

IMPLEMENTING LEAN – DISCUSSING STANDARDIZATION VERSUS CUSTOMIZATION WITH FOCUS ON NATIONAL CULTURAL DIMENSIONS

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ABSTRACT

Lean or Toyota Production System (TPS) has more or less successfully been implemented in the Western world's businesses and organizations for the past 20 years. Several authors have discussed what it is that creates a successful implementation, and several studies have been presented where strategies for implementations have been studied. Culture's impact and possible mitigation for Western companies have been studied and described by for example Womak & Jones. Proponents of the concept of Lean argue that culture is not a constraint for implementation of Lean. Lean Management is called a philosophy but it is often used as a change strategy in the sense that it is implemented with the view of improving performance. A change strategy could be seen as a product that might have to be customized with the view of improving the effectiveness of the implementation. On the other hand abandoning a standardized approach comes with the risk of severely altering the change strategy, possibly to its detriment. Implementing Lean will have an effect on the company culture. Does it make any sense customizing the implementation to culture if the issue is changing the culture? The purpose of this paper is to highlight and discuss the balance between a customized implementation and a standardized implementation. Which are the main arguments for standardization and customization and how could these be reconciled? A literature study of Lean implementation has been carried out and compared with Lean principles and theories from change management with focus on change drivers and change barriers. Main drivers of Hofstede's national cultural dimensions are compared with Lean principles to identify possible drivers and barriers in different cultures. The theory synthesis on drivers and barriers is subjected to a first test in a case study on Lean implementation according to a standardized approach. The implementation is made in a small Swedish factory belonging to a worldwide industrial company. Results from the literature review and the case study indicate that both customization and standardization are needed.

KEYWORDS

Lean, Lean implementation, change management, customization, cultural dimensions.

Introduction

Lean or Toyota Production System (TPS) has more or less successfully been implemented in the Western world's businesses and organizations for the past 20 years. Several authors have discussed what it is that creates a successful implementation, and

several studies have been presented where strategies for implementations have been studied. Culture's impact and possible mitigation for Western companies have been studied and described by, see for example [1]. Proponents of the concept of Lean argue that culture is not a constraint for implementation of Lean. There are several factors that affect organization-

al culture. Some of the most common factors cited include the geographic location (continent, country, part of the country), the organization's size, location size (urban, rural), company tradition, the type of output (if goods or/and services).

It could be that organizational culture plays a role in the implementation of Lean and in the way of how Lean is being worked with. Interesting questions are if and how implementation and use of Lean should be adjusted as a function of the culture. Results of such a study should help us to plan and conduct Lean implementation in a better way.

Lean Management is called a philosophy but it is often used as a change strategy in the sense that it is implemented with the view of improving performance. A change strategy could be seen as a product that might have to be customized with the view of improving the effectiveness of the implementation. On the other hand abandoning a standardized approach comes with the risk of severely altering the change strategy possibly to its detriment. Implementing Lean will have an effect on the company culture. Does it make any sense customizing the implementation to culture if the issue is changing the culture? In this paper we discuss arguments for and against a customization of a Lean program and of the introduction of it.

Methodology

As a starting point we compare the 14 Lean principles based on Liker [2] with the five cultural dimensions of Hofstede [3]. The indications from this comparison are compared with results from a literature survey reviewing articles and the most common books on Lean. This gives us some indications on how culture could affect implementation and the use of Lean. In a case study of Lean implementation in Sweden we study in practice whether we can support indications from our theoretical reasoning.

The chosen case study is on Lean implementation in Sweden carried out with an implementation methodology developed in Brazil with roots in a French organizational culture. The case only highlights parts of the theoretical indications found. However, the example serves as basis for the discussion of how to view the possibly opposing requirements of customer focus and standardization.

