



LEAN PRODUCTION LEAN MANAGEMENT

**Impact
on white-collar workers,
working conditions,
collective bargaining
and trade union strength**

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Foreword

The introduction of lean production and lean management techniques is a feature of industrial change today and everywhere in the world.

Tracing its origins to Japan the practice of lean management has made its way throughout the manufacturing and services sector and affects the day to day working lives of millions of employees.

A plethora of studies and articles have been published about lean management and its application, but precious little analysis has been undertaken on its impact on employees, particularly those working in clerical, supervisory and managerial functions.

EURO-FIET commissioned Tommy Nilsson from the Royal Institute of Technology in Stockholm, Sweden to look into how the world of work has changed for those staff.

The report he prepared and which was presented to the 6th EURO-FIET Industry Conference in May 1994 in Budapest, sheds light on the changes affecting salaried employees in the wake of the implementation of lean production and lean management. As the report shows it has an impact on all aspects of employment and working conditions.

It is our hope that this publication will be a valuable source of information to all our affiliates but particularly to our salaried employees in the industry trade section.



Philip J. Jennings
General Secretary

Introduction

The concept of lean production, as described in the book *The Machine that Changed the World*, has been the subject of much discussion. The authors of the book believe that lean production represents a decisive break with the old production systems according to Taylor and Ford. Biographies of Japanese manufacturing magnates praise "lean production" so highly that they urge captains of industry throughout the world, regardless of the branch in which they operate, to abandon the old unproductive system of mass production and to make way for lean production, which is considered to be superior in every respect. Clearly, some have disagreed with their claims, which have given rise to numerous debates on the nature of the new production systems now being developed.

One question which has been discussed is whether the strong Japanese competition in respect of, for instance, automobile production, is really due to their special way of going about manufacturing or whether it is due to another factors. What is the role played by cultural factors, such as the devotion and discipline of the Japanese, which in turn could explain the long working hours and the extremely high tempo of the work? Another issue concerns how lean production in practice differs from traditional production systems. Is lean production merely a sort of ideal which some Japanese companies achieve to a greater or lesser degree and are the differences between Japanese and for example American companies perhaps not that great when it comes to, for instance, accumulation of capital, flexibility and lead times?

Another important issue is how employees involved in production are affected by lean production. What happens to job content, terms of employment and job security? Will circumstances improve in these respects or will they deteriorate? There has been a lot of discussion on what will happen to workers on the shop floor, if the jobs they do become more skilled, less skilled or require different skills. But, the one issue which has been largely absent in the debate on lean production concerns how white-collar staff are affected both in industry and in other sectors and branches. The aim of this paper is to make a contribution to the debate. Companies which stick to the old production principles, i.e. those using the system of mass production, will in the long run probably be doomed. Lean production has also started to spread to more and more developing countries, such as Brazil and Mexico. But, its introduction is moving more slowly there and is less widespread than in the industrialised nations. This means that it will become more difficult for products from developing countries to compete than was the case to date. Even if these countries put a lot into introducing lean production, the problem remains that they do not have the amount of qualified manpower needed. This applies for Mexico, for instance, which, with the conclusion of a free trade agreement within NAFTA has to compete on the same terms as the USA and Canada, while at the same time its education and training systems are lagging far behind.

One difficulty encountered when writing a report on White-collar staff and lean production is that there is very little material on the issue. I recently ran a search through a few of the largest English-language databases using "Lean production and White-collar work" as the key terms. There is plenty of literature on various aspects of lean production and of White-collar work, but there was not a single book or article

which linked the two phenomena together. However, I did manage to get hold of a small number of articles (in English) on changes in terms and conditions for white-collar staff in recent years; they mainly dealt with the USA and Great Britain, although also to a certain extent with Germany and Japan. As far as Sweden is concerned, I have managed to form a fairly good picture of the situation through my own research and mainly with regard to industry. Therefore, quite a lot of what I have to say is based on a Swedish experience and on my report *White-Collar Employees Close to the Production Process - Companies and Work in Transition* (1992).

Thus, in terms of the international perspective my theories are fairly preliminary, but I nevertheless believe that they give a fairly good picture of some of the main trends in respect of changes in white-collar work relating to the principles governing lean production.

What then is lean production as described by Womack and his co-authors? First of all, if one is to understand and describe lean production, one must be familiar with the principles governing the traditional systems of production, i.e. Taylorism or Fordism in the form of the assembly-line principle. Womack et al. call these systems for "mass production". Let me therefore begin by saying something about the mass production system.

Mass production

The mass production system began to emerge around 1900 in response to the inefficiency of manual production by craftsmen in instances where long runs of products needed to be manufactured. A major problem with the manual system involving craftsmen was that neither the work nor the methods of production were standardised. The clever thing about Ford's production methods for car manufacture from the productivity point of view was perhaps not mainly that he introduced the assembly line, but rather that he was constantly standardising. With the approach based on the use of craftsmen the final products could vary quite a lot despite the fact that they had been made using the same drawing. Also, a great deal of time was spent filing and fitting the parts together, thus leading to major losses in productivity. Mass production is not possible under such circumstances. But, by standardising components (to make them replaceable) and work routines (to make it easy to replace operators and also to keep the time spent learning to do the job short) there was scope for an assembly-line approach. In the "machine book" there is a description of an important difference between assembly by craftsmen and mass assembly of cars according to Ford's model. It reads as follows: "The skilled fitter in Ford's craft-production plant of 1908 had gathered all the necessary parts, obtained tools from the tool room, repaired them if necessary, performed the complex fitting and assembly job for the entire vehicle, then checked over his work before sending the complete vehicle to the shipping department." But with the assembly line (at the new plant in Highland Park, 1915) "the assembler only had one task - to put two nuts and two bolts or perhaps to attach one wheel to each car" (Womack et al. 1991:31). A prerequisite for the assembly line was that products should be standardised and that there should be few product variants; otherwise extensive retooling would be needed, thus involving considerable cost.

Not least Taylor demonstrated what gains in efficiency could be made via "division of labour on a scientific basis". But, scientific management meant not only subdividing the work to be done into manual and intellectual operations, but also standardising the workers' movement patterns for various tasks down to the finest detail. When company managements were about to carry out their systematic studies of all the different sub-operations involved in a given job, they were recommended by the advocates of "scientific management" to use certain specialist areas of medicine such as "industrial physiology and physiologically oriented industrial psychology". Man was regarded as being tantamount to a machine and the study of muscular movements and the energy consumption of human beings played an important part. According to Tarras Sällfors, who has been called Sweden's own Taylor, the most important goal of industrial physiology is "to prevent unnecessary energy consumption, avoid unnecessary fatigue on the job and prevent premature wear on the human body" (Sällfors 1949:21). Industrial physiology was also used to select persons with the right physical attributes in order to as far as possible avoid having workers experience feelings of "discontent with their work, over-exertion, tiredness, failure, occupational accidents, premature wear on their bodies and a pessimistic outlook on life" (ibid:22). Methods and time-and-motion studies based on industrial physiology were designed to increase the speed of each individual work operation. This in its turn led to increasing quantities of products per worker or hour worked, i.e. productivity increased. The most important feature of the mass production system was thus to increase productivity by rationalising work to an increasing degree. This was done via systematic time-and-motion studies and via mechanisation, i.e. capital replaces manpower.

As far as the advocates of "scientific management" were concerned, it was quite out of the question that workers on the shop floor should participate in the process of change and improvement. Ford, for his part, took it for granted that craftsmen did not pass on what they knew about the production process to their superiors out of an instinct of self-preservation. Secondly, he excluded the possibility that the often illiterate, semi-skilled workers could be capable of making suggestions as to how work routines might be improved. Improvement work therefore became the domain of white-collar employees in the planning department. But, with the Taylorist approach to work organisation, which was designed to increase productivity, a highly hierarchical linear system developed with central departments with their own specialists and orders being passed from the top to the bottom. The workers no longer needed to "think about how all parts came together and just what each assembler should do. This was the task for the newly created industrial engineer. Similarly, someone had to arrange for the delivery of parts to the line, usually a production engineer who designed conveyor belts and chutes to do the job" (Womack et al. 1991:31).

The mass production system thus features clear lines of demarcation between operations and therefore encourages the emergence of a multitude of specialist jobs done by white-collar staff working in offices usually totally separate from the production process going on in the plant. A high degree of specialisation crept in, both on the shop floor and in the field of white-collar jobs. The gradual, but enormous expansion in all white-collar functions was later described by Fritz Croner, among others. His theories on duties and delegation of work also lent legitimacy to the claim that the efficiency of the then modern production system was superior.

