

## Aspects On Manufacturing Strategy: A Case Study At Saab Automobile, Sweden

Track title: Operations Strategy

Saab Automobile, Sweden, is a relatively small car manufacturer in the prestige car segment. Saab is fully owned by GM since the beginning of 2000. This article is based on a series of interviews. Questions dealt with are: the process of going from a poor financial result to a successful car manufacturer, experiences so far from being a part of the largest company in the world, and implementation of manufacturing strategies. As a step in this process, Saab has developed its own model of lean manufacturing, called the QLE/H-concept, and is now introducing the Andon system.

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## *1 Introduction*

The research interest for manufacturing and the impact of manufacturing on the companies' financial results has been considerable ever since the beginning of the 20<sup>th</sup> century. The researchers have discovered that Japanese organizations have been in an exceptional position regarding long term approaches, which are required for effective management of manufacturing (e.g. Hayes and Wheelwright, 1984; Hill, 1993). Toyota Company has been leading the progress in many respects and their production system has been described in detail (e.g. Monden, 1983; Schonberger, 1983). The issue of being outstanding in manufacturing, so-called world-class, has been discussed by several researchers (e.g. Hall, 1987).

It has been found in several studies (e.g. Skinner, 1969), that it is hard for manufacturing to claim their proper status and position in many manufacturing companies. Manufacturing was recognized as only executing what others have decided. This attitude is even more surprising since many producing companies may tie up to 70 % of their total capital in manufacturing related investments. The plan for how to use this large capital in the best possible way to get competitive advantages can be called manufacturing strategy. Hill (1995) gives two ways in which manufacturing could strengthen a company:

1. Provide manufacturing processes that give the company competitive advantages. These processes should be unique in one way or another and hard for other manufacturers to copy.
2. Manufacturing could choose processes and infrastructure, which help the company to win orders and match them to the criteria that win orders.

When dealing with car manufacturing, the first way is not of immediate interest, since there are only a few real unique processes, which could give the company special advantages. This leaves us with the second alternative. By being better than the competitors in performing the right activities, it is possible to take market shares.

Skinner (1992) identifies four missing links in MCS, Manufacturing in Corporate Strategy. These links concern

- leadership, which understands and accepts the new concepts. Skinner means that the managers have inherited a way of thinking of production in the terms of efficiency, productivity, and costs. Instead, the leadership should set examples of how the operations functions can be structured to create a strong competitive resource.
- managers capable of implementing MCS. The problem is that the middle management has adopted the same premises and instincts as the top leadership.
- the ideas of manufacturing strategy, which result in two problems. First, there is the issue of trade-offs. Cost, investments, quality etc. are closely linked together, but there is a lack of understanding how these relationships work. The situation is also not static as the technology development continues the relationships change. The second problem is the usefulness of manufacturing strategies as a management tool. What strategic decisions should be taken in order to achieve a certain objective?
- the functional organization. There are often conflicts of interests and barriers between the different departments of a company and the managers are rewarded for their own professional accomplishments and not for the competitive success of the business unit.

The purpose of this study is to present the present situation at Saab Automobile regarding manufacturing strategies and the development of the company during the last 12 years. Is the present situation at Saab the same as Skinner and Hill found in USA some years ago? What consequences did the appearance of GM have upon the manufacturing at Saab?

## *2 Method*

This study was performed as a series of interviews with people at different positions within the manufacturing. Four interviewees are product workshop managers, responsible for different parts of the plants. Another person works as an advisor and coordinator within the group of plant managers. The executive vice president, responsible for manufacturing within Saab Automobile, was also interviewed and gave his overall view. The interviews were semi structured, i.e. the interviewees were guided into a list of issues. They were allowed to freely develop their thoughts. The interviews were all recorded and printed out afterwards. The paper presents the personal opinions of the interviewees as well as some official statements of Saab. In chapter 6, the findings from the study are commented with respect to previous research.