The implementation material from the Swedish company was studied. Additionally five interviews and a plant visit were carried out. The studied company has used the World Class Manufacturing (WCM) as the name of the implemented way of working. They clearly describe the content in WCM as

part of Lean. They do not make any references in their implementation material to other definitions of WCM. In this work we have seen the implementation through the perspective of Lean.

The information was collected from interviews with the

- Consultant used by the global company (Instructor);
- The country coordinator (WCM Coordinator);
- Factory manager (WCM Leader);
- Manager production line 1 (staff member);
- Manager production line 2 (staff member).

The interviews were carried out with support from some main questions to secure that all planned areas were covered. The interviews followed the common interview methodology for auditors, starting with general open question which support the interviewed person to describe in own words the situation. Findings are then checked with more precise questions, which can be answered by yes or no.

The main questions were:

- Have you observed any cultural differences between your organization and the way World Class Manufacturing (WCM) has been implemented?
- What has been most difficult?
- What has been the easiest?
- What should have been done differently?
- Have you seen any results from the implementation?

A complement to the interview was a visit to the factory and a guided walk through the production with presentation of the WCM work.

Other relevant documents, such as guidelines and quality results have also been studied. Finally, the visit and the factory round trip provided us with visual information.

The version of Lean implemented has been compared with the theoretical indications found on possible cultural effects. Additionally a more general discussion has been carried out from the perspective of how to view customization versus standardization.

Literature survey

Implementation strategies have been described by some authors [1, 2, 4] and [5]. Some different approaches have been described as tools first or philosophy first, parallel or sequential implementation, etc. The cultural effect has been one of the parameters. Womack & Jones [1] have in their book *Lean Thinking*, concluded that the concept of Lean is usable in different countries and in different branches. This conclusion has been backed up by different case studies. They also pointed out the changes different

countries have had to do to get further improvement and better implementation of Lean thinking. A typical cultural element where German companies differed was that: “German firms show a clear discomfort with horizontal teamwork of the sort needed to operate Lean enterprises” [1]. Another cultural parameter identified by [1] is the need for alternating careers. The common way to make career is not possible in Lean enterprises.

The need for a flat organization, strong team leaders and well-developed multifunctional teams has been described by [4]. He also refers to [6] that “it is first necessary to change employee’s attitudes to quality, in order to attain a material flow containing only value adding operations” [4]. The number of hierarchical levels in an organization [4] is frequently tightly connected to the companies’ culture. Big companies, public authorities and municipalities are known to have many layers in their organizations. Here, the task of delayering is probably challenging. Many authors have pinpointed the need for changing people’s way of thinking for example [6] and [1] state “...to change the way your employees think by directly demonstrating a better way” [1]. In the *Staying Lean: thriving, not just surviving* [7], the authors describe the need for behavioral changes and engagement. Their conclusion is that in the same way that there are differences in organizational culture there are differences in national cultures. These differences can affect the approach and speed of change. In their example they demonstrate how the vision and direction can be set but how the organizations then are allowed to implement Lean considering the different national cultures. Each implementation was therefore different but all were successful.

In a study on Lean implementation in Health Care [5] Poksinska has not identified any single correct way of implementing Lean. Different environments need different strategies and ways of implementing. Hallencreutz and Turner [8] claim that there is not any acknowledged best practice for change. Kotter has a well-known eight-step model for change [9]. Particular focus in this model is on creating the sense of urgency as the first step of change [10]. Kotter [9] even indicates that there sometimes is a need to create a crisis mentality to get things moving. This could indicate that a mechanistic approach of Lean implementation without the necessary preceding work to create motivation and urgency might fail. This risk might be bigger in organizations with a low Power Distance Index [3] where employees want to be motivated and expect more than only marching orders. Lean requires challenging goals, which if accepted could create the motivation

and urgency needed for breakthrough improvement. A genuine core value of customer focus could also help to create the sense of urgency of doing the utmost to satisfy customers.