Lean production

We have now reviewed the most important features of the mass production system, with the emphasis on how work was organised. I would now like to briefly describe the main features of lean production, not as the system manifests itself in practice, but rather as an ideal. The prerequisites for lean production in terms of market conditions are quite different to those for mass production. The prerequisites for the latter were firstly a constantly increasing demand in markets which seemed to be almost insatiable. Secondly, products were manufactured with few variants and products were relatively seldom redesigned. Direct adaptation to customers' requirements took place more or less only in the case of what were purely luxury goods, since the cost of adjusting to customer specifications was very high. Production volumes were fixed on the basis of forecasts and large stocks of finished goods, raw materials and semi-finished products were kept.

The prerequisites for lean production are saturated markets and customers with specific requirements in terms of choice and rapid redesign of products. Strong cards for companies in the face of competition are therefore being fast and flexible (many product variants), flexibility at low cost, good customer service and rapid manufacture of new products at low cost.

According to Womack et al. a constant feature of lean production in the context of the actual production process is that it combines the advantages of the craftsmanship system and of the mass production system. Lean production uses the flexibility of the former, while avoiding high costs by incorporating the best features of the latter.

A further characteristic of lean production is that, compared to mass production, it uses fewer resources in every respect, while at the same time increasing production volume. This applies for manpower, premises, time and investments in tools and machines etc. In the "automobile book", we are told that everything can be halved. What is referred to as time-based management is becoming more and more common and has been successfully used by companies such as Motorola of the USA and ABB of Sweden. The goal of avoiding tying up capital plays an important role. If rationalisation of work is an important principle in the mass production system, then capital rationalisation is an important principle in lean production.

Lean production also requires a special relationship with sub-contractors, retailers and customers. In the case of sub-contractors, the main manufacturer wants to involve these in the production process, i.e. wants them to be involved at the ideas stage and when new products are being developed. The aim is to shorten lead times and to improve quality. Involvement of retailers means that they are brought in when customer needs and customer requirements are being analysed - all of this so as to better adjust to customers' needs. Lean production puts the customer first. This means that, in addition to manufacturing what the customers want, an effort is also made to establish a long-term relationship with the customer. One spin-off of customer relations is that the customers are turned into co-manufacturers, although Womack et al. do not discuss this aspect. This is what, for instance, the furniture company IKEA has done through its very successful business idea. But, this is becoming more and more common in the services branch, too. Concentrating on customers' requirements

and needs is usually called "service management" in the service trades. But the approach being developed in that sector is beginning to penetrate the goods manufacture sector to an increasing degree.

In lean production, a number of sub-processes in the production context take place simultaneously; this is referred to as "simultaneous engineering". With the old system of mass production, all operations took place in sequence: First the idea, then the design, then planning and purchase of materials, followed by manufacture, warehousing and sales.

Another important ingredient of lean production is "quality"; this means quality both in the sense that the customers get what they want and are prepared to pay more for it and also quality in the context of the production process. In the latter case, the aim is to achieve flawless production (0-defects), which means "getting it right from the start" at every stage. Procedures relating to this are usually called "total quality control" (TQC). According to the philosophy of mass production, it is easy to believe that high quality in the sense of 0-defects goes hand in hand with high costs. But this is not true. Rather we find that all flows and mistakes cost a lot of money. A mistake made at the beginning of a process snowballs as the process progresses and in the end the cost of correcting such mistakes is substantial. It costs, for example, Mercedes huge amounts to correct all mistakes at the final assembly stage. Thousands of workers are involved in making the necessary adjustments during final assembly.

In the context of the actual work process lean production is very much about *tearing down barriers* and shortening lines of communication. If production is regarded as a relay race (although with the reservation that several processes take place in parallel), then one can say that the aim is to hand over the baton as few times as possible, because every time it is handed on there is a risk of it being dropped. This is fatal in a relay race; a dropped baton makes no-one a winner. If handing over the baton also means passing on information, it is clear as we know that the more times the information is passed on, the greater is the risk of the original message being distorted. The barriers to be torn down are those between different departments such as design, production and marketing, between different categories of employees, i.e. blue-collar and white-collar workers, between different blue-collar and white-collar groups, between sub-contractors and main manufacturers and between customers and manufacturers.

The essential thing is to create continuous flows without having stocks, interim stocks or goods in storage. The ideal situation is for production to begin once the product has been ordered by the customer, because then full use can be made of a process where all component operations can be made to function in tandem with limited input of resources, i.e. manufacturing can take place according to the principle of "just in time".

Lean production, i.e. adjusting to customer needs, continuous flows, short lead times and high quality in products and processes demands qualified manpower, not least on the production side. Contrary to the mass production system, in a lean production scenario workers employed on the shop floor participate in work on making improvements and solving problems. But, according to Womack et al. almost all employees in companies using lean production will get jobs in the new production

system which offer skills-enhancement opportunities. "Most people will find their jobs more challenging as lean production spreads" (1991:14). As to that claim, we shall be discussing it in greater detail further on, not least in connection with white-collar staff. But, first something about criticism of lean production.

Figure 1 indicates the main difference between the mass production system and lean production. The Figure has been inserted here, even though it somewhat anticipates what is said later about the organisation of work.

Figure 1. Main principles of mass production and lean production

Mass production	Lean production
Few product variants	Product variations
Production based on forecasts and stocks	Production adapted to customer requirements
Rationalisation of work	Capital rationalisation
Sequential production	"Simultaneous engineering"
Operation-oriented management	Objective-oriented management
Division of labour	Integration
Specialisation	Versatility

Criticism of lean production

Claiming, as do Womack et al., that lean production is superior to previous forms of production systems in almost all respects is tantamount to asking for criticism. The authors and the concept of lean production have also encountered plenty of it, particularly with regard to the development of the concept in Japan and Japanese transplants in, for instance, the USA.

Reading the "automobile book", it is easy to be bothered by the authors' excessive enthusiasm and their enchantment with Toyotaism. Lack of perspective and critical appraisal also led them to make crass generalisations. The principles of lean production can according to them be applied to all branches of production more or less without problems. They neglect, however, to mention the differences in the initial situation in different branches. Thus, it is easier to apply the just-in-time method when it really is a question of order-controlled production, which is the case with, for example, the manufacture of large drilling rigs, machine tools, heavy goods vehicles and similar products. Problems are much more marked when manufacturing products such as small cars, radio and television sets and household appliances; order-controlled production has not (yet) arrived in these branches. When it comes to work organisation and skills enhancement on the job, the difference is particularly noticeable between firms involved in the cutting and machining of metals, on the one hand, and, for example, manual final assembly operations for vacuum cleaners, on the other. They also disregard other problems that the critics have focused on.

One such area of criticism that Williams et al. (1992) picked up on is that lean production is not as lean as has been claimed. Womack et al. compared one of the best Japanese companies, Toyota, with one of the worst American companies. In that context, Toyota appears "outstanding". In Europe, but above all in the USA, one can find plenty of companies which can match the Japanese in a number of respects; e.g. assembly times, quality and not least the efficiency of the sales divisions. Sales divisions in the automobile industry seem to be less lean in Japan than in the USA. According to Hori (1993), white-collar jobs in Japan are anything but lean, compared to many other countries.

Another point of criticism concerns how the workforce is deployed in the context of lean production. Some have claimed that lean production does not mean skills enhancement opportunities for workers on the factory floor or that if such opportunities exist, they are modest. Berggren et al. (1991) took examples from Japanese transplants in the USA and Great Britain to demonstrate that job enrichment is merely a matter of having a system whereby people rotate between simple tasks, although admittedly within the framework of a team. They also give examples of what a strong hold old Taylorist-style foremen have, along with examples of extreme short-handedness in some American transplants. The authors believe that lean production may very well be followed by "mean production". According to them, lean production should really be regarded as a new form of Taylorism - neo-Taylorism; no question of post-Taylorism as claimed by Womack et al.

