reduced costs.

United Nations (2012) acknowledges that SD and all its aspects need to be more integrated at all levels and that interlinkages between different aspects are believed to achieve SD in all dimensions. Laszlo & Zhexembayeva (2011) are of the opinion that SD needs to be part of the

DNA in organizations in order to reach the desired result. For most organizations, it is obvious that it is important to work with SD issues, but often there will be problems or paralysis when it comes to actually working with the issue. There is a gap between what organizations think it is important to work with regarding SD and actually taking action and really doing it (Mirvis et al., 2010). One reason for the gap is that many within an organization don't share the same opinion (ibid). Rusinko (2005) illustrates one way in which QM can be a 'conceptual bridge' by using some of the principles within QM and the Deming cycle, for organizational decision-makers when working with sustainability issues.

The quality management initiative, Lean, has played an important role as a way to develop organizations and improve organizational performance see e.g. Salah et al. (2010). Lean can be defined as a management system designed to be responsive to the needs of individuals in business and deliver better outcomes for stakeholders (Emiliani, 2003). Radnor et al. (2012) defines Lean 'as a management practice based on the philosophy of continuously improving processes by either increasing customer value or reducing non-value adding activities, process variation, and poor work conditions'.

One area that is in need of quality development and that constitutes an important part of many systems is the production of TC. TC is a comprehensive concept that includes different kinds of manuals and maintenance instructions as well as, for example, blueprints, catalogues for spare parts and material for education. TC is an important function which makes it possible to introduce, use, maintain and phase out technical artifacts in a safe, beneficial and sustainable way (Asproth, 2011).

The aim of this paper was to study interactions between SD and Lean values by comparing two organizations, one with TC in-house and one with TC partly outsourced.

Principles within Sustainable Development

According to Lindsey (2011), there is a need for common core principles for SD to help society to develop and implement sustainability. Three sustainable principles that can summarize and form a framework are identified. The described principles are: improved sustainability is achieved through reducing wastefulness; improving quality improves sustainability; and sustainability is best achieved through implementing better systems. Lindsey's (2011) three principles are further explained below:

Principle 1; improved sustainability is achieved through reducing wastefulness.

"The less wasteful an individual, community, or country becomes, the more sustainable it becomes". Wastefulness can deplete availability of material and energy, reduce value and capabilities in different areas which can prevent current and future generations' from reaching their full potentials. Wastefulness can be identified in many different forms that influence and occur in products, processes, and systems. According to Lindsey (2011), wastefulness is associated with 'natural capital', 'all of the ecosystem services that the earth provides to people', which are primarily wasted through two mechanisms, consumption and degradation. Within this principle, the connections between sustainability for the ecological system and the social system are consistent. A starting guide strategy for SD should be the elimination of waste at its source.

Principle 2; improving quality improves sustainability.

Reducing waste in products, processes, or systems is common in almost every QM initiative. It is also reasonable to reduce waste of 'natural capital' in order to improve sustainability. If

quality and productivity can simultaneously be improved through prevention of defects and reduction of waste, sustainability and quality of life can be improved through waste and pollution prevention. Lindsey (2011) suggests that one strategy to integrate sustainability to quality is to add waste of natural capital to the list of seven deadly wastes which are identified in Lean. Another way to reduce wastefulness is to rate the value of natural capital higher in the market. One suggestion to achieve this is to build public databases with information from life cycle analysis.

Principle 3; sustainability is best achieved through implementing better systems.

Ecosystems are working perfectly in terms of sustainability, all organisms' distributors, producers, consumers, and decomposers have a clear function and every part has its purpose. In man-made systems where there are a lot of deficiencies, focus tends to be on isolated components and other components are not taken into consideration. Organizations tend to put the focus on their own organization and not pay attention to suppliers and customers. In contrast to economic issues, organizations tend not to put the focus on the ecological and social aspects in the system view. When it comes to production, Lindsey (2011) suggests that a better way to achieved balance in a man-made system could be to consider product design which is more easily renovated and remanufactured. Design and implementation of more sustainable systems need to focus on the internal and the external, suppliers and customers and the opportunities they present.

Lean – based on values

Lean thinking was first developed in the Japanese manufacturing industry and is influenced by e.g. Deming and Juran (Liker, 2004), two theorists who have also had a significant impact on Quality Management (Bergman & Klefsjö, 2010). Lean is based on a set of values, see e.g. Womack and Jones's (2003) five values or Liker's (2004) '4 P' model. These values can be summarized as follows; customer and value focus, focus on people; continuous improvement; present leadership; system view; long-term thinking and eliminate waste (Emiliani, 2007 and Liker, 2004).