There are parts in Lean that seemingly act against changes such as standardization and using proven solutions [2]. Particularly customer focus and customized products could be seen as going against the urge to standardize. In the case of producing goods it should be possible to standardize the production while maintaining the customization of products. Car manufacturing of today with the moving belt produces a variety of cars simultaneously.

For the delivery of services where the customer is part of the production, standardization could be a challenge, like in for example health care. In order to customize services, training and education of customers is a common thing. Examples are such as getting a haircut and visiting the dentist. We mostly know what is expected from us. When we are on holidays we are offered a welcome drink where we are informed of the essentials of how to use and buy services. In order to assure good quality it might even be necessary to put formal requirement on customers like having a driving license or complying with some other requirements like even having to pass a course and to acquire a certificate to classify as customer [11].

The implementation of a new way of leading and working could be seen as a service, which is offered to an organization and its employees. In this context the employees could be considered customers that might require some customization of both how the implementation is done and how the steady state is going to look like.

Culture and corporate culture have many definitions. This work includes a limited investigation of existing definitions and descriptions of corporate culture. A well known definition is Edgar Schein’s definition: “A pattern of shared basic assumptions that the group learned as it solved its problems that has worked well enough to be considered valid and is passed on to new members as the correct way to perceive, think, and feel in relation to those problems” [12]. A simpler definition could be – as we do it here. The content is both visible as instructions, such as the organizational chart and invisible, such as how we act in our relations between the organizational members.

Geert Hofstede and Gert Jan Hofstede have introduced different cultural dimensions describing the different cultures we can identify. Even if a culture is not always following country borders, the dimension has been measured for different countries. In this

study we have used five cultural dimensions, Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI) and Long-Term Orientation (LTO).

Correlation between Lean and Hofstede's five dimensions

We have compared Lean's 14 principles based on Liker [2] and the five dimensions of Hofstede [3] with the purpose of getting a general picture of how the culture of different countries could affect an organization's will and capacity to implement and use Lean. This correlation is hard to assess and the results in Table 1 should be seen as a starting point. The correlation was evaluated by weak, medium and strong correlation and if the correlation was positive or negative. For each of the cultural dimensions a correlation sum was calculated by weak (W) as 1, medium (M) as 2 and strong (S) as 3.

The dimension PDI, UAI, MAS and LTO in Table 1 seem to be important to look at from the orga-

nizational perspective (who has the power and which rules and procedures should we follow?). The results in Table 1 indicate that a strong PDI and MAS are affecting a Lean organization negatively and that a strong UAI and LTO are affecting Lean organization positively. The Individualism (IDV) seems to have less of an effect.

The number of connections indicates that PDI and UAI have the biggest impact on the different principles of Lean.

Which Lean principles are mostly affected by different cultures? From Table 1 and the estimate of the correlation, we can see that it is "Develop exceptional people and teams who follow your company's philosophy" if we use the number of connections it is "Make decisions slowly by consensus, thoroughly considering all options, implement decisions rapidly".

Results in Table 2 indicate that Japanese culture supports Lean principles by having a low PDI and a high UAI and LTO. These are the principles found in Table 1 to have a possible correlation with Lean principles.

Table 1

The table presents a correlation between Liker's 14 principles for Lean with Hofstede's five cultural dimensions (Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI) and Long-Term Orientation (LTO)). The authors have done the assessment.

Likers 14 principles	PDI	IDV	MAS	UAI	LTO	Sum of correlations
Long-Term Philosophy				M+	S+	5
Create continuous process flow to bring problems to the surface				M+		2
Use "pull" system to avoid overproduction				W+		1
Level out the workload	W-					-1
Build a culture of stopping to fix problems, to get quality right the first time		S+		S-	W+	1
Standardized tasks are the foundation for continuous improvement and employee empowerment	M-	W+		S+		2
Use visual control so no problems are hidden						0
Use only reliable, thoroughly tested technology that serves your people and processes				S+		3
Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others	W+					1
Develop exceptional people and teams who follow your company's philosophy	S-	M-	M-			-7
Respect your extended network of partners and supplier by challenging them and helping them improve	W-		W-			-2
Go and see for yourself to thoroughly understand the situation	M-			M+		0
Make decision slowly by consensus, thoroughly considering all options, implement decision rapidly	S-	M+	S-		M+	-2
Become a learning organization through relentless reflection and continuous improvement	W-	W-			M+	0
Sum of correlation	-12	3	-6	10	8	
Number of connections	8	5	3	8	4	

Table 2
The cultural dimensions for Japan, France, Brazil and Sweden [13].