## *3 Presentation Of Saab Automobile AB*

Saab was founded in 1937 with the aim of manufacturing military aircrafts. After World War II, a part of the manufacturing capacity was directed over to making cars and the first automobile was shown in 1947 to the press. Over the years, Saab has earned the reputation of making premium cars with a high technical standard. The design has always been regarded as futuristic and at the front edge of the technology.

Saab is a very small car manufacturer with about 10 000 employees and an annual production of about 130 000 cars (1999). Since 1990 Saab has been a part of the GM group and is since the year of 2000 fully owned by GM. During the same period Saab Automobile has become totally separated from the airplane manufacturing. The company is, during the fall 2000, expanding the factory in Trollhättan, Sweden, up to an annual capacity of around 200 000 cars. This involves an investment of 3 billion Swedish crowns (about \$ 300 million). The aim is to widen the model program and thereby to increase the volume.

## *4 Findings*

### *4.1 The Development Of Manufacturing At Saab Automobile*

In 1988 the company started to show decreasing financial result and in 1989 the loss was considerable. There was a lack of understanding about manufacturing and its role in the company. The interest in the products and their technical composition was deep, but not in how they were manufactured. The situation was drastically changed as the financial result dropped. At that stage, the Saab people started to ask themselves how the best in the business did. They found that the differences were enormous. To do the same amount of work, the best Japanese manufacturer spent 18 hours, in USA between 25 and 30 hours, and Saab about 77 hours! Saab started to study how the Japanese managed to manufacture cars in such a short time. The philosophy of Lean Manufacturing was considered a remedy, but in what way could this philosophy be used at Saab? At the same time the company got a new production manager, who was experienced in material flow according to the Just-In-Time principle.

The general opinion in the manufacturing department was that they were victims of others decisions and without control of their situation. The department's standpoint was that, when something went wrong, it was always somebody else's fault. The product development or design department was mostly blamed for all the troubles in the manufacturing department. At this stage, around 1990, the production management team decided to change their attitude and stop blaming design for everything. Manufacturing had in fact problems, originating from their own department, to solve.

By the entry of GM in 1990, Saab got access to the whole GM-world with all of its contacts. GM has e.g. joint ventures with Toyota in California, the Nummi plant, as well as with Suzuki in Vancouver, the Kammi plant. Saabs special application of lean manufacturing is called QLE/H, and the major part of the concept origins from Kammi. It is primarily based on the Toyota Production System, TPS.

During 1990-91 all personnel was trained in the idea of lean manufacturing and the basic idea of Japanese car industry. The management team also put together a book, "The way of manufacturing", describing the QLE/H principles. The key issues for survival were the change of manufacturing combined with cost reduction for purchasing. Almost all of the car manufacturers today work according to some kind of the Toyota Production System and the competition is severe. In spite of the fact that the overcapacity in the automotive industry is between 10 and 20 %, the general aim is to increase their outputs.

#### *4.2 Some Matters Of The Business Plan Of Saab Automobile*

One of Saab Automobiles objectives is to increase the satisfaction of the company's owner, GM, drastically. The expansion targets should be met and the result represents a high sustainable return on investment. The target is to sell 170 000 units during 2003 compared to 120 000 during 2000. This will be made possible by a customer satisfaction at world-class level. Saab has defined "world-class level" as being among the five best manufacturers in the world. The main prerequisite is recognized as to be the motivation and competence of the personnel.

The company has formulated a number of strategies to support the company objectives and the main strategies directly linked to manufacturing are:

- Decreasing the throughput times of product development and manufacturing.
- Utilization of the large resources and processes of the GM group.
- Creation of efficiency and elimination of inefficiency through process management.
- To ensure that the team members have the right competence to fulfill their task.

These objectives and the strategies are continuously subject to revision and the time horizon is approximately five years.

#### *4.3 The QLE/H Concept*

Saabs way of fulfilling the objectives according to 4.2 was their own QLE/H concept.

Q, quality, means doing the right thing from the start of a project, which also is one of the corner stones in a lean system. To do the right thing from start does not imply increasing cost. The basic idea is not to accept defect goods, not to continue to process a defective part, and not to deliver faulty details. Each team has its own right-from-the-beginning-record and they get feed back on what they have delivered to the next stage in the flow. Corrective and preventive actions are based on these records. Quality has become important to all car manufacturers and is today considered a matter of course for cars in any price segment.