As to how the workforce is used in the production process, there are many examples to be found of poor workplaces where the workers have virtually no opportunity of developing their skills on the job. Nevertheless, the main trend in industry still seems to be, as mentioned above, that workers employed on the factory floor are being given more responsibility and more authority. As to lean production and manning levels, the critics have much more ammunition. In order-controlled production the amount of working time put in (new people taken on or overtime for existing staff) is the "buffer" replacing stocks, which are the buffer in mass production, which is managed using forecasts and stocks. An important question is then what level of demand is used to decide on the number of employees needed. This is of great importance to the workforce, since the staffing level decides the number of hours worked by each employee. Company managements have a tendency to opt for a manning level which is slightly below the normal level of demand. This means a lot of overtime in boom periods. Since modern production techniques demand qualified employees, it is not as easy to take on new staff as it is when following the Taylorist principle. This can mean that the employees are constantly working very long hours, something that can undermine motivation and commitment. But, an important prerequisite for lean production is that all employees should be motivated and committed. Short-handedness can thus be counter-productive.

Lean production means cutting everything fine, even manpower, as the tendency towards staying short-handed indicates. There is no doubt about it that the rationalisation methods associated with lean production offer great potential in terms of increasing work output. Most large companies in Sweden such as, for example, Volvo, SAAB, Ericsson and ABB can undertake major expansion in production without having to take on any new people. If we look at the USA, we find that there

are many who believe that short-handedness and high unemployment will remain, even if the economy takes an uptum and there is a boom in economic activity. According to an article in *Industry Week* in 1993, cutbacks in the USA's largest companies over the past few years have hit white-collar staff particularly hard, even those who have a relatively high level of education. As a result of restructuring and computerisation of white-collar jobs, the upswing in the economy will not generate comparable new jobs . Instead the view is that the greatest increase will take place in the services sector and there it is a question of very simple jobs.

Lean production has a tendency to increase unemployment, at least in the short term. This tendency is also aggravated by the phenomenon of outsourcing, which is associated with lean production. Outsourcing means contracting out parts of the operations of large companies to small firms. The aim here is to lower wage costs (wages paid by small sub-contractors are often lower than those paid by large exporting companies) and also to transfer production to the places where it will be most efficient and where the highest level of skills is to be found (many sub-contractors have a higher level of skills relating to the production of certain components than the principle manufacturer).

The trend towards outsourcing also affects white-collar staff. With this in mind, IG Metall of Germany has formed what may be called an informal alliance with engineers and technicians with a view to resisting too much "outsourcing", since this is said to lead to a decline in the number of jobs (*Lean production and Beyond* 1993:120). It is becoming more and more common for certain areas of production in large companies to be transferred to sub-contractors and when this happens the jobs move, too. But, the number of sub-contractors is becoming fewer and fewer and the number of persons employed by them also relatively lower because these too are becoming the disciples of lean production to an increasing degree. Yes, they are being encouraged and "forced" to be lean by the principle manufacturers so as to lower the total costs.

Another point of criticism is that the successes of the Japanese are due not so much to smart production, but primarily to the discipline and devotion shown by the employees, these being the reasons why they put up with hard work and long hours. This, in fact, has led to the emergence of the "karoshi" phenomenon, i.e. there are employees who literally work themselves to death.

Lean production: Efficiency and job enrichment

Even though lean production has its negative sides - and here the problem of manning strengths is perhaps the most serious - there should be no doubt that this system of production is superior to the mass production system in terms of increasing productivity and also, it would seem, in terms of opportunities for the employees to enhance their skills an the job. If this is true, then lean production, contrary to the Taylorist approach, should be capable of combining improvements in productivity with job enrichment and skills enhancement. It has already been pointed out by, for example, Michael Schuman (1990) and by Warner et al. (1990) that the principle trend as far as the workers are concerned is towards more qualified jobs.

Let us take an example from Sweden, i.e. SAAB's automobile plant in Trollhättan. In recent years, a system of more or less independent, flexible and target-oriented production teams has evolved at that plant in the final assembly shop, where "kaizen" is an integral ingredient in the work. Gradually, the time clocks will be removed and operators will be responsible for recording the number of hours worked themselves, since separate administration of working time costs too much. It is also very much a matter of cutting things fine in terms of resources. The level of tied-up capital is low and production works to the motto of JIT (Just-in-time). It is clear that this is a case of lean production, because fewer tools and fewer components are used at the assembly stage. The reason why the number of components has decreased is above all due to the fact that more and more has been pre-assembled. An increasing amount of the pre-assembly and preparatory work is done by robots and automatic circuits. In the bodywork and press shops, for instance, 95% of the work is automated. The trend towards lean production has, however, meant that the number of people employed throughout the plant has fallen from 10 000 to 4 000 in the space of four years while production capacity remained constant. To give two examples of improvements in productivity, the time taken to assemble a SAAB 900 fell from 110 hours to 45 hours over the same period and the time taken up by readjustment work due to defects in the cars caused during production has decreased by over 300% (*Dagens Nyheter*).

Lean production and organisation of work

As already mentioned, it seems as though lean production or modern production systems help workers on the shop floor develop their skills on the job. When this occurs, however, they may feel themselves to be under more stress at work, since their degree of responsibility has increased. It is this responsibility which "raises anxiety about making costly mistakes" (Womack et al. 1991:14). But, this is a problem that managerial staff and qualified technical staff have always had to deal with and it is a price that blue-collar workers have to pay, if they want to be upgraded and be given more of a say in the production process.

How then can factory workers develop on the job in the most advanced companies?

New demands on the workforce

Lean production makes special demands on the workforce. In the mass production system it was rational to have specialised manpower; in the modern production system it is rational to have a versatile and flexible workforce. This workforce must also be capable of relating to customer requirements and production flows. In addition, employees must be prepared to accept change and responsibility and be motivated; they must also have the ability to solve problems independently and contribute to developing and improving production - everyday rationalisation (Hutchins 1989). So as to derive maximum benefit from people's skills and know-how, the work is often carried out by teams with a rotating team leader. Duties are integrated into the teams both horizontally and vertically. Even white-collar duties are delegated to these teams.

Incentives to extend the range of shop-floor tasks are not only designed to increase productivity; difficulties in recruiting manpower for jobs in industry, the high costs generated by turnover in staff and absence due to illness and occupational injuries are also part of the picture. (This problem has been of a lesser order of magnitude during the present economic recession). Even the trade unions' drive for "good jobs" has played a part. Metalworkers' and employees' interests coincide an a number points.

New pay systems called "qualifications-related scales of remuneration" have been introduced in order to increase the pressure for change, encourage the skills enhancement plant employees need in order to be able to do their jobs and achieve a maximum degree of flexibility. A variable, performance-related element of remuneration is usually linked to these pay scales - a team bonus based an results. The piecework system is in the process of being abandoned in favour of rates of pay related to the demands of the job.

Duties in the team context

Experience gained in Sweden, at least, Shows that in most of the progressive companies teams of operators have a large number of duties in addition to their actual work with the machirres. The following tasks are often delegated from the supervisory level:

- Detailed planning of the work (per day and per week)/ division of labour (who is to do what)
- Personnel matters
- Instructors' work
- Ordering of materials, tools, measuring equipment and repairs
- Follow-up of production targets (quantity and quality)
- Problem solving/correction of defects.

The following duties are delegated to the teams by production engineers, planners and other white-collar categories:

- Programming
- Some contacts with customers
- Some production engineering
- Some planning
- Contact with sub-contractors/dispatch
- Work an improvements (in project groups together with technicians).

The tasks connected with production engineering that the teams can carry out are, for instance, fitting blades into finishing machirres, altering cutting speeds and feeding new processing blocks into existing programmes. Planning duties may involve, for example, updating stocks and rotas, deciding the sequence of assembly and making changes in records of orders previously completed. As a rule, the target-oriented and mor.e or less autonomous teams will have received training to help them carry out their new duties. This often entails subjects such as mathemat-ics, data processing, knowledge of products and components, programming and production techniques.

An important prerequisite for delegating responsibility and authority to the teams of operators on the shop floor is new technologies. For many years technical systems were centrally controlled, e.g. the main frame computers, and were overseen by white-collar staff in the main departments far removed from the production line. Thanks to new technologies (e.g. PCs), it is now possible for the systems used for steering production to be much more "local" and user-friendly for production staff, thus increasing the scope for management by objectives in the relatively autonomous teams of operators.

Lean production and White-collar jobs

Most discussions on lean production and how it has affected employees' jobs and working conditions have focused mainly, as I have already mentioned, on people employed on the shop floor and to a lesser degree on White-collar staff. One reason for this is that it is only in recent years that the new methods of production have affected White-collar employees. In Japan, where there is a long tradition of lean production - mainly at Toyota, large parts of the White-collar area remained intact for a long time. Admittedly, the number of White-collar employees at the level of production is lower in Japan than in other countries, but, on the other hand, the amount of White-collar work outside the production process is substantial. Hori (1993:158) claims that "during their struggles to grow fast enough to keep up with the expanding market for their products, few Japanese companies paid attention to the fact that overhead personnel costs were increasing much faster than other costs".

