

Work environment, Lean and agriculture

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Abstract. Lean has become the predominant management concept in industry, but its effect on the work environment is debated. Lean has now reached farms and garden nurseries. This paper aims to identify consequences for the physical and psychosocial work environment when Lean was applied in micro-businesses in the agricultural sector. Observations, a questionnaire and interviews were used as methods. It was concluded that the psychosocial work environment became more structured and less stressful. The physical work environment was partly improved by less transportation on the farm. However, consideration of the physical work environment was insufficient.

Keywords. Psycho-social perspectives, development processes, farmers, interactive research.

1. Introduction

Due to the increased global competition within the agricultural sector initiatives for organizational development have been implemented within Swedish agriculture. The sector has not had any broader interest in management systems, such as ISO and TQM, which have flourished in the industry. The concept that has been implemented in agriculture to the broadest extent but with no deeper impact or sustainability is the ISO system. ISO 9001 and ISO 14001 are the most common systems within the agricultural sector (Bergström & Hellqvist, 1999). None of the concepts have been implemented in agriculture through a national program or project. However, the latest influence in the sector is Lean Production (LP). LP originates from the Japanese car manufacturing industry and could be viewed by its philosophy and by its tools. Examples of LP's most known characteristics are just-in-time (JIT), standardization of work processes; visualization, continuous improvements, elimination of waste, value stream mapping and 5S. The agricultural Lean program has been influenced by the LP program: The Production Leap (Produktionslyftet, 2014).

1.1 The Production Leap 1 and 2

The Production Leap was a program within the Swedish manufacturing industry aiming an implementation of the productivity and quality philosophy LP in middle sized companies. The program included interaction research, collaboration with academia, unions, the industry and branch representatives (Halvarsson & Svensson, 2008). The program has gone through two project phases, The Production Leap 1 (2007-2009) and The Production Leap 2 (2009-2012).

The program based its view of LP and Lean processes on Liker's (2004)

contribution to the description. The program had a stringent methodology and structure which among others included education, joint learning through analysis seminars, and the use of coaches and secondary coaches. The program had clear attempts of interaction research both at an organizational and institutional level (Halvarsson, et al., 2013).

1.2 Lean Production's effects on the work environment

Researches' views of how LP affects the work environment from both physical and psychosocial perspectives differ (Westgaard & Winkel, 2011; Hasle et al., 2012, Eklund et al., 2013). For example, Björkman (1996) gives a more negative view of Lean processes. Ibid considers, e.g. that team and team-spirit only is a definition of employees working towards the same goal and not real team work. However, ibid's perception lacks empirical evidence. Berggren (1993) views the Lean processes from both a negative and a positive angle.

There are also examples of a more positive view of the effects of Lean processes. Liker (2004) contributed with probably the most original, exclusive and generally positive view. Liker's perception stresses the importance to run the Lean processes according the concept's philosophy. If the processes are run correctly, it will not affect the work environment in a negative way.

Lately, two new views entered the discussion on the effects of the Lean processes. Several authors stressed the importance of how Lean processes are implemented and how the context, e.g. such as culture, norms, and management philosophy, of the operation contribute to the implementation and its effects (Oudhuis & Tengblad, 2013). Langstrand (2008) emphasized how the concept also should be redesigned to fit and be more appropriate to the context it is supposed to be implemented in. Other authors, Eklund & Berglund (2007) and Seppälä & Klemola (2004) highlighted how Nordic operations have implemented a slightly redesigned LP concept with socio-technical influences.

Brännmark (2010) concluded, after studying 24 companies within the Production Leap 1, that the physical work environment was affected in a positive way despite a certain degree of work intensification. He also concluded that the Lean coaches possess critical roles in the implementation of Lean in operations (Brännmark, 2010).

This paper aims to identify consequences for the work environment when Lean was applied in agriculture, especially the effects on the physical and the psychosocial work environment.

2. Methods

2.1 The Lean Agriculture

The program, the Lean Agriculture, aims to enhance Swedish farms' productivity with help of Lean processes. The program includes two projects and this paper focuses on the first, "the Agriculture learns from the knowledge of industry" (ALFKI). Represented branches were dairy, egg, broiler, pig, beef, grain, garden nurseries and different combinations of them. The farms had an average of five full-time employees and were often run by the owner and his family.

Further, 19 reference farms were added to the research project. These farms were very similar to the ones in the ALFKI. The criteria to become a reference farm were the farm's engagement and strive for development. The 19 reference farms have earlier in some way been involved in research projects and therefore seen as inclined for organizational improvement and development processes.

2.2 Monthly meetings

The ALFKI project leaders have through the 18 months long implementation phase executed monthly meetings together with the nine Lean coaches and the project evaluators. The monthly meetings had a purpose of joint learning, feedback, state of development and discussions. The monthly meetings were every second time 1 hour long and the others were 1,5 hour long. During the shorter meetings the group dealt with the status of the operations Lean development, information and discussions about challenges the coaches' experience. The longer meetings had the same focus as the short ones but the coaches had also, in advance, prepared answers to given questions. The project evaluators' role in the meetings was to listen and give feedback. They also had a role to challenge the processes to create joint learning. The data were validated through a questionnaire and interviews.

2.3 The questionnaire

The questionnaire was divided into four sections. The first section stated individual information such as gender, age, employer/employee and level of education. The second section dealt with physical strain and pain. The following section scrutinized how the respondents regarded their own psychosocial work environment. The last section brought up the respondents view of what kind of improvement work the operations were engaged in, how and to what extent the respondent were involved. Since the same questionnaire was sent to both the reference group and the ALFKI, the development work was defined as Lean/Lean inspired improvement work/improvement work.

Furthermore, the questionnaire was a snapshot of the ALFKI and the reference operations work environment, half way in the ALFKI 's project duration.

