ABSTRACT
This article reports on the spread of lean manufacturing in the Swedish engineering industry. The point of departure is the current debate on ‘work in lean organizations’. Since many people have an opinion but nobody actually knows, we found it highly important to investigate if lean manufacturing contributes to a reinforcement of Taylorism or constitutes a basis for sustainable work systems. We have carried out a survey of a representative sample of Swedish manufacturers and the results show that the spread of lean manufacturing is not to be blamed for deteriorated working conditions. On the contrary, the adoption of lean manufacturing contributes to the creation of sustainable work systems. Thus, this manufacturing strategy is not to be regarded as a problem. Instead, the real trouble is that too few plants have had an inclination to implement the strategy. Lean manufacturing is a solution for Swedish manufacturers. It stands as a competitive alternative in an era where the role of the manufacturing function is continuously being degraded and where outsourcing/off-shoring seems to be the only way out.

Keywords: Empirical research, lean manufacturing, work organization.

Note: This is an excerpt of a detailed working paper that can be requested from the authors. Many tables and figures have been omitted due to article size restrictions.

INTRODUCTION
At the end of the 1980s the Swedish engineering industry faced a severe crisis. High inflation and high interest rates, in combination with low productivity growth, forced Swedish manufacturers to take action for increased competitive advantage. In order to find possible development paths the government supported a lot of research that aimed at identifying work organizational changes that would entail significant productivity improvements. Among the better known publications of this time resulting from these research efforts are two reports from the productivity delegation (Broström, 1991; Eklund & Westerberg, 1991). The core message was rather simple and straightforward. Swedish manufacturers must adopt the principles of lean manufacturing. Furthermore, this change process has to be characterized by an abandonment of Taylor’s principles of scientific management in favour of vertical and horizontal integration of work tasks. The wave of rationalizations that were undertaken later on during the 1990s seemed to follow this advice. Many manufacturing plants met this work organizational change with a ‘white-collarization’ of blue-collar work. ABB’s world-renowned customer focus program T-50 is a good example. The rationalizations have had effect and the negative trends of the 1980s have been broken. Most importantly, we have witnessed steady growth in productivity since the mid 1990s.
However, as the new millennium approached a new debate started on how working life has changed in Sweden during the last decade of rationalizations. The main reason was that the number of employees reported sick had increased dramatically. The Swedish Council of Working Life Research found it highly important to shed light on this issue. A conference was arranged in October 1999 on work in lean organizations, and later on three anthologies were also published, with more than 50 contributing researchers (Barklöf, 2000a, 2000b; Lennerlöf, 2000). A rather gloomy portrait of the working conditions was given in these books. In summary, it is difficult to draw conclusions other than the following: Rationalizations undertaken in Sweden have not led to more qualified and better workplaces, and moreover, organizations have become so slim that they cannot operate efficiently and have lost their ability to continuously improve products and processes. The recognition of health consequences caused by increased work intensity is an important contribution. However, there were also major misconceptions. While some referred to lean as downsized, emaciated and slim, others meant the principles of lean manufacturing as described by Womack et al. (1990). Confusion of ideas runs the risk of connecting negative experiences that employees have from organizational change with the wrong causes. None of the reported studies was originally designed to study lean manufacturing as defined by Karlsson and Åhlström (1996) or described by Womack et al. (1990). Future research has to define the concept in focus. Another future research area is to separate different branches from each other when studying lean organizations. Samples that consist of all lines of business activities (i.e. kindergartens to industry) are another source of confusion.

The study that we report on in this article has taken the above limitations into consideration. The overall purpose of the article is to map the spread of lean manufacturing as defined by Karlsson and Åhlström (1996) in the Swedish engineering industry. Of particular interest is also to analyse the consequences of the adoption of lean manufacturing for work organizational, performance and continuous improvement capability. Our first research question was:

1. Has the adoption of lean manufacturing contributed to a reinforcement of Taylorism or to a basis for sustainable work systems?

In case our data indicated development potential in the area of lean manufacturing, our second research question was posed as follows:

2. What kind of manufacturing development initiatives can be taken in order to strengthen the competitiveness of the Swedish engineering industry?