L stands for delivery precision. The base for delivery precision is to have a process as free of disturbances as possible and, if any, they can be corrected without delay. Delivery precision is a matter of quality. These issues are closely related and non-defective parts, in the right amount, are prerequisites for high delivery precision.

E means efficiency. Waste should be hunted and reduced as much as possible, as it does not add any value for the customer. The most obvious types of waste are over production, waiting times, downtime of machinery and equipment, and corrections. Even though the demand for operators, working with corrective actions, has been reduced by half during the last ten years, corrective

actions still take considerable resources. Minimizing waste requires all employees' involvement in searching for surplus material, unnecessary actions etc. Involvement means that everybody is given the opportunity to focus on what they are doing and make a judgement if it is possible to do the work in a better way, in terms of education, training, access to managers, feed-back for good work, and appreciation by management. The whole concept is customer driven and customer satisfaction is a key word.

H, the human resource is, according to Saab, the difference between success and failure. The employees have to be involved and feel responsibility for the company. If one is to produce a Saab 9<sup>5</sup> every 154:th second, there has to be a high level of discipline. The assembly line is manpower intense and every one of the workers must be able, willing, and capable of doing his tasks correctly. Worker's safety and protection are considered important and Sweden is a leading country, according to Saab, in these matters. Workers have to be educated in these matters in the same way as they are trained for their job, educated in quality matters, policies etc. The QLE/H-concept of Saab is presented in figure 1.

*Figure 1. The QLE/H-concept of Saab*

#### *4.4 The Andon System*

Andon is a visible alarm system (e.g. Svensson, 1994) in the driven manufacturing lines, see figure 2. Five operators form a team, which is lead by a team representative. The operator pulls an alarm string when something occurs that he needs help to solve. An electric light board is activated, yellow when the operator calls for help and red if the operator is stopping the line. The team representative or the works manager, who is in charge of a number of teams, comes to assistance. In that way they take on the responsibility for solving the problem. After corrective actions have been taken, the alarm is reset. If the problem is not solved within a certain time/distance the line is stopped. This requires a stable process and, if something occurs, that the operator gets fast assistance. One single operator actually gets the power of stopping the entire production if the problem is not solved within a certain time. A fixed point is set on the carrier and this point is not supposed to pass over a certain mark of the line if the problem is not solved. All other stations of the line can finish their work prior to stopping the line. I.e. there are no stops in the middle of an operations cycle.

The change of responsibility implies a transformation from Span of Control to Span of Support. The works managers change their way of working. It is easier to control than to support and the group sizes are therefore reduced. In fact, the number of works managers is doubled in an andon system.

At Opel's Astra factory in Antwerp, Belgium, the andon-principle is fully deployed and the model will soon be introduced at all GM's plants. Saab will start with a part of an assembly line in a short time. By fall 2002 the whole assembly line will be running according to andon.

*Figure 2. The Andon Concept*

#### *4.5 The Switch To Lean Production System*

Many companies try to implement lean manufacturing by investing in a lot of equipment without changing the organization. They start by investing in equipment trying to minimize waste and

being more efficient. The basic idea with a lean system is, however, to create a commitment in the value adding activities and to eliminate or reduce everything that does not add customer value. After that phase, the company usually discovers that the competence of the personnel has to be developed. The implementation of the philosophy is often forgotten. Saab had a different starting position regarding organization, than companies with a tradition in classic mass production. The Swedish traditional philosophy is based on a socio-technical principle, meaning an involvement of the employee in the decision process and the possibility for the workers empowerment. The benefit of Saab is that they, with this socio-technical tradition, already had personnel who were used to take initiative and performing complex tasks. This made it possible to go directly to a more people centered lean model.