Cultural dimension	Japan	Brazil	France	Sweden	Lean optimum (Assessment has been done by authors)
Power Distance Index (PDI)	54	69	68	31	Low
Individualism (IDV)	46	38	71	71	
Masculinity (MAS)	95	49	43	5	Low
Uncertainty Avoidance Index (UAI)	92	76	86	29	High
Long-Term Orientation (LTO)	88	44	63	53	High

The results show that we could expect some implementation problems for Sweden due to the low index for UAI. This could be by employees putting things into question that are not well explained. Employees would most likely not be prepared to follow strict rules without understanding the purpose.

In our case the implementation methodology has been prepared in a culture affected by Brazil and France. These countries have a better fit for UAI, but a less favorable PDI and MAS. The Lean effect on PDI is visible in team development and in making consensus decisions. The difference between Brazil and Sweden is the largest for UAI, which could indicate that implementation of reliable, thoroughly tested technology and standardized methods for implementing without a good motivational component could encounter resistance. On the other side to build a culture of stopping whenever observing a problem to fix it, should be easier for Sweden.

The company studied

The company in question belongs to a worldwide building materials group with operations almost all over the world with a total of around 190 000 employees in 46 countries. The Swedish company has about 300 employees. The current factory is located in a small town in central Sweden (number of inhabitants around 12 000). The number of employees at the plant is 25 and its organization is a typical line organization with a manager and two supervisors responsible for two different production lines. The Group to which the Swedish plant belongs to, has in Brazil developed and tested the model for implementing what they call World Class Manufacturing (WCM). In their implementation material they define the Objectives of the WCM training program as:

“Based on a standard approach, to transfer the concepts of the Lean Thinking and its tools to the WCM Coordinators & Managers;

Support the WCM coordinators, the plant managers and all WCM (Company name) community members in their implementation of the Lean tools;

To coach them so as to certify their abilities to autonomously continue the Lean implementation after the training period”.

The material supported by the Group is also clearly following the principles and tools that are typical for a company working with Lean.

Despite the fact that Lean and WCM cannot be regarded as exact synonyms, this article will not discuss these differences. By support of the clear link between the companies WCM and Lean tools and principles the article will look at the implementation from a Lean perspective.

Method of implementation

The implementation is based on standardized methods and materials. The implementation is divided in eight modules. Each module contains two parts

- Workshop;
- Implementation task list.

To conduct the workshops and to do the tasks some standardized materials are used. The timetable for the implementation is to implement each module in the plant with one to two months between them. The implementation of a module starts with a workshop followed by task list to do in the period to the next modules.

The implementation has been presented as a PDCA cycle.

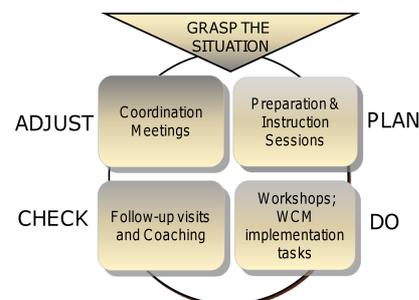


Fig. 1. The implementation process as a PDCA cycle, [source: case company, educational material].