The reason for applying Lean has to be for the benefit of the customer (Emiliani, 2010). It is only the ultimate customer who can define value and value is a main focus area within Lean (Womack & Jones, 2003). It is also important to meet the customer with a whole offer, not only simply by optimizing part of the delivery (ibid). In this paper, the concept of customer includes both external and internal customers. According to Bicheno & Holweg (2009), a system approach is the very essence of Lean. A system can be defined as a network of independent components that work together to try to accomplish the aim of the system (Deming, 1994). Parts or properties in a system make sense to the whole system, but may seem to have little or no meaning when looked at piecemeal (Adetunji et al., 2003). Lean emphasizes the supply chain, where the production within the organization is a part of a value stream from the sub-suppliers to the ultimate customer (Womack & Jones, 2003). If an organization is seen as a system, one thing to bear in mind is to have an outside-in perspective and to have a design based on customer demand, value and flow (Seddon, 2005). Continuous improvement within Lean is more than problem solving; it is fundamental to how organizations think and learn (Liker & Franz, 2011). Requirements on products constantly change Bergman & Klefsjö (2010) and (Deming (1986) states that one should "improve constantly and forever the system of production and service" and advocates the use of "the improvement cycle" (PDSA). Elimination of waste is closely linked to creating flow in an organization's processes (Liker, 2004 and Womack & Jones, 2003). The opposite of value is

waste and waste elimination is constantly ongoing within Lean. It is not enough to eliminate waste when it arises; waste needs to be prevented (Bicheno & Holweg, 2009). There is a great need for long-term thinking in an organization because changes often take longer than anticipated (Berglund, 2010). Lean is a long-term commitment and organizations expecting short-term effects may focus on tools and not on changing the culture since that often takes a long time (Bhasin & Burcher, 2006). Long-term thinking has to be prioritized at the expense of short-term economic goals (Liker, 2004). Organizations need dedicated co-workers to develop the business (Berglund, 2010) and motivated people to cope with challenges within problem solving (Kanji et al., 1995). Rother (2010) claims that one of the basic assumptions within Toyota is that people are doing their best and the focus needs to be on the process instead of apportioning blame in order to make people want to participate and be committed. If focus is solely on continuous improvement, the organization will never be truly Lean and to reach real Lean management, the value Respect for people needs to be present as well (Emiliani, 2010).

Organizational culture relevance

The culture in an organization is formed by the organization members' shared norms, values and beliefs and it has an important function: it helps the employee to understand the surrounding environment and how to react to it (Yukl & Kaulio, 2011). An organizational culture can be explained as a set of shared values (O'Reilly et al., 1991). The shared values can be expressed as "value profile" (Rokeach, 1973) where the individual values are the abstract ideals that represent beliefs about modes of conduct and ideal goals. According to Chatman & Eunyoung Cha (2003), a strong organizational culture is based on two things: a high level of agreement among employees about what is valued and a high level of intensity about these values. Establishing a new organizational culture or modifying an existing one is a long-term process (Sinkula et al., 1997), but, if a strong organizational culture is established, it can improve the organizational performance in two ways: it energizes the employees by appealing to their higher ideals and undefined values; and it shapes and coordinates behaviors and decisions (Chatman & Eunyoung Cha, 2003 and Grönfeldt & Strother, 2006).

How the organization is structured can reflect its values and simply making a list of the values will not support the employees (Yukl & Kaulio, 2011). The values need to be explained: the way in which they are connected; how to prioritize between them; and how they shall be expressed or received in an organization. On the other hand, values can unconsciously affect attitudes and behaviors (ibid.). Leadership is of importance when creating a culture (Ingelsson, 2013). By establishing a strong culture, leaders can indirectly affect members' attitudes and behaviors (Schein, 2004). Culture can be an obstacle rather than an amplifier of leadership influence on organizational members' values and beliefs if they don't match the leaders goals (Yukl & Kaulio, 2011).