#### *4.6 The Planning Of A New Assembly Line*

When planning a new assembly line, Saab works with full-scale laboratory experiments. Each station is altered approximately 20 times, operations are clocked, and, at the same time, work instructions are written. This approach is considered by Saab to be the most efficient. The best writer of work instructions is recognized to be the operator who is going to perform the operation. The most crucial part of a car factory is the manual assembly, where a large number of people are to be guided in their work. That is the reason why Saab has identified the manual assembly and the work done there to be essential for the future of the company.

#### *5 Future Trends At Saab*

Ergonomically difficult or dangerous operations are to be eliminated or reduced by investing in more robots and handling equipment. Management does not foresee that the degree of automation will increase particularly for other reasons. Other car manufacturers, such as Volkswagen and Fiat, have, according to the interviewees, tried to run automatic car plants, but the uptime dropped and nothing else was won on these experiments.

The degree of outsourcing will be increased. Subassemblies, such as dashboards, could e.g. be bought ready assembled from an external supplier. Japanese car manufacturers generally include suppliers in the project teams and even invite them to produce in the OEM factory. This is a way of taking advantage of benefits from outsourcing and still keep some control of the supplier. GM is working according to GBOP, Global Bill Of Process, which is a way of introducing a standard system for process planning. The objective is to make it easier to move production between GM's different plants. The economical potential is enormous for the world's largest car manufacturer.

#### *6 Conclusions*

When comparing Saab Automobile with the earlier studies (Skinner 1969); it is interesting the way things have changed the last 10-12 years. According to Saab, the manufacturing has taken action to improve its own situation and is now actively contributing to the successful progress of the company. Saab is working closely together with the rest of the GM group, implementing new manufacturing philosophies such as QLE/H (TPS) and Andon. By becoming a part of the GM group, Saab got the necessary support to drive through these changes. These philosophies have been in progress for only a few years and the full effect is yet to come.

The ways of solving problems presented by Hill (1995) have also been addressed. Especially the choice of processes, which can give competitive advantages, has been focused. Saab has, for example, built a new surface treatment plant, putting the company in a world leading position in that area. The study comes to the same conclusion regarding the four missing links formulated by Skinner (1992):

- The leadership, not only understands and accepts the new concepts, but also is actively involved in taking the initiative to improvements.
- The middle management has adopted the new concepts and taken active part in developing and implementing them in the organization.
- The company has clear ideas about its manufacturing strategies. These strategies are to be synchronized with the overall strategies of GM.
- The functional organization is being altered. The introduction of the andon concept in the manufacturing is one example, where more responsibility and authority are delegated to the people performing the manufacturing operations, i.e. the operators.

When making these comparisons, it is important to bear in mind the possible differences in company culture between the USA and Sweden.

The major weakness of this study is that the interviewees gave their subjective opinion and it was not possible to go deeper into the production to study the manufacturing in action. Would it, for instance, be possible for these persons to openly criticize the ownership of GM? Our impression was that the interviewees were honest and open in their replies.

The conclusion is that Saab Automobile is well suited for modern production and the main weakness regarding manufacturing is the competence and capacity of the subcontractors. The question is if they can contribute actively in the product development process? It is essential that the purchasers implement long-term relationships with the subcontractors, in order to be able to develop their competence. The global over production of cars is also a fact of concern, which makes the competition even harder.