In relation to antecedent studies on sustainable work systems we have chosen the work of Docherty et al. (2002) as point of departure for our investigation. This entails a perspective where work systems that reinforce Taylorism consume human resources while sustainable systems regenerate them. Taylorist work organizational structures are henceforth referred to as ‘structure conservative’, while ‘structure innovative’ will be used to denote sustainable systems. The typology is based on the work of Schumann et al. (1995) and Schumann (1998; 2000) and indicates either persistence of or a breakaway from traditional conceptions of how to organize industrial labour. In practice these types are rather elastic. However, as the former emphasizes the vertical and horizontal division of tasks, the latter emphasizes integration, especially in terms of white-collar work into the daily work of shop floor teams. The mechanism that makes work systems sustainable is the ability to balance demanding and interesting work tasks with the power to influence the team’s work situation. In addition to regenerating human resources, sustainable work systems have two additional features (Docherty et al., 2002). First of all, in order to be sustainable they have to be competitive. Second, sustainable work systems take charge of all employees’ innovation potential, which entails a capability to adapt the business to continuously changing market conditions.
APPROACH, DEFINITIONS AND HYPOTHESES

Fundamentally, our approach integrates two concepts. On the one hand we have the principles of lean manufacturing, and on the other we have Schumann's categorization of work organizational development paths, i.e., the structure conservative and structure innovative paths. This is illustrated in Table I and yields four groups of manufacturing plants when combined. The main reason for choosing this approach is that it enables us to clarify if the work organization is designed to consume (Group 2) or regenerate (Group 4) human resources among lean manufacturers in Sweden.

<table>
<thead>
<tr>
<th>Structure conservative manufacturers</th>
<th>Traditional manufacturers</th>
<th>Group 1</th>
<th>Lean manufacturers</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure innovative manufacturers</td>
<td>Group 3</td>
<td></td>
<td>Group 4</td>
<td></td>
</tr>
</tbody>
</table>

When we henceforth refer to the principles of lean manufacturing, we mean those described by Karlsson and Åhlström (1996). Their point of departure was The machine that changed the world by Womack et al. (1990), which entails a conception where lean manufacturers eliminate waste of all kinds. Manufacturing processes are developed through continuous improvements. The operative work is carried out in multifunctional teams. Team members have adequate knowledge of process outcomes. Pull systems instead of push are used, and only requested parts are manufactured just in time with zero defects. However, it is of vital importance to acknowledge that the work of Karlsson and Åhlström (1996) is a further development of the work of Womack et al. (1990) and deviates on a central point: namely, the issue of decentralization and integration of white-collar functions into the daily work of shop floor teams. When Womack et al. (ibid) discuss multifunctional teams they only mean other direct operative tasks in the workflow and/or indirect tasks such as housekeeping and simple machine repair.

Since multifunctional teams with decentralized responsibilities and integrated functions are an integral part of the kind of lean manufacturing that we study, it can be argued that the structure conservative/structure innovative dimension is redundant in our approach. However, as we stressed in the Introduction, there is a conception among researchers that lean manufacturers in Sweden have primarily emphasised reduction in lot sizes, buffers and other kind of resources and thereby ignored the importance of developing the work organization in line with the structure innovative path. Thus, their view is that the majority of Swedish manufacturers resemble plants of Group 2 in Table I. According to them this creates a stressful environment for workers where human resources are consumed rather than regenerated, which would be the case among the Group 4 manufacturers in Table I. They have reasons for their doubt. An Italian study on work organizational differences between traditional and lean plants showed that the emphasis has been on creating multifunctional teams for increased flexibility while neglecting the decentralization of authority and worker autonomy (Forza, 1996). We agree with the view that Group 2 plants have working conditions that consume human resources. This has been shown in several studies before, see for example (Parker & Slaughter, 1988) and (Berggren, Björkman, & Hollander, 1991).

The taxonomy of structure conservative/structure innovative forms of teamwork was developed in order to describe work organizational development paths in German industry. Characteristic for the structure conservative form of teamwork is that the status quo of the Taylorist organization is reinforced and the traditional work organization is at best modified. This team concept increases the flexibility within the work force by horizontal integration of work tasks. The basic principle of the structure innovative form is the attempt to establish radical structural change. Both the vertical and horizontal organization is changed and in both dimensions there is a reduction in the division of
labour. Key words here are decentralization, extended decision-making and a transfer of competencies from peripheral departments back to the production workers in areas such as parts procurement, maintenance, quality control and industrial engineering.

