What can be used in Lean and in new organisation theory to develop socio-technical work organisation?

Abstract

The aim of the paper is to analyse and discuss which parts of Lean Production can be used in a way that fits with the societal structures and cultures in the Nordic countries, where socio-technical models of work organisation have been used for a long time and still are used to a considerable degree in both manufacturing and services. The impact of Lean in Sweden, and also in Denmark and Norway, but also existing socio-technical models in working life are described and analysed in a recently published edited book (Sederblad, 2013). The previous socio-technical models were restricted to the micro level and never managed to match the emerging Japanese production/Lean Production models, which offered a complete model for all levels of the company (Smith & Meiksins, 1995). However, there are now interesting organisation theories and models available, which focus on the meso level in organisations. If socio-technical theories can be combined with useful elements in Lean and e. g. relational coordination theory (Gittell, 2009) there might be possibilities for developing socio-technical models for work organisation on a company level.

Introduction

The aim of this paper is to analyse and discuss which parts of Lean Production that can be used in a way that fits with the societal structures and cultures in the Nordic countries, where socio-technical models of work organisation have been used for a long time and still are used to a considerable degree in both manufacturing and services. In the paper some new organisation theories are presented also with the aim to contribute to a renewal of socio-technical theory. Research results from a recent research project* on the truck producing company Scania’s production system are presented to illustrate the theoretical arguments.

The socio-technical model of work organisation

The “Swedish model of work organisation”, based on socio-technical ideas, was focusing the micro level of the organisation, the work groups. There were during the 70’s and 80’s elaborated ideas about autonomous groups presented (see e.g Gulowsen, 1971), later
changed to “semi-autonomous groups” when it became obvious that the teams had restrictions in their resources and regarding the relations to upper levels of the organisation.

In a thin and small book published in 1976, Philip G. Herbst discuss and outline alternatives to hierarchial organisation. Three alternatives were presented; the matrix organisation, the network organisation and, here most interestingly, the “compound autonomous groups” model. The basic idea behind this last mentioned model was that all members in a group should have the competencies to conduct all work tasks in the group and also work tasks in other groups. In this way the groups were connected to each other by job rotation. In my thesis (Sederblad, 1993), I describe a petro-chemical company with this kind of organisation, with a well-fuctioning systematic job rotation system both inside and between the groups.


The shortcomings of the socio-technical model

In an article published year 1995, Chris Smith and Peter Meiksins discuss tendencies towards convergence and divergence in the diffusion of work organisation models on a global scale. They present a model with three levels: The first is the system level, interpreted as the capitalist system obviously more and more spread in the world. The second level is the societal level, with national differences in the organisation of work, based on so called “societal effects”. The third level is called the dominance effects level, driven by “global forces”. This is the level where we find models of work organisation that was/is regarded as “best practises”.

Historically, the best example of a dominance effect and “best practise” is Taylorism. During the last decades “Japanese production processes” based on JIT (Just-in-time principles) has been a global force. Lean production, based on the Japanese systems, has been seen as best practice in manufacturing, and during the last decade increasingly also in the service sector. This can be described as a second wave of Lean (see Sederblad, 2013).

In the article by Smith & Meiksins, the Swedish model of work organisation is shortly discussed as an alternative to Lean. Smith and Meiksins are not convinced that this model should have the status of a model on a global scale, as it has emerged during specific historical conditions, and only lasted for a limited time. However, the limitations of the “Swedish model”, based on socio-technical ideas, was also that it was only focusing the micro level of the organisation, the work groups.
The Toyota production system and the socio-technical model – the case of Scania production system

In this section, I will present some result from the research project on Scania. The background to the project was that Scania during the recession in 2009 presented a conversion strategy, were the basic elements were to offer employees (apart from them with short-time contracts) continual employment, but with reduced payment (90%) and working hours (80%).

Scania has today around 38,600 employees. The head office and largest production unit is located in Södertälje, south of Stockholm. There are production units also in two other places in Sweden, in Oskarshamn, on the south-east coast and in Luleå, in the North. We have mainly studied the unit in Oskarshamn, where the cabs to the trucks are produced. There are large production units in Brazil and the Netherlands, and smaller units in some other countries. The main owner of Scania is Volkswagen, now aiming to take full ownership control of the company.