In the export industry, in particular, improvements in productivity have been recorded in recent years in the area of White-collar work. However, when it comes to industry oriented towards the home markets, which have been protected from foreign competition, e.g. the foodstuffs industry, the building industry and the services sector, there is a huge potential for rationalisation. In the banking sector and in public administrations, for instance, many jobs are still being done manually despite access to new technologies (ibid:160). It is this source of inefficiency, above all in the services sector, which partly explains the low unemployment figures. According to Hori it has been estimated that if the necessary rationalisation measures were to be introduced in the field of White-collar jobs, total unemployment in Japan would rise from just over 2% to more than 10% (ibid:163).

The large exporting companies had found it difficult to introduce rationalisation measures into the White-collar area because of the principle of life-long employment. Nevertheless, very recently some cuts have begun to be implemented. This is true, for instance, of the company TDK.

It is interesting to note that, while the principle of "Kaizen" has become widespread in the production context among blue-collar workers, the same does not apply in the White-collar ranks. It is therefore likely that there will be increasing pressure to have "Kaizen", which among other things involves self-rationalisation, introduced among White-collar staff as well. The question for many categories of White-collar employees is increasingly not how many hours they spend working in their offices, but rather

how much added value they bring for the customer during the hours they spend in their places of work.

I want now to try to assess what is happening as far as white-collar staff are concerned and to identify what would appear to be the main trend in terms of changes in the nature of the work. But, let me first make a few brief comments on the principles on which the organisation of white-collar work used to be based. Having got that picture, it is then easier to see how things are developing today.

Old principles for the organisation of white-collar work

The Taylorist views on a division of labour and specialisation led to the emergence of numerous departments in the engineering industry which were removed from the production line, e.g. production engineering, planning and inspection. These in their turn were sub-divided into groups of specialists who were in charge of time-and-motion studies, quality assurance, distribution of orders, preliminary estimates, time-keeping, detailed planning, materials procurement etc. Specialisation was pushed to such extremes that in companies involved in the cutting and working of metal production engineers were to be found who for decades had been responsible for preparing just one or two lathes, while others had, for instance, been responsible for preparing a few milling machines. Womack et al. (1991:63) gives an example of an "engineer in a mass-production auto company who had spent his whole career designing auto car doors locks. He was not an expert on how to make door locks, however; that was the door-lock manufacturing engineer. The door-lock design engineer simply knew how they should look and work if made correctly."

The same type of specialisation was also found in other branches, such as banks and insurance and in the services sector in general. But, if "scientific management" is mainly applicable to the manufacture of goods, *bureaucratic organisation* is more applicable to administrations and to the paper work involved in the production of goods and services. The inventor of this, Max Weber, however himself claimed that it could be applied to all types of activity and even to industrial companies and manufacture (Weber 1983:150).

Bureaucratic organisation

Yes, it was a German, Max Weber, who in theory invented the principles of bureaucratic organisation. An important point for Weber - and this is in line with the way in which the capitalist economy works - was that bureaucratic organisation should permit a high degree of "estimability" in respect of the results one wished to obtain. In order to achieve this level of "estimability" it was important for the results to depend as little as possible on the personal opinions of individual employees. He therefore took the view that the more bureaucratic principles were allowed to prevail, the more efficient an operation would be, because personal idiosyncrasies could not manifest themselves.

In other words, this simply means that bureaucratic organisation operates according to the following principles:

- White-collar employees are free as individuals and are only required to show obedience in relation to impersonal duties an the job;
- They are components in a rigid hierarchy of positions;
- Each position has a clearly defined sphere of competence;
- A person holds a position by virtue of a contract based an occupational qualifications;
- The person occupying the position looks forward to a career, a system of promotion based an years of service or performance;
- The employee shall demonstrate discipline and control in the exercise of his/her duties.

The insistence an clearly defined areas of duties for each position means that clear lines of demarcation are established between the main departments within the company and between the posts in each main department. This produces *sub-division according to function* and *specialisation*. The requirement that the organisation shall be hierarchical, i.e. that each level shall be managed and monitored by a per-son at a higher level implies both *management by rules and standards* and proces-sing of matter s through *formalised channels*. These "formalised channels" mean that lines of contact between superiors and subordinates in the hierarchy are vertical ; no horizontal contacts take place within the structure, not even between employees an the middle and levels, an the one hand, and customers, subcontractors etc. outside the organisation, an the other.

Henri Fayol should be mentioned when it comes to the traditional principles for the organisation of white-collar work. He was more or less a contemporary of Weber, but was a company manager and thus adopted a more practical approach. Fayol identified six main functions applying for all corporate enterprise (Fayol 1949): technical, commercial, financial and administrative, plus safety issues and accounts. Fayol showed particular interest in five areas of activity in the administrative field: planning, organisation, giving of orders, coordination and checks. He set out four-teen general management principles an the basis of which, in his view, the most efficient form of administrativn could be achieved. Some of the most important prin-ciples are:

- division of labour, i.e. specialisation
- unity of command, i.e. each employee shall have only one boss
- centralisation
- hierarchy, i.e. line systems.

It is clear from the above that there are a number of similarities between Taylor, Weber and Fayol. One is the stress laid an hierarchies within which operations are managed from the top and down. There is also similarity in their views an division of labour

and specialisation, with employees at lower levels reporting to higher levels and not being expected to take initiatives vis-à-vis customers, clients etc. Initiatives in relation to the outside world are taken at managerial level.

These main principles for the organisation of the total work load have been applied to a greater or lesser degree in companies and other bodies for a very long time and are still being applied to a large extent. However, they have gradually begun to function less efficiently as conditions in the markets and customers' and clients' requirements have changed. Over the years the inefficiency of bureaucracies has been criticised. Michelle Crozier, for example, said in her day that a bureaucratic structure could not "change its modus operandi by learning from its mistakes" (Albrow 1972). Others who highlighted the inefficiency of bureaucracy at an early stage were Joan Woodward and Burns & Stalker. As early as the nineteen sixties Joan Woodward pointed out that as far as industry was concerned a bureaucratic structure worked fairly well for mass production, but less well in the case of single piece production. At the end of the fifties, Burns & Stalker conducted a study of corporate structures and were able to demonstrate that companies in branches undergoing rapid change, e.g. the electronics branch, found it difficult to hold their own if they stuck to bureaucratic principles such as strict hierarchies. This type of organisation is too rigid to be able to adjust to the constant changes taking place all around (Mabon 1973).

The new white-collar jobs

The hierarchical, formal, strictly sub-divided and specialised type of organisation seems to be more or less an the way out. The question, however, is, "What will replace it?" The fundamentals are to be found in lean production and the most important of them as far as white-collar staff are concerned are adjustment to customers' needs, flexibility, flat organisations, cost rationalisations, decentralisation of responsibilities and powers to front-line staff and focusing on the flow of products (in goods manufacture).

As I have already pointed out, this is of greatest relevance to white-collar staff in goods' manufacture, but also concerns white-collar employees in the services sector.

New trends

The following trend seems to be emerging in top companies in respect of white-collar jobs in goods manufacture. Firstly, the number of white-collar employees is diminishing and one of the reasons for this is to be found in new technologies. The introduction of Computers and electronic communications systems reduces the need for white-collar staff. This is also the case in the services sector. In industry, the departments affected are payroll administration, planning, controls, timekeeping etc. In industry, the decrease is also due to the fact that some of the duties are being transferred to the shop floor. But, reorganisation of white-collar jobs is also having an impact. Middle-level white-collar staff have been particularly affected by companies becoming flatter in structure and by the introduction of new technologies. An American article on the precarious situation of this group carried the dramatic

headline "The Death of Middle Management" (George Newman 1991). The need for manpower in both the White-collar and blue-collar category is shrinking, but the process seems to be more rapid in the case of the white-collar group. Lean production, as has already been pointed out, needs no reserve staff. A Swedish plant manager speaking on the subject of white-collar staff put it as follows: "Previously people were taken an "unnecessarily" so as to have access to extra manpower when, for instance, drafting budgets and at times of heavy work load. That's not the way we do things now". Some contributors to the periodical *Economic Commentary* (Randall & Groshen 1991) a year or so ago wrote, "As the percentage of blue-collar workers continues to shrink, businesses will be increasingly forced to take a hard look at their white-collar staff when seeking to trim costs, thus putting white-collar jobs in greater jeopardy in future downturns." It is reported from Great Britain that calls for rationalisation are just as strong in the case of white-collar categories as they have been with regard to blue-collar workers on the shop floor (Saydan 1991). New technologies are in part behind the shrinking numbers of white-collar jobs: "The introduction of computers means that a great many functions traditionally carried out by numerous accountants, stock controllers and data processors can now be done by machine." The new communications systems also mean that "top-level decision makers can stay in touch with and control people closer to the operational base without going through the middle layer." The author also claims that this decline in the number of white-collar jobs should really have taken place a long time ago, but for a number of reasons did not. The economic crisis "is now providing companies with an excellent excuse."