In order to shed light on our research questions, six hypotheses were developed. Our first concern was whether the adoption of lean manufacturing had contributed to a reinforcement of Taylorism or to a basis for sustainable work systems. Therefore, our first hypothesis was formulated as follows:

- **H1:** Lean manufacturing is associated with structure innovative forms of teamwork.

Our second concern was whether lean manufacturing contributes to plant operative performance. Therefore our second hypothesis was formulated as follows:

- **H2:** Adoption of lean manufacturing contributes positively to plant operative performance.

The adoption of lean manufacturing is a major change process, which is concerned not only with trimmed material flows and work organizational change. Previous research has shown the importance of parallel changes in the management accounting system (Åhlström and Karlsson, 1996) as well as the remuneration system (Karlsson and Åhlström, 1995). Traditional management accounting systems are inappropriately designed to support the adoption of lean manufacturing. Information is important in order for the multifunctional teams to perform according to the goals of the company; a traditional system doesn’t provide this kind of support. Moreover, there is also a need for congruence between the remuneration system and the principles of the new organization. New remuneration systems should stress the importance of developing competence in different areas in order for team members to be able to perform more than one job and thus become more flexible. Team skills such as cooperation and leadership should also be stressed. Finally, it is essential that the new systems remunerate the important outcome variables in lean manufacturing such as quality and time accuracy. In order to test if lean manufacturers in Sweden have changed their management accounting systems and remuneration systems, our third and fourth hypotheses were formulated as follows:

- **H3:** Lean manufacturing is associated with changes in the management accounting system.
- **H4:** Lean manufacturing is associated with changes in the remuneration system.

Our final concern was continuous improvements. We wanted to test if lean manufacturers have become so slim that they have lost their ability to continuously improve products and processes. This issue is divided into two parts. First, it is important to study to what extent the manufacturers have developed certain abilities to carry out continuous improvements in a systematic and strategically aligned fashion. Previous research has shown that these abilities are critical in developing continuous improvement capability (Bessant, 2001). The second part concerns the extent to which the improvement work undertaken actually contributes to plant operative performance. Therefore we formulated the following two hypotheses:

- **H5:** Lean manufacturing is associated with an increased ability to continuously improve products and processes in a systematic and strategically aligned fashion.
- **H6:** Lean manufacturers gain significant improvements in plant operative performance from their work on continuous improvements.
METHODOLOGY

Data collection
This survey is a part of the 2nd international continuous improvement survey, carried out in 11 different countries in Europe and Australia. Since the Swedish research team also had an interest in studying lean manufacturing and work organization we added items about these issues. The unit of analysis in our study was manufacturing plants of engineering industry companies in Sweden. The production manager was judged to have the best general view of the researched issues. Therefore the instrument was distributed as a postal survey to a random sample of 200 plants with more than 50 employees and addressed to the production manager. Statistics Sweden’s Business Register 2002 within ISIC codes 27-35 was used as a sample frame. Data were collected during the spring of 2003 and the total response rate amounted to 69%. No major deviation from the population in terms of ISIC representation was found. No significant response bias was detected other than that those manufacturing plants that responded were less complete, i.e. they didn’t have R&D, logistics/distribution, marketing/sales, HRM and finance functions to the same extent as the telephone interview group of companies.

RESULTS

Reinforcement of Taylorism?
To start with, our analysis suggests a confirmation of H1. The adoption of lean manufacturing in the Swedish engineering industry has not contributed to a reinforcement of Taylorism. On the contrary, lean manufacturing is significantly associated with structure innovative forms of team-organized work (see Table XII). In total, 23% of Swedish manufacturers can be considered ‘lean’ as opposed to ‘traditional’ manufacturers, and a qualified majority of these plants have chosen a development path towards a structure innovative work organization (51/63 = 0.81 ≈ 81%).

Table XII. Relationship between lean manufacturing and structure innovative work forms ($\chi^2 < 0.001$).