Interaction between Sustainable Development and Lean

Sustainable Development has been on the agenda for a while but to go from knowing and agreeing that we need to do things differently to knowing exactly what should be done seems to be difficult (Johnson & Isaksson, 2010 and Rusinko, 2005). In Rusinko's (2005) findings, it is shown that where QM can be a useful tool when implementing environmentally sustainable practices, one cause can be the sharing of common beliefs and principles between QM and sustainability. The identified beliefs and principles were: long-run focus – economic and social, continuous improvements, employee empowerment, an integrated perspective, multifunctional approach and participation by the whole value chain. Wiengarden (2013) also

establishes that the three practices Quality, Lean and Environment, (note Wiengarden (2013) puts quality and Lean practices on the same level, in this paper Lean is referred to as a Quality management initiative), are overlapping principles and practices, as well as comparable underlying philosophies. Eliminating waste is at the core of Lean and environment practices and focus on quality also, among other things, results in reduction of waste (ibid.). Tice et al. (2005) also confirm that Lean fosters continual improvement, a waste-elimination culture that involves workers throughout the organization. The definition of Quality has been expanded to include stakeholders, not only customers, and thereby the interests of the stakeholders e.g. environment, safety and social aspects. A summary can be found in (Maletič, 2013).

Technical Communication

Technical Communication is characterized by information that enables a safe and environmentally friendly introduction, usage, maintenance and destruction of products and services (Asproth, 2011). In other words, TC is connected to the product life cycle and due to this tight connection it has a high impact on quality. TC has transformed from communication about technology to communication as and in technology. This means, according to Johnson-Eilola & Selber (2012), that TC has become both a process and a product and something that it is not possible to talk about technically as a separate part of the product. Instead, it should be viewed as part of the product. In this paper, the standpoint is based upon the belief that TC has the potential to create surplus value for the customers and for the enterprises. This standpoint is based on the trend that technical communicators nowadays also have competence (or at least should have) in information economy (Hart-Davidson, 2013). This shift is however easiest to see in organizations that have information as their primary product; meanwhile a lot of organizations often see information as a secondary product and in some cases even as a necessary evil (ibid). This view of TC is affecting the status of both TC and furthermore of the technical communicators producing it. This has been shown for example by (Bank et al., 2013). This had a negative impact on TC quality and therefore we argue for a need for research that focuses on quality improvement.

Methodology

A literature review has been carried out focusing on values within SD and Lean, and interactions between them. Identified SD values were then compared to categories representing Lean values designed by the research group. The categories agreed upon were: customer perspective, long-term thinking, system view, value flows, standardization and continuous improvement.

In order to identify best practices and areas of improvements in TC based on Lean, interviews in two companies working with TC in different ways were conducted. In the companies, A and B, a total of 13 interviews were conducted. Eleven of the interviews were conducted on-site and the remaining two were conducted by telephone. All the interviews were recorded. The interviews were semi-structured and based on an interview guide, which was sent out to the companies in advance. The questions for the interview guide were developed by the research team and based on the identified Lean categories. After the interviews were conducted, they were all transcribed verbatim. The transcripts were then analyzed. All were read through by all of the members of the research team and each identified best practice and areas of improvement. Each interview was compiled by the research team in workshops, where the identified best practice and improvements were discussed and then categorized into the six categories.

Results

The results from studying interactions between SD values and identified Lean categories shows that there are several interactions, see Figure 1.

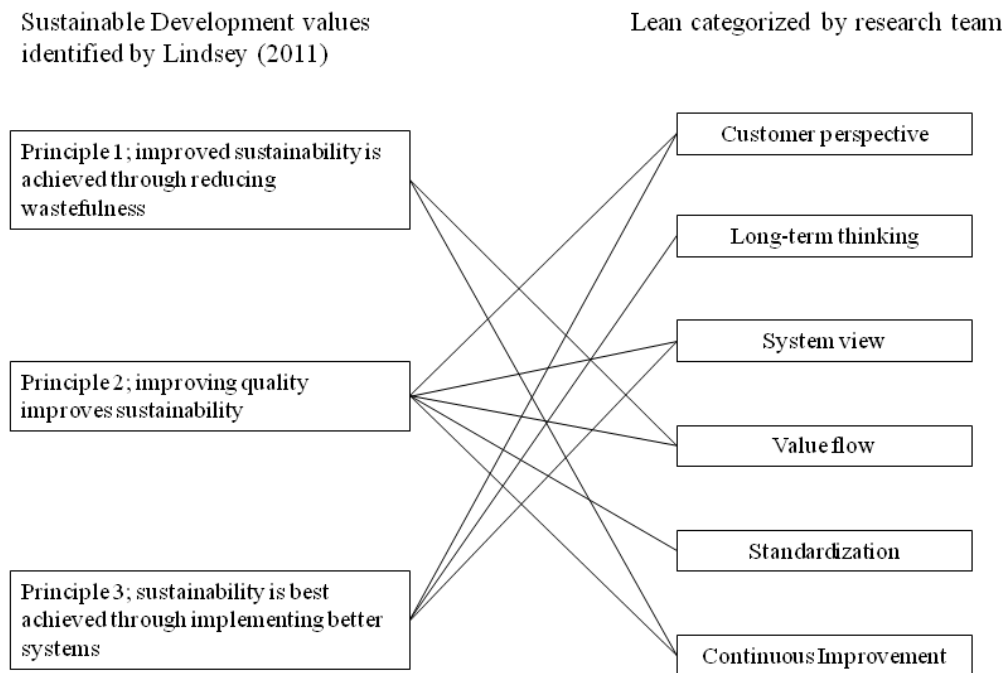


Figure 1. Interaction between Sustainable Development values and Lean.