One way in which the smaller need for white-collar staff is manifesting itself is in the relatively high level of unemployment in this category. In recent years unemployment among white-collar staff has increased in many industrialised nations. In Sweden, 12% of SIF's members were unemployed in September 1993 (SIF: Swedish Union of Clerical and Technical Employees in Industry). This is an extremely high figure and the level can be compared to the unemployment figures for white-collar staff during the economic recessions in the seventies and eighties; back then it was just over 1 % and was considered to be totally unacceptable at the time. The high level of unemployment can to a large extent be attributed to the very special kind of economic crisis that has hit Sweden, but some of the unemployment is also due to lean production methods. In the present climate of crisis, the employees have seized the opportunity to get rid of many white-collar employees. Since the end of the eighties a surplus of white-collar staff has been accumulating due to the introduction of new technologies and the way in which work is organised. Lean production has even started to affect the job security of white-collar employees. This is the clearest common trend throughout the industrialised world from Japan via Stockholm and London to New York and Los Angeles.

Another trend is that the traditional foreman functions are changing. The Taylorist style of detail-oriented management is disappearing and the foreman role is being replaced by a position where responsibility is much more comprehensive. The new supervisors, who are fewer in number and who are sometimes called production managers or similar, may be responsible for both blue-collar employees and for white-collar staff working in the back-up sections in the plant. They may also be responsible for budgets and for the workforce's skills-enhancement. At the Ford plant in

Southampton, for instance, the "supervisors" are now responsible for several teams of operators and have overall responsibility for quality and planning (SIF 1993:25). Leonard Sayles, in an article in *Organizational Dynamics* 1993, writes that top American companies can identify four new duties for supervisors; they have to ensure that existing and new technologies are understood by all employees, assist with work on ongoing improvements, analyse production output and give support to employees' wishes for changes.

The trend towards more general responsibility and wider-ranging skills, moving away from detail-oriented management and specialisation, seems to be affecting not only first-line managers, but middle management as well. An extensive study was carried out a few years ago on middle management in six Western European countries and the following conclusion was reached (see Dopson & Stewart 1993): "Middle management now works in a more turbulent environment which has frequently radically changed their role and function. In all but one of our Gase studies, middle management jobs became more generalist with increased responsibilities and a wider range of tasks. An increasing span of control was a feature of most middle management jobs, and generally they were responsible for a wider mix of staff." And as to qualifications' requirements, middle management was "required to change their attitude to management and to acquire new skills. Greater flexibility and adaptability were stressed, as were more generalist skills, which included financial knowledge, a greater ability to manage staff...".

The trend is that central departments made up of production engineers, planners, programmers etc. are being dissolved. The white-collar staff affected are being divided up into smaller groups and moved out to the works offices on the edge of the production process to provide back-up for the latter.

Fourthly, the content of the positions is being broadened. People who, for instance, used to be production engineers are now expected to be able to do programming, carry out planning duties and possibly also handle routines for the purchase of materials and components. In addition, it is becoming increasingly common for them to have to deal with customers. A new type of position is emerging, that of *technical generalist*. Versatility among production technicians goes hand in hand with the requirement of being able to adjust to customer needs, flexibility, short lead times and a smooth production flow with a minimum of breakdowns.

There is another reason in addition to the above for broadening the scope of positions and that is motivation of white-collar staff. All experience gained indicates that if employees are given increased responsibilities and increased powers on the job, they will become more motivated. Now, this claim is relevant for large groups of operators, but what happens to white-collar employees if the traditional career prospects no longer exist? If it is relatively easy to find development possibilities for most categories of blue-collar workers, it is not as easy in respect of some white-collar employees. An important question is then how does one motivate white-collar workers when the turn taken by the organisational structure is unclear and may even seem a threat to them? It can be a delicate task to generate motivation in white-collar employees who have been "forced" out onto the Shop floor. It is not at all certain that there will be a spontaneously positive reaction which makes a white-collar employee on the shop

floor say, "Wonderful, we have got a new system . Now we just have to roll up our sleeves and Show that we can produce satisfied customers." A number of large American companies, such as General Electric, Du Pont and Pepsi Cola, have invested extensively in broadening job specifications to increase motivation and job satisfaction among white-collar staff. White-collar staff in these companies are also allowed to work in different departments and divisions. Pepsi Cola in particular has developed an extensive programme for this. The principle is that if you can't move upwards, then "you must do a lateral move" (Denton: 1992).

A further stage in this process is total integration of white-collar staff close to the production process into the work teams. So far, this is being done in only a small number of companies and the aim is to increase flexibility by allowing technicians to do some of the work involved in the ongoing production. At the same time, operators are supposed to acquire production engineering skills from the technicians. Another aim is that the dialogue and team-work expected to be generated between operators and technical staff should help produce better solutions to problems and a more effective process of change.

The demand for versatility and flexibility applies even more to qualified white-collar employees, "professionals". According to an American article, they are now required to "collaborate with other professionals and non-professionals, and they must thoroughly understand the overall business" (Hecht 1993).

The increased merging, above all in industry, of traditional white-collar jobs and jobs an the shop floor has led to deinands that blue-collar and white-collar staff shall be placed an an equal footing and that the principle of "siegle unionism" be introduced. Extensive debate is taking place in Sweden at the moment an what are referred to as "co-workers' agreements". These mean, among other things, that blue-collar and white-collar workers shall be subject to the same scales of remuneration and conditions of employment.

New job content

Many company managements still find it difficult to specify what the duties of white-collar employees close to the production process, administrative personnel etc. precisely are. But, the problem of developing "generalist" positions also lies with white-collar employees themselves and with the operators an the shop floor. The forrner find it difficult to accept working dose to the Shop floor or an it. In the case of operators, many find it difficult to tolerate having for example technical staff standing at "therr" machines. However, if these problems are handled properly, they will diminish. At the automobile company IBC Vehicles of Luton the rifts between blue-collar and white-collar staff were still considerable, as is the case in many other plants; neither group had respect for the other. Now, they work together and respect each other (SIF 1993).

Even though the creation of posts for "technical generalists" may be a slow process, there are signs that in the future they will involve the following:

- solving problems in current production
- making improvements in current production
- participating in the development of new systems for planning, manufacture, quality assurance etc.
- acting as project managers
- participating in current production.

The "technical generalist" or "general technician" must have the ability to communicate with designers, operators, marketing division staff, customers and suppliers. Naturally, he must have an overall understanding of the whole production process from order to finished product. So, what has to be done is to create posts with a broad range of duties which general technicians can grow into via experience and training. If work for White-collar staff is developed in this direction, it will mean skills enhancement on the job and there is much to indicate that the shrinking number of White-collar positions are developing in that direction.

This kind of scope for development could lead to a new careers' structure. It would mean that individual technicians could make a career for themselves by learning to carry out more operations, by working on projects and being involved in development work. This growth in the scope of a position could take place without the employee concerned needing to be either a specialist in a development department or an executive.

According to Womack et al (1991:14), the careers' structure in the context of lean production is different to that found in the context of mass production. In the case of the latter, an employee could make a career by gradually being promoted up the ladder and by being given an increasing degree of specialisation with every rung. In lean production, it is more a question of horizontal learning and of developing skills within the framework of the team.

A major problem for many White-collar staff is that they are not very keen on working on the shop floor. Many of them, particularly older White-collar employees, regard being required to work closer to the production process etc. as being tantamount to demotion. However, quite a few White-collar employees working close to the production process were themselves recruited from the shop floor. Another problem is that moving from main departments in the company's office premises to offices in the plant can mean isolation. When working in the main offices away from the production process White-collar employees identify both in professional and social terms with their peers there. When located in offices attached to the plant, a White-collar employee will be with just a few other White-collar staff. But, White-collar staff's unwillingness to work in the plant has led to the emergence of an interesting phenomenon. In cases where White-collar employees are unwilling to work on or close to the production line, company management will transfer White-collar duties to the teams of operators involved in the production process to a commensurate extent.