The questions were taken from well-known and validated questionnaires such as, COPSOQ, the Swedish Work Environment Authority and from a questionnaire used in a longitudinal study in the Production Leap. Applicable and only complete sections from the original questionnaire were used. Besides those sections, a section with own branch specific questions was added. The final questionnaire draft was validated within the agricultural sector.

2.4 The semi structured deep interviews

The data from the questionnaire was in a later state validated through semi structured deep interviews with 28 respondents from 14 operations. Seven farms were chosen from the ALFKI and seven operations from the reference group. The operations from each group reflected on each other in the sense of employees and branch of production. In each operation one manager and one employee was interviewed. The choice of employees was made as those being in the middle of the age range. The manager was self-appointed.

2.5 The use of the Production Leap as a role model

Since the ALFKI used the Production Leap as a role model, the Lean processes and their contents were launched in modules, similar to the Production Leap. However, there were also some differences. One difference was the process and criteria for operations to sign-up for the project. The Production Leap had an extensive and exclusive methodology for the sign-up process.

In the ALFKI the operation was allowed to join the project if the project management considered them to be motivated and had the engagement to complete the project according to the project's goals and vision. The operation was accepted against a smaller cost. The decision whether the operation, at an organizational level, was aimed to join the project or

not was made in different ways. In some cases the owner took that decision by himself but in most cases the owner had a discussion with the employees before taking the decision.

The operations were educated in both theoretical and more methodical perspectives of LP during a two-day event for the operation owners and foremen. The LP concept was then launched during 12 weeks within the operations. The 12 weeks included both educations of the employees and building a consensus of where the operations wanted to be after the project duration of 18 month, where they were at the moment but also what the operation needed to do for their planned achievement. Consensus within those areas was launched through three workshops. The project included both educational visits and experience meetings (where both operation owners and employees were welcome) and visits from the Lean coach every third week.

3. Results

The Lean processes' effects on the physical work environment were hardly highlighted during the monthly meetings. The coaches shared "good examples" during the meetings and they pinpointed how the farmers had organized the operations in a way which resulted in less movement and transportation on the farm. This was highlighted by the Lean farms during the interviews. One farm had installed a signal system on the automatic rail-mounted feeder. As a consequence they got informed when it was not operating as it should. Before, the farmer controlled the feeder manually 4 times a day whether it operated as it was supposed to. Another common example of an improved work environment was how tools (e.g. the dung scrape) and material were on its right place when needed. The reference farms referred to a greater extent an improved physical work environment to new technology, such as touch-screens, swivel chairs in tractors and new ventilating system in egg production. They referred less to the organizational management as a reason for improved physical environment. However, they also worked according the characteristics of 5S (orderliness and tidiness). The questionnaire validated the view of owners' and employees' work with 5S. Furthermore, the questionnaire stressed more traditional physical constrains, such as problems with knees, backs and shoulders noticed but whether these constrains were a result of the LP concept or something else could not be seen from the questionnaire.

The LP concept had consequences on the psychosocial work environment. The monthly meetings revealed how the farmers work environment became more structured through clear visualisation, standardisations and daily and weekly meetings among others. This view was validated through the interviews with the Lean farmers. The interviews gave an indication that several of the Lean operations' work and processes already, unconsciously, were Lean inspired but as a project result the farms got a better structure of their work and processes. The more structured work processes were seen as affecting the work environment to be less stressful. Several operations had a close co-operation with advisers with specific focuses, e.g. the quality of the calves and milk quality. Several operations were also engaged in research projects that aimed to improve a particular area. Another view was how the amount of communication increased among the workers and within the operation. Information, data and perceptions that were unspoken and things that "everybody already knew" were now spoken verbally. Data and information that usually were collected in the manager's computer or files were now communicated through whiteboards. The Lean processes also raised consciousness of differences between co-workers' traits of character. The interviews also showed an enhanced consciousness of the role as a leader. The reference farms highlighted during the interviews how methods such as regular meetings, visualisation, continuously improvement and standardisation were

used to some extent. The interviewees highlighted effects such as shorter introduction periods with new employees, less transportation between different fields due to checklists and maps of the fields in the tractors. A section in the questionnaire dealt with the individual perception of the Lean processes/development work underpins the possibilities and engagement owners and employees have to participate and contribute in decision making. Examples of that are the content in the development work/Lean practices and how the development work/Lean practices could be realized.

4. Discussion and Conclusions

Liker and Morgan (2006, p. 6) concluded that “applying Lean concepts to technical and service operations, where work is much less repetitive than the shop floor and the product less tangible, is not straightforward”. Ibid stressed a relevant perspective in the process to introduce and implement Lean processes in the Swedish agricultural sector. The agricultural processes of production are to a greater extent more different in comparison with the car manufacturer Toyota, than the Swedish manufacturing industry. However, this study showed some indications of how farms and garden nurseries could be affected by the Lean processes within the area of physical and psychosocial work environment. It is highlighted how the operations choose to apply a narrow range of the Lean concept, from a given broader one. This choice could be a result of the maturity process where the Lean’s applicability was realized the more the operations worked according to it. Secondly, the operations need more help with the “translation” of those processes into an agricultural context.

The agricultural project owner and management had an awareness of the importance of leadership in both the sector and within the Lean processes from the beginning. This could automatically give a higher focus on features that could affect the psychosocial work environment than the physical work environment. Doubtless the physical work environment is an important aspect for sustainability within the operation and among the employees and should therefore be given a greater priority.

This paper concludes that there are positive effects from the implemented Lean processes on the psychosocial work environment, due to the structure Lean gave. However, better consideration to the physical work environment would contribute to the farms sustainability in both a short and long time perspective.

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