Scania Production System (SPS) is developed in collaboration with Toyota and with obvious similarities with Toyota Production System (TPS). This system has distinct characteristics, such as the importance of culture in the organisation and trust between management and workers. In Scania, usually the term SPS is used and often there are references made to TPS (Sederblad, 2011b).

SPS has a focus on the organisation of production in the company, were team organisation is a central component. The teams in Scania are called “improvements groups”, as they are important for the “continuous improvement” activities in the company and are also the basic organisational unit for the entire production system. SPS was introduced in the company during the first years of the 2000’s, but there were other similar concepts used in Scania earlier, even if not so elaborated and far-reaching. The main principle in the systems, especially in SPS (as well as in TPS), is to organise production in a flow, which means that line production and the assembly line has been re-introduced.

However, there are also elements from previous socio-technical models, at that time used in Volvo cars and trucks/busses, SAAB and Scania, which have been transferred to SPS. These elements are focusing quality, delivery and economy – and in the case of SAAB and Scania the “human” element, including a resource perspective on the employees and focus on work environment (Thompson & Sederblad, 1994). SPS has been developed during the years of 2000’s, with a comprehensive training program for the first line managers in 2003 and with the introduction in 2007 of the “Andon” role in the work teams. The Andon should be resource if problems come up on the production line, to immediately act and solve the problem.
The improvement group size vary, from three up to twenty workers, but normal has been around ten workers. During the last years, smaller teams with five or six workers have become common. The groups are led by a “group coordinator” (now called team leader), a title often used in previous Scandinavian socio-technical models. Then the position was rotating among workers in the team, up to half of them were in some organisations involved (Sederblad, 1993), but now the position is held by one worker in each team. The teams in the socio-technical models were described as autonomous, or later semi-autonomous, while the teams in SPS have been described as “self-managing teams” (Holmqvist & Maravelias, 2011, p 54).

There are, apart from the Andon role and the group coordinator, some other identified roles in the teams, focusing customer issues, health and safety and waist elimination. These roles reflect the core values of the company. The next level in the organisation is departments lead by production leaders, responsible for two to four improvement groups. Further up in the organisation, we will in Scania Oskarshamn find six production managers and on the top, two factory managers (for Body production respectively Cab assembly).

The core idea for improvement of the production system is the alteration between standardized work methods for each position and the introduction of improvements for a work task. There are in every improvement group held weekly meetings focused on suggestions of improvements. If the improvement is evaluated as successful it will be a new standardized work method, if relevant also introduced in other work teams. The procedure is repeated in a never ending process and the label “continuous improvement” seems to be suitable. However, more far reaching innovations of work methods and components are handled in a parallel process to the production flow, in a “Kaizen project”. The workers and engineers involved in these projects have reserved time in their working hours to work intensively in the project teams.

The communication structure in the organisation is very elaborated and intense: There are every morning held “daily steering meetings” first at the departments (in some cases also at the team level, in the improvement groups), then at the production unit level and finally at the factory level. To get a total overview, all the production managers and the factory managers meet every Monday in meetings chaired by the plant manager. The communication structure means that problems, as well as suggestions of improvements, in production will be well known on a daily basis in each factory, and for the plant manager in the beginning of the following week. This communication structure also is used for information from the managers out in the organisation and decisions can almost immediately be implemented.

The company was under severe financial pressure and had an organisation of a Tayloristic type when SPS was introduced. The unions first regarded the system as a new way to focus the effectiveness in production. They were not really involved in the introduction of SPS, they proposed the “Good work” concept, presented by the Metalworkers union in the 80’s.
However, as has earlier been mentioned, there are elements from socio-technical models in SPS, including focus on development of employees and work health and safety, and the unions accepted the new system. It can be regarded as “hybrid” organisation, with elements of TPS (and partly Lean Production) and the socio-technical models (cf Börnfelt, 2006). The unions have an important task to protect the workers from too hard pressures and intensification at work. In the plant in Oskarshamn that we have studied for several years our interpretation is that the production system, as well as the negation system, is based on “conditional trust”** and a strong local company culture (Sederblad, 2011a)

New organisation theory - Relational coordination

The coordination of teams in the organisation becomes more complex if we study professional work organisations. Also, team work inside the teams can sometimes be complicated as the employees often have a strong professional identity, stronger than the identity as team member. Judy Hoffer Gittell has studied this kind of work and she has presented a model called “Relational coordination” (Gittel, 2009). The concept focuses “…coordination that occurs through frequent, high quality communication supported by relationships of shared goals, shared knowledge and mutual respect” (Gittell 2006, quoted in Gittell 2009). She started with studying the aircraft industry, an industry with a high degree of standardised work procedures and high demands on security and safeness, but then moved over to study health care and she has made a lot of empirical work in this sector.