One example of how white-collar employees are increasingly being transferred to the production process is to be found in a department of one of Sweden's largest engineering companies. This department carries out a lot of operations involving the cutting of metal. The material handled is costly and quality requirements are extremely high. Here, responsibility and authority have been transferred to the production process or close to it in order to increase the competitive edge of the operation and there are plans to transfer still more such powers. The aim is to generate more flexibility, to certify all operators as being skilled in a range of occupations and to move the production engineering, production planning, quality control and inspection, maintenance and materials' procurement departments to the groups responsible for the flow of production. The objective of having these production groups is to reduce the amount of capital tied up (in goods), lower manning levels and shorten lead times.

In addition to the Works manager, 58 operators work in this production unit, but only one of them is white-collar. This lone white-collar employee occupies an administrative post; his duties involve general planning and logistics, dealing with sub-contractors and checking supplies originating from abroad. Virtually everyone employed in the Workshop Works mainly on the machines used in the production process. However, they also carry out work relating to reception handling and inspection, production engineering, planning, programming, purchase of tools and inspections. For some time now operators have been carrying out the relatively complicated metallurgical check on the finished product. Previously this was a job done by a graduate engineer. In the future more white-collar work may be affected by the changes in production. Operations carried out in the plant are related to the jobs of about 25% of the white-collar staff outside the plant in the accounts, personnel management and technical departments etc. But, many of these functions will in time be integrated into the production flow. With computer back-up the Works manager can handle, for instance, wages and accounts himself with some assistance from the teams of operators.

The new ways of running and organising flexible companies operating on the basis of customer requirements also make new demands on administrators, specialists and managerial staff. It is also a fact that the content of positions in most of these categories is being broadened and is oriented towards customer requirements, either those of internal "customers" within the company or outside customers. I shall now give some examples of this; several of them are taken from the publication *Lokal lönesättning i ny arbetsorganisation* (Fixing wages locally in new work structures)-Nilsson 1993.

Administrators

In the case of changes in the work done by administrative personnel I shall refer to an interesting example from SAAB Distribution in Nyköping (Sweden) where SAAB Automobile's central warehouse for spare parts is located. It involves order clerks and invoice clerks (Brulin & Nilsson 1991).

Traditionally, handling orders and invoicing have been highly specialised areas subdivided into many small operations. For many years, this area was also divided up into different functions, with each function corresponding to a (low Status) job:

- Entering orders at the computer terminal
- Dealing with back orders
- Writing invoices
- Processing transport documents
- Ordering goods' transports

The changes made in the organisation of the work and the introduction of new technologies (computer back-up) have caused the number of positions to shrink. Those remaining have been made responsible for different countries and each position involves all of the duties listed above. Those affected have become what one might call *all-round order processors*. The changes are in line with the demands that customers now make; they want to deal with only one employee who can answer all their questions. But, this also reflects the need for flexibility, i.e. that everyone shall be reasonably capable of carrying out fellow employees' duties.

With the new set-up, all-round order processors also participate in development work, i.e. in what is called the document development project. The aim is to optimise the documentation process - that is, find the most efficient way of processing different types of documents, both from the communication and data points of view.

A further change for these all-round order processors (with their responsibility for specific countries) is that they will be moved closer to the actual stock management process - the production process - and near to the dispatch bay. (The company has changed the entire process of stocks' management radically since the end of the eighties). The reasons for this are a wish to shorten lines of communication and increase flexibility. The all-round order processors must be capable of working in the "production sphere" to a certain extent when needed. The call for increased flexibility is also reflected in the fact that some of the warehouse operators can also replace the all-round order processors.

Secretarial positions - difficult jobs to enhance

The classic type of secretarial post seems to be in the process of disappearing. This is primarily due to extensive computerisation of clerical work. Processing staff, section heads etc. are now doing their own clerical work to an increasing extent. They also keep simple accounts relating to travel and hotel accommodation etc. However, it is not clear what secretarial jobs are to be replaced with, but the main trend in top companies is for the new "secretaries" to be given a broader range of duties and increased responsibilities. Let me outline what form such a job will take in the future.

The following duties were commonly associated with the traditional secretarial position:

- typing letters, rough drafts and reports

- answering the telephone
- typing up minutes of meetings
- making travel reservations, booking tables in restaurants and similar
- brewing coffee and generally assisting with social arrangements.

How then does one develop this kind of job in the context of modern methods of rationalisation? First of all, the question is which duties from the stand-point of total efficiency can be transferred to section heads, analysts, processing clerks etc.? Theoretically, one might say the following:

- simple booking of premises, tickets etc.
- organisation and convening of simple meetings
- writing letters, minutes and short memoranda
- ordering periodicals and books.

These duties must be standardised and take a relatively short time. Otherwise, there is a risk that, for instance, a member of the managerial staff will spend too much time on this, thus affecting the efficiency with which he/she carries out the other duties and the customers/the clients/the members.

A major problem with the role of the secretary is that secretaries are regarded as being there to provide general social and practical services for neighbouring departments. Processing clerks, managerial staff, analysts, union representatives, researchers etc. do not as a rule regard secretarial duties as being independent of themselves *personally*. The implication of this is that secretaries function as mother-figures or servants. They make coffee, take photocopies, make run-of-the-mill phone calls, buy flowers for people having birthdays etc. It should be possible to remove this category of duties from the catalogue of secretarial tasks, as these are things that anyone at all can do; they take up little time and are so simple that everyone can learn to do them.

A modern, all-round administrative position might involve the following duties:

- Making reservations for travel and conferences (and solving all problems relating to this)
- Obtaining literature and materials (and solving all problems...)
- Typing out long memoranda, reports and minutes of meetings (as already mentioned, managerial staff and others write letters and short memos themselves)
- Organising conferences and larger-scale group meetings
- Working on projects relating to the purchase of new equipment, enhancing the organisational structure, improving and expanding conference activities and systems used for travel and conferences
- Acting as project leader in connection with purchases of new office equipment
- Being able to give customers answers to simpler questions concerning the specific field of the section/department/company
- Co-ordinating administrative routines
- Instructing new administrative staff
- Training administrators and others.

The skills of an administrator should include a proficiency in using computers, ability to type (possibly also make calculations), order tickets, book premises and organise conferences. But, it is not only a question of, for example, making travel arrangements, but also of knowing the best routings, travel agencies, prices etc. The Same applies for courses and conference centres. When asked to arrange conferences and receptions, this should not be done in the role of a "mother figure", but instead in the role of a professional organiser of conferences and receptions. As we all know, there are today professional party organisers who make a very good income and who are highly respected.

Another important part of an administrator's work is that of co-ordinating and of being on the spot often. It is then assumed that processing and managerial staff etc. are away from the workplace fairly often, but someone has to be capable of answering questions regarding operations. It may involve statistical data, information from meetings, prices etc. The administrator must be able to give "first aid" and often just that may be sufficient. But, he or she must also be able to offer more information either in the form of brochures etc. or by talking to specialists, who will be met later.

An important ingredient in positions which are defined as being highly qualified is development work; e.g. developing new products, new marketing strategies, new production systems. The traditional job of secretary has never included any ingredient of development work. Secretaries have been forced to accept given rules, existing office technology etc., which have been decided and introduced by others. This is not efficient, this is not lean administration. Probably the most effective way is for administrators to improve their working conditions and their work (kaizen) either by themselves or with others. A "secretary" could very well be made responsible for a project involving, for instance, the purchase of new administrative hardware and software and in that capacity be above managerial staff and processors. The Same is the case when it comes to organising conferences.

It is clear from the above that the duties of future administrators may be numerous and varied. They are adjusted to the demands made by a modern organisation based on lean production and customer requirements. But, new, more wide-ranging skills are necessary; to be able to act as project leader, have the capacity to solve problems, general grounding in technical and community matters in order to be able to administer "first aid".

The role of the specialist

The role of the specialist is also changing. In addition to a more in-depth knowledge of the area of specialisation, specialists are now also required to broaden their field of knowledge to a certain degree. This is necessary because the production- and customer-oriented strategy call for this. For a long time technical staff have been "introverted" and have concentrated on solving technical problems. But it is, of course, better if technical staff are outward-looking and able to develop the products and systems that customers want, instead of producing technically advanced designs which are nice to look at, but which no-one is asking for or which are too expensive to manufacture.