The standardized eight modules are:

1. Introduction to Lean thinking
Introduce the key concepts of Lean Thinking, start to identify the production lines problems and set action plans;
2. Value Stream Mapping
Identify the systemic problems and set action plans;
3. A3-paper
Define the (company name) strategic and tactic objectives and how to deploy them;
4. Stabilized job in the 4Ms
Set action plans to achieve stability in Manpower, Method, Materials and Machines;
5. Stabilized work (standards)
Set action plans to apply standardization in order to achieve stability;
6. Focused improvement
Based on the current standard, set action plans to improve continuously and apply the new improved standard;
7. Pull system of the sales
Set action plans to minimize the demand variation in order to stabilize the production flow;
8. Create pulled production flows
Set action plans to produce what is necessary, when it is necessary avoiding over production and achieving high service levels.

Standardized materials that are used are

- Presentation slides;
- Simulation games and practical exercises;
- Workshop evaluation forms;

- Indicators chart and templates;
- Checklist;
- Action plans.

Follow up is made by three audits (made by three international coordinators).

The implementation is organized in a hierarchical organization:

- Program manager;
- Instructor;
- WCM Coordinator (country level);
- Plant manager (WCM Leader);
- Staff members.

The knowledge transformation is going from top to bottom and the technical support is going from WCM coordinator to bottom. Problem is escalated from origin up to the level, which solves the problem. Follow up is made by reports between staff members and WCM leader weekly, WCM leaders and Managing director monthly and Managing director and WCM Director quarterly.

Results from the interviews

The interviewed persons have given a similar picture about the implementation. The answers have some differences depending on the position of the interviewed person. The WCM Coordinator has presented more general thoughts, probably due to his experience from many implementations and plants. The results that can be categorized to cultural behavior are presented in Fig. 2.

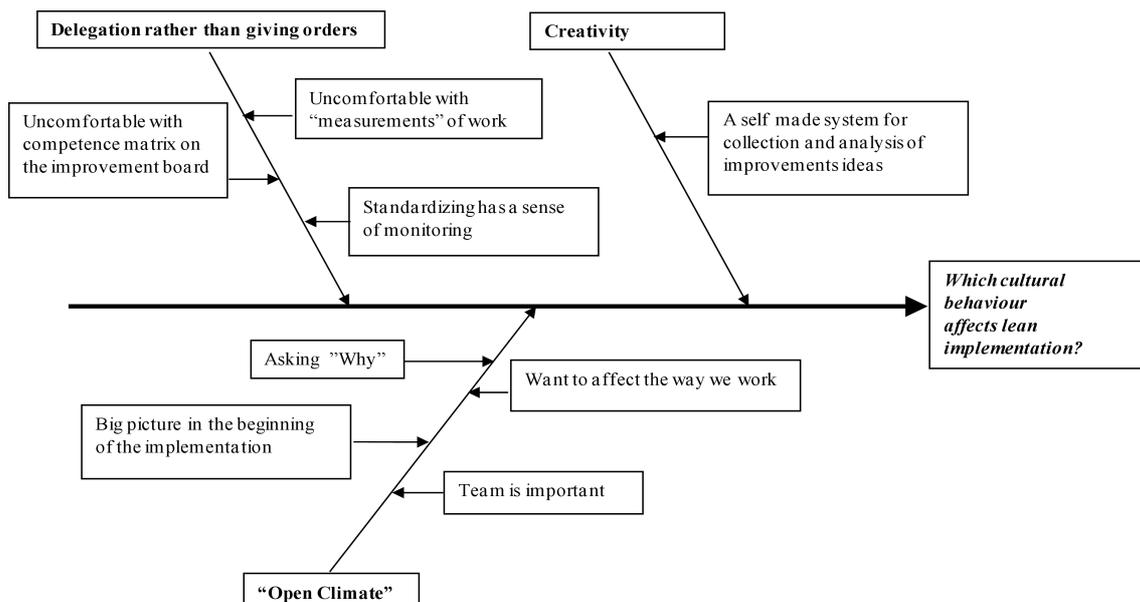


Fig. 2. Summary of answers to question: "Which cultural behavior is affecting Lean implementation?".