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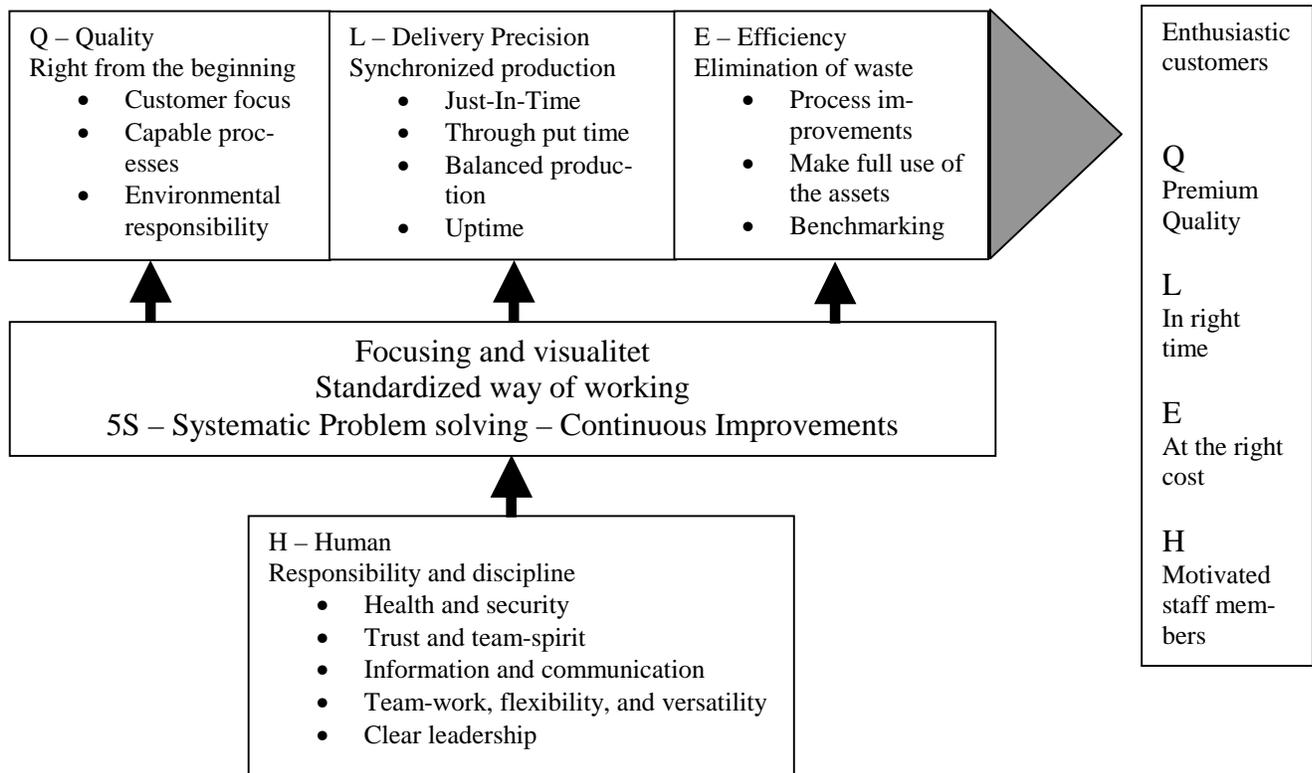


Figure 1. The QLE/H-concept of Saab

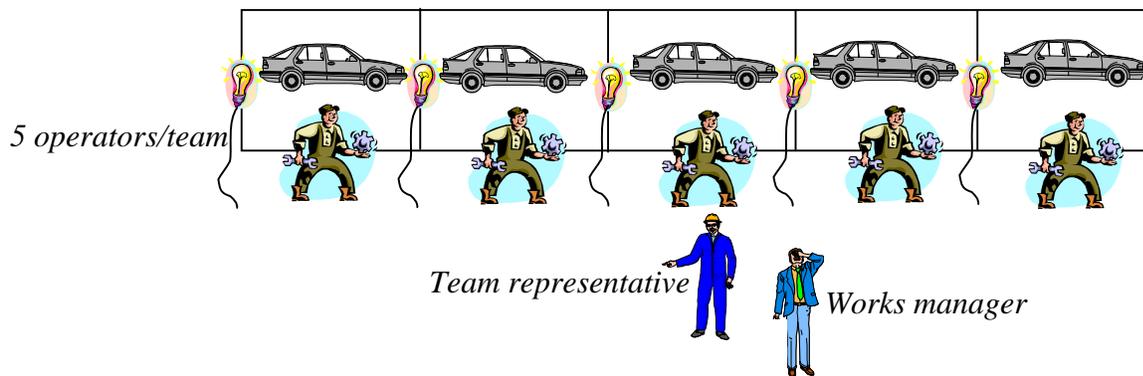


Figure 2. The Andon Concept