The broader range of skills aimed at should primarily include knowledge of areas such as the production and marketing departments. At Ericsson in Stockholm a system of job enrichment and pay advancement is in the process of being developed for trainees and is designed to both broaden and deepen their knowledge. If a designer is to be able to earn more, he/she must not only enhance his/her skills in the area of specialisation, but must also acquire relevant knowledge of testing and production procedures etc.

Some specialists, however, i.e. those involved in basic research, are not required to broaden their knowledge. In their case, the specialisation is particularly marked. This applies, for example, to some technical staff employed at ABB Stal in Finspång. These are people who calculate the angles of the blade wheel (in turbines) at different distances. This type of mathematical exercise, which requires a highly qualified knowledge of hydrodynamics, is relatively separate from the organisation of production and the immediate requirements of customers. It is important for these technical staff to keep up to date on what is going on in research into hydrodynamics.

On the other hand, the category of engineers who design blade wheels for manufacture, making use of the results of basic research, must broaden their knowledge of, for instance, production techniques and quality.

The role of managerial staff

With the old assembly line approach it was common to recruit specialists for posts as managers simply so as to be able to offer them higher pay. This was sometimes the only way of keeping what a company considered to be attractive manpower. Someone put it as follows: "The ideal executive was the professional expert who ran the operation using plans and Budgets backed up by instructions from managerial staff at a higher level". How a manager functioned in social terms in relations with subordinates, customers and other interested parties was of secondary significance. The manager's specialist area was what came first. But, more and more companies now employ expert managerial staff to meet other requirements. In addition to being well-versed in their respective areas of responsibility (and they do not necessarily have to be specialists), they also have to be leaders and have the following qualities:

- be able to communicate with all areas of work and persons
- be capable of reacting swiftly to customers' requirements
- have an understanding of the overall processes involved
- be able to put themselves in the position of others and understand how they think and how they feel
- be capable of helping others develop their skills on the job.

Leadership should be regarded as a profession in itself. It has a logic which differs from that of the specialist or the "lack-of-all-trades", for example. Good leadership calls for personal maturity and that vital ability to communicate with people. But, good leadership also means being able to communicate goals and visions, being able to listen and being capable of learning from others, including those being led.

There are two types of leader functions. There is the line manager, when he/she is running things for long periods of time, perhaps even until retirement and there is the project manager, where the person is in charge for a limited period of time. In principle, the same requirements should apply for both categories, but there is perhaps a tendency to be less restrictive in the case of project managers when it comes to leadership qualities since the specialist role is given high priority.

Production of services

Extensive rationalisation is also taking place in the services sector, e.g. in the Banking and insurance branches. Banking in particular has been going through a serious crisis throughout Western Europe since the end of the eighties. An article in *International Business* in 1990 entitled "Fired! Now, Europe is Singing the White-Collar Blues" predicted that tens of thousands of bank employees in Europe would lose their jobs and many already have. In the case of Italy, it was estimated that 10% of the country's 320 000 bank employees would be made redundant.

In sectors such as these traditional methods of rationalisation such as take-overs and mergers are being used, but there is also evidence of systems resembling lean production - or rather lean administration. In Sweden, the National Labour Market Board, the state agency responsible for employment issues, has made an assessment of what is happening in the field of Banking and insurance and of what is likely in the immediate future. It predicts that the mergers will continue, hastened by companies' need to rationalise costs. A fresh wave of computerisation is also in progress, meaning that more and more transactions can be processed via computer terminals in companies or in homes. This in its turn will cause the need for personnel to decline, particularly in the fields of administration and customer service.

The general view is that we are witnessing a division of the Banking and insurance markets into two main segments; a mass market with highly standardised products which can be marketed and handled without needing a lot of staff, and a market for qualified advisory services designed for both the corporate and private customer. It is this latter market which is growing. Advisory services in particular will mean staff will have to increase their sphere of knowledge. "They must master areas where savings, investments and insurances are regarded as part of a whole. They must also have a high level of social skills and the ability to communicate and transmit information in order to be able to manage their contacts with customers in a professional manner". In the Banking sector it is becoming increasingly common to have a "personal banking adviser" with a broad range of skills and who is able to handle entire operations.

In the insurance branch we note the same trend. Personal advisory services are becoming more widespread and personal insurance consultants are taking charge of customer service, sales and settlement of claims. This is in line with the principle of lean production; the customer deals with one person only, a person with all-round knowledge, who swiftly and efficiently accommodates the customer's needs. But, if these "all-rounders" are to be able to do their job in a qualified manner, they must receive assistance from specialists inside the company. In Sweden, there is another reason why the content of many jobs in the insurance branch is being broadened.

Insurance companies are going to be allowed to handle a certain amount of banking business and in connection with this new services which are a combination of insurance and saving will be marketed.

The Labour Market Board's report also predicts that it will be in local bank branches that we will see a trend towards posts with a broader content. The Gashier function will be integrated into other office routines, with employees working in teams and rotating between different duties.

A trend towards jobs with a broader content seems to be a general trend in this type of sector. An article in *Savings & Community Banker* in 1993 forecasts that as far as the USA is concerned the structure of the banking sector will be flatter; this has already meant that "the ranks of middle management are being trimmed dramatic-ally". But, at the same time responsibilities and powers are being decentralised and delegated to staff in the "front office", while job content is also being broadened. A number of banks are offering those in lower level jobs, women Gashiers and cus-tomer service representatives, extensive training opportunities. In the past, a bank employee would stick to one particular area, e.g. deposit accounts, and would then try to advance by climbing the career ladder. But, career paths have also changed. "career path straight to the top is becoming an exception. Compared to the past, the career progression for an institution manager today has more twists and turns. Yet there are new opportunities for broadening areas of expertise and acquiring new skills". In the future, careers will follow an up and down and sideways course.

The new trends are even manifesting themselves in the field of public admin-istration, at least in Sweden. There, it has previously been claimed that it is difficult to change traditional bureaucratic principles and organisational structures. We have seen that the jobs done by all categories of staff have been broadened in content and made more flexible so as to meet the need to increase productivity and improve service to clients - e.g. reduce the time spent an processing Gases and shorten wait-ing time. The Gothenburg City Court was quick to make changes in the way in which work was organised. When the time taken to deal with Gases at the City Court became inexcusably long and staff began complaining about serious shortages in resources, the response was reorganisation to permit Gases to be dealt with more quickly and without the need for extra resources. Duties were delegated by legal counsel to clerks and these clerks were given full responsibility, i.e. a clerk follows a Gase/brief throughout. In addition, barriers between clerks and legal assistants, which were having an inhibiting effect an productivity, were removed. By also introducing modern computer back-up productivity Gould be noticeably improved. This change meant job enrichment for most of the clerks and for the assistants, in particular (*Arbetsorganisation och produktivitet* 1991:193).

Are white-collar jobs being enhanced?

It is obvious that white-collar jobs in traditional branches such as industry, banking, insurance, transport etc. will decrease in number. At the saure time, there is plenty to indicate that the content of jobs will be enriched; this applies not least for the "first-live managers", although there are also signs of this among white-collar em-ployees

working close to production and among administrative personnel. Two large surveys have been conducted which point in that direction; one is American, the other is German.

Littek & Heisig's studies (1991) revealed that white-collar jobs in Germany have been through two phases since the sixties. The first phase lasted through the sixties and a bit into the seventies and led to deskilling of many white-collar jobs, particularly at the lower levels. This was caused by the introduction of new office technologies, but was mainly due to the fact that company managements put a lot of effort into "Taylorising" white-collar jobs. In some circles there was talk of "proletarianisation" of the white-collar corps. As a parenthesis it may be interesting to note that it was during this time that the employer organisations in Sweden tried to introduce piece-work rates for white-collar staff. Here, it was a question of white-collar staff at the lower rungs of the hierarchy. At most, some 20 000 white-collar employees were on piecework rates; these were groups of punching machine operators, order processors, invoicers and staff engaged in registration routines in general.