<table>
<thead>
<tr>
<th></th>
<th>Traditional manufacturers</th>
<th>Lean manufacturers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure conservative manufacturers</strong></td>
<td>Group 1</td>
<td>138</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Group 2</td>
<td>115</td>
<td>35</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>51</td>
<td>4</td>
</tr>
<tr>
<td><strong>Structure innovative manufacturers</strong></td>
<td>Group 3</td>
<td>70</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Group 4</td>
<td>93</td>
<td>28</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>208</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>208</td>
<td>63</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>77</td>
<td>23</td>
</tr>
</tbody>
</table>

Table XIII presents some descriptive statistics on indirect operative work performed by shop floor teams across the four groups of plants. The data are rather ambiguous except for maintenance, which is carried out to the same extent across the four groups.

Table XIII omitted

However, the descriptive statistics on white-collar work close to production are more clear-cut (see Table XIV). A team member at a Group 3 or 4 plant carries out white-collar work to a far
greater extent. This validates the results of the initial cluster analysis, since a transfer of competencies from peripheral departments back to production workers is said to be related to structure innovative work forms.

**Table XIV omitted**

Figure 1 provides further facts on this issue by exploring the kind of white-collar tasks that the production teams perform. In addition to illustrating that white-collar work is performed to the greatest extent in teams of Group 4, it also shows that this work primarily consists of tasks such as distribution of work, target follow-up, planning, programming, industrial engineering and continuous improvements. Tasks such as preparation, accounting, human resources, procurement and customer contacts occur but to a lesser extent. The team archetypes of the other groups of plants follow a similar pattern.

**Figure 1 omitted**

**Performance**

The Kruskal-Wallis test shows that there are significant differences between the groups on all performance indicators (see Table XV). Either Group 1 or 3 obtains the lowest ranks. Group 2 performs better than the former two. However, the plants of Group 4 are outstanding. They obtain the highest ranks on all indicators and in four out of seven indicators there are many more cases above the median than below. This compels us to confirm that lean manufacturing practices in combination with structure innovative forms of team-organized work contribute to improved plant operating performance to the greatest extent. However, only 19% of the plants in the sample had chosen this combination, which signifies a huge improvement potential. Progression towards these manufacturing practices is not only a question of trimmed material flows and decentralization. As we shall see in the later sections of this article this transformation is also associated with changes in the management accounting and remuneration systems as well as with developed systematic and strategic continuous improvement ability.

**Table XV. Kruskal-Wallis test of differences in plant operating performance.** ** = p<0.01, * = p<0.1.

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Median</td>
<td>46</td>
</tr>
<tr>
<td>&lt;= Median</td>
<td>81</td>
</tr>
<tr>
<td>Ranks</td>
<td>111</td>
</tr>
<tr>
<td><strong>Quality conformance</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Median</td>
<td>20</td>
</tr>
<tr>
<td>&lt;= Median</td>
<td>108</td>
</tr>
<tr>
<td>Ranks</td>
<td>104</td>
</tr>
<tr>
<td><strong>Delivery reliability</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Median</td>
<td>51</td>
</tr>
<tr>
<td>&lt;= Median</td>
<td>76</td>
</tr>
<tr>
<td>Ranks</td>
<td>117</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Median</td>
<td>27</td>
</tr>
<tr>
<td>&lt;= Median</td>
<td>97</td>
</tr>
<tr>
<td>Ranks</td>
<td>112</td>
</tr>
<tr>
<td><strong>Customer satisfaction</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Median</td>
<td>36</td>
</tr>
</tbody>
</table>
Question posed: How have the following plant operating performance indicators changed over the last three years? A 10-point ordinal scale was used: 1-3 = Deterioration >10% - 0%, 4-10 = Improvement 0% - >30%.

<table>
<thead>
<tr>
<th>Time-To-Technology**</th>
<th>&lt;= Median</th>
<th>Ranks</th>
<th>Median</th>
<th>Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>74</td>
<td>96</td>
<td>102</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>26</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>158</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>107</td>
<td>108</td>
<td>100</td>
</tr>
</tbody>
</table>

Management accounting systems
Table XVI shows that there are significant differences between the groups with respect to changes in the management accounting system. Group 1 has changed their systems the least. Group 3 has changed their systems to a greater extent than the former. However, it is Groups 2 and 4 that have transformed their systems to the greatest extent and there are no differences between them. In relation to H3, this confirms a need for congruence. The adoption of lean manufacturing principles has to be supported by parallel changes in the management accounting system.