Gittell and her team have developed and used a questionnaire for measuring relational coordination. It is available for different situations regarding time and other resources. The dimensions in the questionnaire corresponds to the dimensions in the concept and are communication, both horizontal and vertical, knowledge sharing which is connected with trust and mutual respect between workers. This is to say that relational coordination in e.g. health care can’t (only) be based on formal structures and roles, to a considerable degree it has to be complemented with informal relations. There are different versions of the questionnaire available, for the aircraft flight departures respectively several versions for patient care. Normally, the questionnaire consists of seven questions and in each question you are supposed to mark the frequency or depth of your relationships with different professional groups. The model and the questionnaire have been used in different societies, apart from the US e.g. in Australia and in Denmark.

The increased importance of customer relations

Robert Karasek has, in a series of articles published in the Bulletin of Science, Technology and Society in 2004 about “conducive production”, built up a model starting with the individual and his and Töres Theorell’s well-known demand-control model and the horizontal communication in the work groups. The basic new idea in the model is to link production to
consumption, which means that the members in the work group directly shall communicate with the customers. This was practised in the Volvo Uddevalla plant, where customers could come and follow the assembling of the car they had ordered, and make some final choices of details of the car.

However, Karasek has even higher ambitions and will create a conducive economy linking conducive production with the consumption of the products by social integration. The consumption will in return create motivation for the employees to produce new products. The idea is then to link the new conducive value economy with the commodity value economy. The hope is then that the conducive economy will be successful and expand, while the commodity value economy will be decreasing. In short, Karasek has moved from the individual level to the societal level in his articles, or in other words from the micro to the macro level! What is missing in the model is the meso level.

Conclusion

Scania production system can, as mentioned, be seen as a hybrid organisation with influences from Toyota production system which was the prototype for Lean Production even if some important aspects, such as a relative employment security for the workers and a strong company culture did not came with in the transfer of the TPS system to Lean Production. The improvement groups were continuous improvement is practised is one important part of the system for socio-technical model development. The possibility for the workers to specialise in roles as team leader, Andon or one of the three value-based roles in Scania gives the individual an increased importance in the team, which is a tendency in different forms of team working today. The communication system in Scania by which the whole organisation at the workplace, all levels, is hold together is very central in the production system. In this way, the barriers in the organisation are passed and the information flows rapidly and effectively, in both directions. The basic company values and the culture of the company are other aspects to notice for socio-technical researchers from Lean Production.

It is interesting to compare and to notice that the dimensions that Gittell build her model of Relational coordination on are very similar to the aspects of the Toyota system and Lean Production presented above: communication, knowledge sharing and trust in Gittell’s model corresponds in the TPS/Lean model as in the case of Scania with communication by the daily steering meetings, continuous improvement and conditional trust. The latter is however often missing in companies and plants practising a rationalisation focused “hard” version of Lean (Sederblad, 2013). The common ground for both Gittell’s model and TPS/Lean is the team based organisation, and here socio-technical research can learn how to diffuse the knowledge and improvements in the whole organisation.
Finally, the need for establishing increased and improved customer relations can, as Karasek has suggested, be organised by the teams themselves. The condition for this is that the teams have quite a high level of autonomy. If the model of the “compound autonomous team” presented by Herbst is practised in combination with an effective communication system in the organisation, both coordination and autonomy can be established and increase trust and improvement capacity.

Notes

* The project title was ‘Conversion strategies in Scania - a question of organization, cooperation and competence development’ and it was conducted 2009(December)-2014(April). The project was financed by VINNOVA, the Swedish Governmental Agency for Innovation Systems.

** The conditional trust is limited to the workplace and the company, and it is depending of the power relations of the actors and the situation on the market for the company.

Literature


Sederblad, P (2011a): ‘Scanias produktionssystem och omställningsstrategi’. Arbetsmarknad & Arbetsliv, årg 17, nr 1