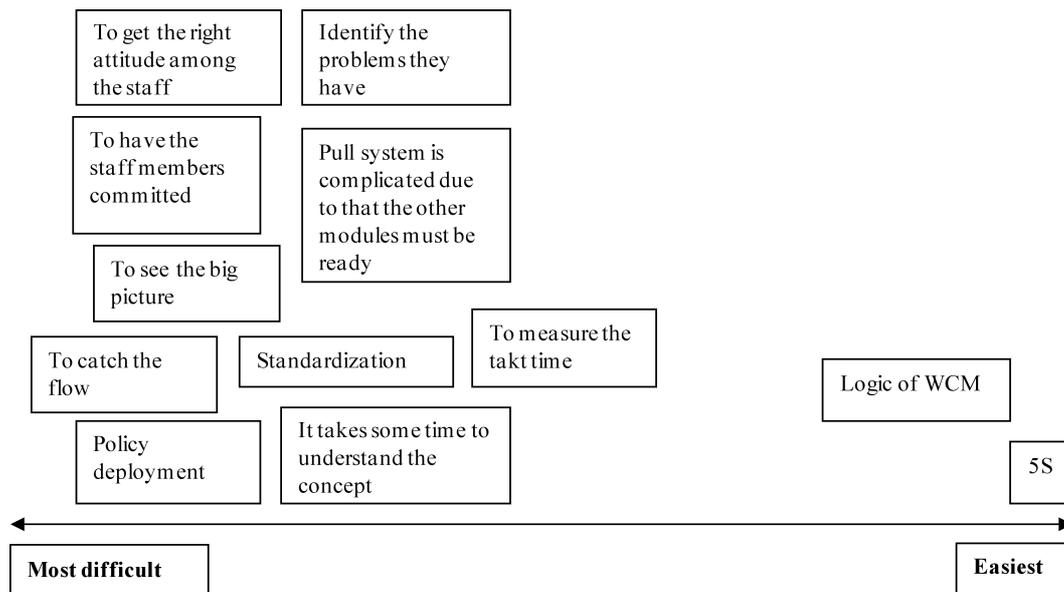


Fig. 3. Summary of answers to the question: "Which is the most difficult and which is the easiest part in the implementation of Lean?"