But, Littek & Heisig feel that this period was fairly short-lived, because according to them the main trend since the end of the seventies has been towards more qualified white-collar jobs. They claim that Taylorism reached its peak in the mid-seventies after 20 years of triumphal advances and at that point exhausted its potential. According to the authors, "most managers reported that they had to learn that strategies of fragmentation and deskilling of qualified workers had produced disadvantages for the level of performance. Low motivation to work occurred when high expectations were frustrated by low demands in work tasks. It was nearly unanimously reported in our interviews that the Taylorist restructuring of white-collar work had created more problems than it had solved."

As companies have developed their own internal customer-relationships systems, more demands have been made of a number of white-collar groups at the lower levels. In the case of plant office staff, for instance, many have now established a sort of customer relationship with blue-collar workers at the shop floor. They have been given "increased delegated responsibility and are more flexible and more highly qualified" in order to be able to carry out their duties more efficiently.

An American study (see Capelli 1993) has shown that between 1978 and 1988 blue-collar employees were in general given more qualified jobs. In the case of white-collar staff, there were two trends; white-collar groups whose jobs were much affected by new technologies (stocks controllers, wage clerks, office services staff etc.) saw their jobs become less qualified, while most others had been given more qualified jobs. In the case of secretaries, it was found that their jobs had been deskilled as a result of the new office technologies and word processors. "The skill levels of typists have apparently declined with the introduction of word processors". It is possible that this trend towards deskilling of certain white-collar jobs is a transitional phenomenon belonging largely to the seventies and the eighties. The German study and own experience indicate that the sequence of events was as follows: With the introduction of the new office technologies these jobs required less effort and the work itself became simpler. Initially, the staff affected did not have the skills necessary to be able to take on more qualified jobs. But, once routines have been computerised and once the new

market-oriented requirements begin to apply to increasingly large segments of the workforce, companies started making more stringent requirements of new recruits for administrative jobs or of existing members of the administrative staff in terms of training or further training. If we are to believe what Thomas H. Johnson has to say in his latest book, *Relevance Regained*, it is only those companies aiming at production adjusted to customer requirements and having a high measure of flexibility that have a future. However, according to him, a prerequisite is a total change in the way in which companies are run. Employees at the lower levels must be given more say and greater scope for continuous, on-the-job learning. "Top-down command and control information does not motivate the workforce to take actions that make companies responsive and flexible. Adapting flexibly to change requires constant learning and prompt action by those people in a business who are closest to the customer. Traditional accounting control systems assume that learning takes place at the top - far away from customers and processes - and that new knowledge is transmitted down in the form of instructions..... In competitive companies today, the *entire* workforce must be empowered to learn and act quickly. The power derives from ownership of 'bottom-up' information about what the customer wants and about the process people perform to satisfy those wants" (Johnson 192:4).

With the new market preconditions companies will thus not be able to afford to have unqualified "office staff" who only carry out specific, simple duties.

One of the reasons given by the American report as to why many white-collar employees have been given more qualified jobs is companies' growing tendency to listen to the customer; this also tallies with Johnson's observations. It is claimed that "the sharpest upskilling is for customer Service jobs, which may relate to new business strategies that demand higher levels of Service (solving problems, providing a wider range of service and so on) at the point of customer contact without passing the issues on to the bureaucracy".

Summary

The cornerstones of lean production are the new conditions governing the markets and saturated markets, customers with specific requirements in terms of choice of product and demands for rapid revamping of products. Companies must be quick off the mark and flexible (wide range of product variants) and offer good customer service. At the same time, the flexibility must be provided at a low cost, if they are to succeed in meeting these requirements. One implication of lean production is that companies must manage all types of resources sparingly; manpower, premises, time, investments in tools and machines etc. Lean production also means that sub-contractors, retailers and customers must be more closely linked to the production process. The aim in integrating sub-contractors is to shorten lead times and improve quality, while linking retailers more closely to the production process is designed to improve analyses of customer needs and requirements. The focus of interest in lean production is the customer and this means that companies endeavour to establish long-term relationships with their customers in addition to manufacturing what those customers want. Quality work is therefore an important ingredient in lean production. The production process means continuous flows of goods without stocks, interim stocks or warehousing facilities. The ideal is for production to start only once a product has been ordered by the customer, because then it is possible to apply the manufacturing principle of "just in time" to the full. If the principles of lean production are to succeed, i.e. adjustment to customers' needs, continuous flows, short lead times and high quality in both products and processes, employees on the shop floor have to be versatile, be able to take on responsibility and be capable of communicating with those around them both in the plant and outside. The main trend for plant employees is towards enrichment of the work they do. In addition to the traditional duties they are increasingly being given tasks involving inspection, planning, production engineering and administration (wages and timekeeping). It is becoming more and more common for them to be involved in work improvements and to be in contact with customers and sub-contractors. The traditional type of operation-oriented management is playing an ever declining part, being replaced by objective-oriented management.

In the case of white-collar employees close to the production process the main trend is towards a broadening of job content and towards bringing them physically closer to the actual manufacturing process. It is now more common for them to even participate in work on the shop floor. This gives them a better overall picture and they have the opportunity of being involved in entire processes or large part-processes. These occupational categories are increasingly required to be capable of communicating with those around them. They are also participating to an growing extent in project work designed to improve systems and processes. It may be true that many white-collar employees do not themselves feel that they are enhancing their skills on the job; most of them nevertheless do so in the long run, since they have to work on the shop floor or close to it.

Most other groups of employees in industry (supervisors, administrators and some specialist staff), but even in service branches such as banking and insurance are finding that the contents of jobs are broadening. However, it is not just a matter of their being able to carry out a longer list of duties, but also of participating more in the

process of change. Further, it also seems as though with objective-oriented management they are expected to take the initiative more in relation to customers and sub-contractors.

Lean production in the perspective of the work process is a lot about tearing down barriers and shortening lines of communication. The barriers needing to be torn down are those existing between different functions such as design, production and marketing, between different categories of employees, i.e. blue-collar and white-collar workers, and between different groups of blue-collar and white-collar employees respectively. This trend has caused companies to start insisting more and more on industrial unions and on all employees being subject to the same terms of employment and remuneration.

The corporate move towards flatter structures and new approaches to organising work have led to new careers for many groups of employees. Individual white-collar employees make a career for themselves by taking on more duties and by working on e.g. development projects. But, this growth in the scope of positions takes place without the employee in question becoming a specialist or being promoted to a managerial level, although this does not mean that the old career paths no longer exist - they have merely become narrower.

But, lean production is not without its problems. One question which has been the subject of much discussion is whether it impoverishes job content. It probably does for some groups, at least in the short term. However, in the longer term the great majority in industry and in the services sector will probably find that they have broader and more interesting jobs. In the services sector - the five-dollar-jobs sector as it is sometimes called in the USA - (laundries, cleaning firms, restaurants etc.), which is an expanding sector in many industrialised countries, trends are however quite different. But, this is an issue we shall not discuss here. Another problem which has been highlighted is that stress is increasing for different groups of employees who have been given increased responsibility and authority, but who traditionally were not used to this. But, this is a problem which should be taken fairly lightly because this kind of stress need not be negative and goes with enrichment of jobs.

Another short-term problem is that lean production has a tendency to increase unemployment levels. The need for manpower declines in the traditional branches of activity, while production volume may at the same time increase. Improvement in employment levels must therefore come via jobs in new and possibly more person-intensive areas.

A major problem inherent in lean production is the tendency towards under-staffing. The old production systems used stocks as buffers for balancing supply and demand to a certain degree, but in lean production stocks cannot be used as a buffer. Only with the help of the amount of work on hand and working time input is it possible to handle variations in demand; this can be done either by taking on new staff or through overtime. As companies want to keep pay costs low, they have a tendency to go for under-staffing, often when demand is normal. This means that there is a very heavy work load on employees in periods of economic boom or peak demand and that they

have to work a great deal of overtime . But, under-staffing can have negative effects on productivity, since it can lower employees' level of motivation.

The emergence of lean production is an irreversible process. More and more companies will to a greater or lesser degree be gearing their operations to the principles of adapting to customer needs, flexibility, short lead times and rationalisation of costs. There is also much to indicate that increasingly large numbers of employees are being given increased responsibility and increased authority on the job. But there is no absolute logic governing the shape taken by these jobs in the future. Even though there seems to be a main tendency, the scope for variations is extensive. For example, there are many company managements who will not adapt to the new production methods for reasons relating to power politics or for other reasons. They will cling to the old ways for as long as possible and this is why it is so important for union organisations, branch organisations and others to push for jobs which help the employees enhance their skills under conditions which keep them motivated while doing so. This is what will produce efficiently run, competitive companies.

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