Remuneration systems
Table XVII presents descriptive statistics on the distribution of various kinds of remuneration systems across the four groups. There are significant differences between the groups ($\chi^2<0.002$). The interpretation of differences is made easier by the use of correspondence analysis. From Figure 2 and Table XVIII it becomes evident that Groups 1 and 3 use wage systems that consist of fewer salary parts and competence is not rewarded (Groups 1 and 3 tend to use wage systems 1, 3, 4, 8). On the other hand Group 2 and especially Group 4 use wage systems that consist of many salary parts and competence is rewarded (Groups 2 and 4 tend to use wage systems 5, 7, 9). In relation to H4, this confirms a need for congruence as well. The adoption of lean manufacturing principles has to be supported by parallel changes in the wage systems for shop floor workers.

Continuous improvements
Table XIX shows that Group 1 has developed systematic and strategic continuous improvement ability to the least extent. There are no differences between Groups 2, 3 and 4, which indicates that continuous improvements is not only related to principles of lean manufacturing but also to structure innovative forms of team-organized work.

However, when the contribution of continuous improvements to plant operating performance is estimated, it becomes clear that Group 3 falls behind (structure innovative forms of team-organized work and traditional manufacturing practices). It was expected that Group 1 would, since these plants were not carrying out continuous improvements to the same extent as the other groups. Table XX shows that Groups 1 and 3 have an equal and low capacity to gain performance benefits from their CI endeavour. Only the continuous improvements of Groups 2 and 4 bear fruit. This indicates that continuous improvements are carried out to the same extent across Groups 2, 3 and 4, but it is
only the adopters of lean manufacturing practices that benefit with a significant impact on plant operating performance.

Table XX omitted

DISCUSSION

In relation to our first research question, we claim that the adoption of lean manufacturing has contributed to form a basis for sustainable work systems in the Swedish engineering industry. There are three reasons for this. First, the majority of lean manufacturers have chosen structure innovative forms of team-organized work. Second, lean manufacturers gain more in terms of plant operating performance. Third, lean manufacturers have the highest ability to take charge of their people’s innovation capability. We base our reasons on the three sources of evidence.

First, Hypothesis 1 was confirmed. A majority of the traditional manufacturers have chosen structure conservative forms of teamwork (76%) while a majority of the lean manufacturers have chosen structure innovative forms of teamwork (84%). The difference is significant at the 0.1% level. It is also of very high importance to note that only 4% of all manufacturers in the Swedish engineering industry have chosen to combine lean manufacturing with structure conservative work forms. In addition to proving that lean manufacturing is not to be regarded as a problem, this finding corroborates the work of Karlsson and Åhlström (1996), who have discussed how the most salient features of a lean work organization are multifunctional teams, decentralized responsibilities and integrated functions. Thus, even though Group 2 plants have trimmed their manufacturing processes in line with the principles of lean manufacturing, it is only the Group 4 plants that can be considered lean manufacturers in its true meaning.

Second, Hypothesis 2 was confirmed. The Kruskal-Wallis as well as the median tests show that lean manufacturers have had outstanding plant operating performance development over the last three years. Either Group 1 or 3 obtains the lowest ranks. The differences are significant at the 1% level in most cases or else at the 10% level. Furthermore, in four out of seven performance indicators there are many more cases above the median than below for Group 4 plants.

Third, Hypothesis 6 was confirmed. The ANOVA on the contribution of innovation efforts to plant operating performance shows that it is only lean manufacturers who benefit from their CI endeavours. The differences are significant at the 10% level.

If the analysis signified a development potential in the area of lean manufacturing, our second research question was posed to point out the kind of manufacturing development initiatives that could be taken, in order to strengthen the competitiveness of the Swedish engineering industry.