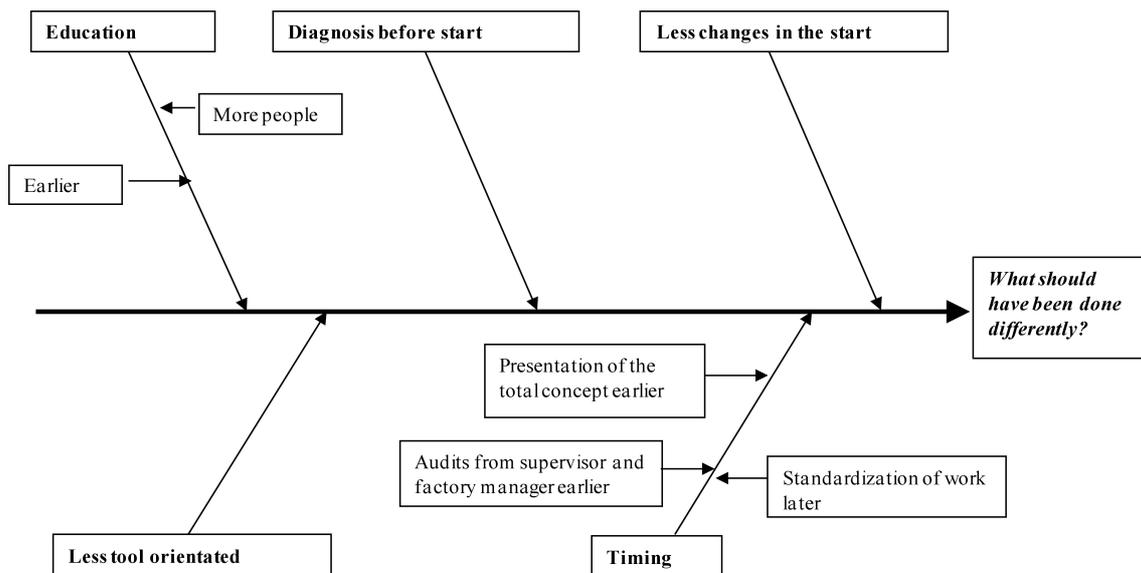


Fig. 4. Summary of answers to the question: "What should be done differently the next time?"

The results from the question about the most difficult and the easiest part in the implementation are shown in Fig. 3.

In Fig. 4 results are showing what the interviewed people would have done differently if they should do the implementation one more time.

The WCM instructor emphasized the importance of the management support and the selection of the WCM coordinator. From his experience from other countries and factories he said that most of the tools need modifications between countries and also between factories. This can create "problems" at the

audits due to the auditors not expecting any variation or any alternatives in the standardized work. It is important that the resources at the factory are checked and dimensioned to the rate of implementation.

Analyzing the implementation and the cultural changes

We could look at Fig. 2 where delegation and open climate is clearly linked to the cultural behavior. This cultural behavior has forced the imple-

mentation to work more with arguments to answer “Why” and to give the whole picture about the coming changes. The second question in Fig. 2 concerning resistance to measurements is also found in Fig. 3 to the left (most difficult). Again the person responsible for implementation needed to present good arguments for monitoring and measurements. It was only when the team members could see improvements from measurements that it was accepted. Other examples of changes needed and resistance are:

- The international instructor points out that most of the tools need modifications between countries and also between factories. He also has identified that standardized work is coming in early in the program. It could be a little too early especially for the Nordic countries.
- The WCM leader points out that they have developed a new tool for identifying and working with improvements (observation notes on small prepared note books and frequency measurements).
- The supervisor for line 1 pointed out that the staff members were not prepared to have their competence matrix visible on a white board. Today it can be seen on a PC screen located at the work place. This could be seen as a small modification of the steady state situation due to cultural differences.
- Standardizing had a sense of monitoring which was not natural for the company culture.
- The sense of monitoring and aversion against measurements on personal performance has been hard to overcome.

The changes and resistance have not stopped the implementation. It may have improved it and perhaps it was needed to get the implementation to continue. At this stage it is not possible to say if there will be any permanent differences in the steady state compared to the standardized form. It could be that when time goes that the way of working will be adjusted to the original model of implementation. Positive effects could in the future change the feeling of being monitored.

These findings are supported by the literature survey and especially the conclusion and description Hines et al. have [7] made. The suggested approach from the Instructor “*The implementation is rather rigid and it would be better to make a diagnosis of the plant and choose proper tools*” seems to be very wise. To know where you stand is a good start to find the way to the goal.

Some of the answers also indicate that the implementation strategies suffer from not showing the big picture. The assumption of the Swedish corporate culture requiring, that more time has to be spent on explaining the purpose, is supported by:

- The most difficult to do in the implementation is to catch the flow and to see the whole picture. After that it is only hard work, (WCM Leader).
- Some parts could have been made differently as giving the big picture in the beginning, (Staff member supervisor line 1).
- In Sweden it is a wish by many co-workers to be involved and affect the way of working. They also question decisions and handling with “Why”. We have to convince our co-workers that our decisions and handling is the best, (WCM Coordinator).