Principle 2 among the SD values had five interactions with the Lean categories, while Principle 3 had three and Principle 1 had two interactions. Customer perspective, System view, Value flow and Continuous Improvement each had two interactions and Long-term thinking and Standardization each had one interaction.

Identified best practice in Company A

Processes have been mapped out and the company works with value flows. They have initiated documentation of their processes and there is a clear process for producing TC where the Technical Communicator gets the opportunity to meet the customer during the training process, they can then give feedback and update the TC. Course evaluations are used for evaluating the TC. The process also includes handling feedback that comes when the product is delivered to the customer. Internal verification is also used for feedback on improvements. Users of the product are involved at an early stage in the of TC process development. Work on defining quality in customer documentation has started. The company has also started to measure which improvements have been carried out. The company has a structured way of starting to apply Lean which is initiated by the co-workers. They measure the Lean culture four times a year.

Areas of improvement in Company A

The TC department in the company has a lack of Lean focus and the organization's objectives need to be clarified; TC doesn't have any specific objectives at all. The process maps are not being fully utilized for managing the organization for instance there are unclear methodologies for updating TC. Many different channels into the organization from customers exist but coordination and structure to handle these are missing. It is also unclear who the customer is: the one who pays or the user? The experience is that it is hard to get feedback from the customers, especially from users. There is a need for the organization to clarify what quality in TC and customer documentation is and a consideration of the external customer perspective also needs to be included. The requirements on TC are unclear and there is a need for a better understanding of the customer needs. The structure that exists to produce TC is not followed by everybody and there is a lack of structure for learning from each other between different projects. Methodologies for working with improvement of documents are needed. The view on TC is that it's only a cost and is measured only as a cost.

Identified best practice in Company B

Company B has initiated a structured way of working with strategy for the company (up to 2020). They are working with processes and have done process flows, check lists, templates, and instructions, and have also started with internal and external process reviews. They involve the internal customers in evaluation of the processes. They have an existing process for carrying out and handling the results from customer surveys and giving feedback to the customer. The structured customer surveys include both questionnaires and personal interviews. Besides the surveys, they use other ways to obtain customer feedback e.g. social media and frequent outreach contact with structured documentation in one common system. The purpose with the outreach contact is to get input about their products. Suggestions for improvement are always welcome and customers are involved when it comes to bigger projects. Internally they have a close co-operation between support and design and design and the TC department. Education for the customers is available to reduce the pressure on support and the website is a channel for TC and can continuously be updated.

Areas of improvement in Company B

The company lacks a strategy for how to handle and work with consultants for production of TC, namely it is not made explicit if the company should outsource TC or focus on it in-house. The process for consultant procurement is complicated and time-consuming. The use of consultants creates a distance and the cooperation between competences is made more difficult. TC has no specific objectives and no internal measurements on TC are done. TC comes late into the process and is often delivered late. TC is a field that has a lack of methods for involving customers in development and customer needs can't be responded to because of a lack of time. TC is not represented in the customer surveys and there is no structure for handling feedback from the customers. It is time-consuming and there are long intervals for following up TC; there is a lack of methods for handling needs for change within TC. There is a need for more cooperation with the suppliers and more focus must be put on the products' life cycle.

Analysis

A clear connection has been identified between Lean and SD which are shown in Figure 1. Most connection had SD principle 2; improving quality improves sustainability. Which is not surprising since Lean is considered as a QM initiative. According to the definition of quality that Bergman & Klefsjö (2010) use, it is the customer needs and expectations that has to be fulfilled. Quality has to be improved in all parts as well as in the smallest piece as in the

whole system. To be able to improve the system, it can be assumed that a system view is necessary. Lack of standardization can have impact on the outcome of the quality of products. Working according to standards can help prevent variation when it supports working in the same way. Continuous improvement can be one way to solve quality issues by identifying problems and eliminating them: it's a way to constantly meet new challenges in organizations. Principle 3; sustainability is best achieved through implementing better systems. Within Lean customers as well as suppliers are a part in the system (Womack & Jones, 2003). According to Emiliani (2010) Lean is a system that is designed to be responsive and deliver better outcome and could be considered as a better system. In Lean, customers need to be considered when it comes to the value chain and it is for the customer that value shall be created. Long-term thinking and a System view have to be considered when looking at a products life cycle. Principle 1; improved sustainability is achieved through reducing wastefulness, had connections to Value flow and Continuous Improvement. Identification of value in processes helps to visualize waste and waste can be prevented and eliminated by continuously improving the people, processes and systems as Lindsey (2011) mentions.