The most obvious fact, or problem rather, is that only 19% of the surveyed plants can be assigned to Group 4, which could be a model for the Swedish engineering industry in general. This means that 51% of the plants need to move towards lean manufacturing processes as well as along the structure innovative development path (Group 1). An additional 4% of the surveyed plants have to move along the structure innovative development path (Group 2). An additional 26% of the plants have to move towards lean manufacturing processes (Group 3). Thus, there is a huge development potential and lean manufacturing is not to be regarded as a problem. On the contrary this manufacturing strategy is a solution and can serve as a competitive alternative to the uninhibited increase of outsourcing and overseas transfer of manufacturing operations. Recent studies have shown that it is of high importance to properly evaluate the actual benefits of outsourcing the manufacturing function. The total cost as well as the detrimental effects on the firm’s long-term innovation capability is often in favour of a more reluctant and well-considered attitude towards this trend. See, for example, the comparison between Ericsson and Nokia’s strategies for manufacturing and outsourcing (Berggren & Bengtsson, 2004). Moreover, ongoing survey research in Sweden shows that companies that outsource do not gain any benefits in terms of financial performance (Bengtsson & Von Haartman, 2004). On the contrary, the referred study
shows that investments in technology as well as efforts to increase manufacturing flexibility and competence have a significant impact on ROCE, i.e. Return on Capital Employed.

However, as the Results section shows, the transition towards sustainable work systems in the Swedish engineering industry is not only a question of trimmed material flows and changed work organizations. In response to our second research question we claim a need for change in management accounting systems, remuneration systems and innovation ability, as well. The main reason being that management have to provide a supportive infrastructure for the change process. There are three sources of evidence for this.

First, the confirmation of Hypothesis 3, which suggests that plants that wish to adopt the principles of lean manufacturing have to change their management accounting systems. According to the ANOVA performed, Group 2 and 4 plants have changed these systems to the greatest extent. The differences are significant at the 5% significance level. This finding corroborates the work of Åhlström and Karlsson (1996), who previously have discussed this issue based on a longitudinal case study in one organization.

Second, the confirmation of Hypothesis 4, which suggests that plants that wish to adopt the principles of lean manufacturing have to change their remuneration systems. The cross tabulation as well as the correspondence analysis show that plants of Group 2, but mostly those of Group 4, have changed these systems to the greatest extent. The differences are significant at the 0.2% level. In addition to providing valuable facts on the distribution of various remuneration systems in the Swedish engineering industry, this finding corroborates the work of Karlsson and Åhlström (1995), who previously have discussed this issue based on a longitudinal case study in one organization.

The third source of evidence is the confirmation of Hypothesis 5, which suggests that plants that wish to adopt the principles of lean manufacturing have to increase their ability to innovate. The ANOVA shows that Group 2 and Group 4 plants have developed their ability to systematically and strategically improve products and processes to the greatest extent. The difference is significant at the 10% level. There are a stumbling block here. Plants of Group 3 have also developed this ability. But we know from the confirmation of Hypothesis 6 that it is only the adopters of lean manufacturing who gain significant improvements in plant operating performance from their CI efforts, so it does not really matter. On the contrary, this finding extends Bessant et al.’s (2001) work on their five-level evolutionary model of CI behaviour. Our analysis also shows that if an organization starts to progress along the CI road it is likely that it will gain impact on plant operating performance, but not always. Our contribution is that we have been able to indicate under what specific circumstances the model is valid in a manufacturing setting in Sweden.

CONCLUDING REMARKS
First of all it is important to acknowledge the fact that the number of people reported sick is still high in Sweden. This consumption of human resources must come to an end. However, in the future search for a cure we strongly suggest less prejudiced approaches than we so far have witnessed. To come to the point, it is our firm belief that the spread of lean manufacturing, as has emerged in the Swedish engineering industry, is not to be blamed for deteriorated working conditions. On the contrary, the adoption of lean manufacturing seems to contribute to the creation of sustainable work systems. Thus, this manufacturing strategy is not to be regarded as a problem. Instead, the real trouble is that too few plants have had an inclination to implement this manufacturing strategy. Lean manufacturing is a solution for Swedish manufacturers. It stands as a competitive alternative in an era where the role of the manufacturing function is continuously being degraded and where outsourcing/off-shoring seems to be the only way out.

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