Without making any deeper analysis the result from the interviews showed that the implementation was more tool orientated than people orientated. Our comparison with Lean principles and Hofstede’s cultural dimensions in Table 1 is supported by the indication that the standardization has been one of the difficult areas in the implementation (difference in UAI between countries). We have also noted that the Swedish low index for power distance could explain some of the implementation difficulties relating to direct orders and to control of work. The difference in the PDI and the way it affects the decisions of the organization, can also be seen in the context where the model for implementation was prepared. The implementation methodology coming from Brazil and France having a high PDI did probably not include the need for consensus and involvement that is typical for the Swedish culture with a low PDI. The tools and standardization are supported by a high UAI. The resistance against monitoring and order giving could maybe be explained by the difference in PDI between Brazil and Sweden.

Standardization or customization of implementation

What speaks for standardization of the implementation and what speaks for a customized implementation? Based on [8] there is no best way of implementing change, which would support customization. Lean principles promote standardization as an important part of continuous improvement. By first standardizing a process it becomes possible to improve it. Standardization often involves reduced overall development costs. Customization means that the variations among customers might affect how the optimal implementation is carried out. Customization might also have to take into consideration existing resources and the depth of customer interaction where customers might have to get involved.

Why standardize or customize our work? Well, we want to increase customer value of our product.

This basic principle should be leading in the choice of the degree of standardization and customization. What gives most value to the customer? We should, therefore, for each situation evaluate the degree of standardization and customization.

Conclusion and findings

Previous experience and conclusions from implementations described in the literature have been supported by this case study. We know that we need to alter the plans for implementation due to the situation and culture the organization has. Implementation should start with a diagnosis of the organization followed by planning and adjusting the implementation strategies for each plant and to ensure that resources and timing are matching. From our case study we have learnt that educating and presenting the big picture in the beginning are important activities. We need to convince our staff with good arguments. In the process of implementation of a new way of working the employees are the customers and logically therefore customization is needed. For the steady state work with Lean the external customers are in focus and it could be that some cultural changes in the organization are needed in order to be able to deliver better products. Here, the employee views still are important, but they could be seen to have second priority to what is required by the external customer. That is the employees should have a say of how things are introduced but less of a say of what is introduced as long as it is based on sound and proven principles.

We can see that the various cultural dimensions support Lean in different ways, some with positive correlation others with negative correlation. The clearest effect is a high value of the Power Distance (PDI) that seems to have a negative impact on Lean. The reason is that it will be difficult to empower people to point out errors and difficult to work in teams where roles should be equal. Uncertainty Avoidance (UAI) seems to have a positive correlation with Lean where the greatest impact is expected from standardization and the use of well-proven technology. Sweden's low value for UAI can manifest itself in an unwillingness to fit in an overly standardized and controlled system.

It should be of interest to further study how differences in cultures could affect Lean implementation. A starting point could be observing differences between "optimal Lean culture" and the country culture. It could also be of interest to see how Lean implementations are modified by the culture of where they have been prepared and how this affects the

implementation in other cultures. This should be relevant for many multinational companies where central strategies could have been affected by the culture where it was prepared. A culturally biased implementation of Lean could encounter avoidable problems. To study the country culture and the organizational culture prior to implementation could improve the change success rate.

Further research

The case study indicates that previous interpretations on the cultural effects on implementation seem to be valid. The next step is to identify successful strategies for different cultures. Do we have strategies best suited for our countries (cultures)? An interesting observation that Womack and Jones [1] have raised, is that the manager must be able to conduct the work to be able to change the way the staff is thinking. In some countries in Europe this is a typical situation where the expectation is that the supervisor and the management are those that have the best competence for doing the work they are responsible for. In the Nordic countries the manager should be the leader and coach and it is the staff members who have the best skills to do the work. How should the Nordic countries do? Should they train managers to do the staff members work in a good way or continue to improve the skills of leading a team?

Reference [14] points out that, "Lean management is learnt best by doing and not by reading or by classroom lectures, or through distant theoretical analysis". An example on the coaching part in Lean is presented by [15]. Here, examples of both knowing and doing are presented. There are examples of a leader who is doing more coaching than giving instructions. Combining general management theory with Lean Management is an interesting area of further research [16].

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