Company A has fragments in both identified best practice and areas of improvement from all categories. Value flow and customer focus were seen as more visible in identified best practice. On the other hand, customer focus along with long-term thinking were the two areas that were most identified in areas of improvement. Contradictions that are visible when it comes to customer focus can be signs of not having shared values and thereby the lack of a strong organizational culture as described by Chatman & Eunyong Cha (2003).

In company B five of six Lean categorizes identified in best practice. As well as in Company A, the presence of customer focus was also more visible in the results. Even if Company B focused on processes, a focus on value flow was missing. It seems like Company B has processes for gathering customer needs, but there are difficulties in feeding back the customer needs to production. TC has a low status within the company but the customers think it is an important area.

The companies have identified fragments of working with continuous improvement, improvements are welcome and internal co-operation occurs in Company B. Company A also has internal methods for working with improvement. The result indicate that the learning part see Liker & Franz (2011) of continuous improvement is missing. Both companies have identified a lack of standardization, which is connected to quality. According to Lindsey (2011), higher quality is necessary to support SD. Quality is difficult to improve if the customer needs are unknown.

System view is of significance in both Lean (Bicheno & Holweg, 2009) and in SD (Lindsey, 2011). It is important to understand the big picture and to understand the parts of the system (Adetunji et al., 2003). According to Lindsey (2011) total balance is desirable in systems to become sustainable, like in ecosystems. If balance in the system is to be fulfilled, the whole chain from product design to renovation or remanufacturing needs to be considered. The field of TC seems to have deficiencies in regards to System view in both companies when it comes to internal working structures that support the production. In Company A, there are difficulties to communicate between different projects and in Company B, there is a distance to consultants producing TC that complicates co-operation. Long-term thinking has connections to System view when a products life cycle has to be considered. The deficiencies become apparent when one objective of TC is that it should provide support to the product's life cycle. The companies have identified best practice and areas of improvements among the principles that Rusinko (2005) had identified in both QM and SD.

Discussion

The literature study and our results indicate that the presence of Lean values helps to create the conditions for SD, but organizations need to focus on their culture and values see e.g. (Yukl & Kaulio, 2011). Identified best practice in the companies indicates that the conditions for SD are weak. This is based on that all Lean categories couldn't be identified, Company A had a lack of value flow, and contradictions within the company were visible, for instance within customer focus in both companies. It seems like the values weren't shared within the company. If TC, that is significant for the product's lifecycle, has a low status, this could indicate that the company put a low value on SD. A lack of outspoken strategies and objectives, and not taking the product's life cycle into consideration could show that the company needs to elaborate Long-term thinking and System view. One positive factor is that the companies understand and can identify deficiencies. It is possible that Company A has better conditions to become sustainable because of their focus on value flows and it seems like they have reached a certain level of applying Lean. Lean in Company A is initiated by the co-workers which could affect the initiatives' condition to be sustained since the leadership when it comes to creating a culture is not present see e.g. Ingelsson (2013).

Company A, which has TC in-house, has a structure for involving customers in the production of TC. This might be easier to do if you produce TC by yourself. Since it is the customer who can define value, it can be seen as significant in this case. The customer perspective is also interesting when it comes to clarifying who the customer is. There is no indication in the interviews that the companies have expanded their definition of customer to also include stakeholders, but with systems for customer focus, there might be conditions to do that.

Studying separate parts like TC does not give the whole picture about the system, however it may help those who are active in sub-systems to understand their contribution to the system. On the other hand TC has connection to the product throughout the life cycle and can be a support when developing new more sustainable systems.

Future research

This study can be further supplemented with more data collected from the organizations e.g. by measuring the Lean culture in different parts of the organization, to explore if these parts have similar values. Other data that could support the study include harder measurements that indicate SD in economy, environment and social aspects. The study can also be expanded with more cases. Dedicated co-worker, one of the identified values within Lean, was not studied in this case. To be said is that, the co-workers are of importance when it comes to the organizational culture and which values that permeate the organization. This is also an interesting area to do more studies in.

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