UNIVERSITY
LEKE
UNIVERSITEIT
BRABANT

POSTBOX 90153
5000 LE TILBURG
THE NETHERLANDS

[redacted]

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RESEARCH MEMORANDUM

TRICKS AND TRUCKS: TEN YEARS OF ORGANIZATIONAL RENEWAL AT DAF?

Freek Aertsen and Jos Benders

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Tricks and Trucks:
Ten Years of Organizational Renewal at DAF?

Freek Aertsen

Tilburg University
Department of Business Administration
P.O. Box 90153
NL-5000 LE Tilburg

tel. +31.13.662315
fax +31.13.662875

Jos Benders

University of Nijmegen
Department of Business Administration
P.O. Box 9108
NL-6500 HK Nijmegen

tel. +31.80.612028
fax +31.80.611933

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1. Introduction

'Lean production' (Krafcik 1988) is one of the latest best-selling management concepts. The need to reorganize according to the principles of lean production is even presented as being self-evident, as employers and employees alike are assumed to profit from its beneficial effects (Womack, Jones and Roos 1991). To what extent, however, does this concept represent a break with former traditions? Is lean production (LP) merely a new label attached to a mix of already existing practices? In other words *does LP, as a prescriptive and idealtypical approach to organizational structuring, present a break with more traditional ideas, or is it merely a fad?* This question was answered by means of a literature review.

The second question addressed is *does lean production constitute a new approach for a particular organization?* What is its actual impact? These questions were addressed by means of a case study of DAF Trucks. DAF Trucks was chosen for two reasons. Firstly, DAF Trucks seemed to have embraced LP. One of the main gurus of LP, professor Daniel Jones had visited the company. The popular press as well as a scholarly journal (Nuys 1993: 113) mentioned DAF as one of the Dutch examples of a company in which LP was being implemented. Secondly, presumably, there was a plan to convert the traditional labor organization into a structure based on independent work teams, a reduced number of hierarchical layers and the integration of indirect tasks into direct work. Such a transition sounds familiar, especially in case of DAF: the company had initiated many organizational renewal projects in the last decade. In particular with respect to previous changes in the work design, DAF's conversion to LP was remarkable as earlier reorganizations were motivated by Dutch sociotechnical thinking which, at face value, seems to prescribe the opposite of many of the prescriptions of LP. Before answering the second research question Modern Sociotechnology (MST) was compared to the LP concept. This comparison is presented in section 3. Preliminary results of the case study and the answer to the second research question are presented in section 4.

2. Lean production

The book 'The Machine That Changed the World' (Womack *et al.* 1991) made 'lean production' popular. The term was invented by researchers of the International Motor Vehicle Program, which was initiated by researchers of the Massachusetts Institute of Technology. Researchers from many countries participated in this five-year project, covering ninety car assembly plants worldwide. The study distinguishes between two groups of manufacturers. The 'good guys', the lean and generally Japanese manufacturers, perform better in almost every aspect than the 'bad guys', mostly the traditional mass producers in the United States of America and Europe. However, the latter are not lost because they can still transform their organizations into 'lean' organizations by copying the good guys'' methods. The only alternative is bankruptcy.

However, Womack *et al.* (1991) are rather vague in their description of LP as far as the work organization and factory practices are concerned (cf. Jürgens 1992: 25). Essentially, they discuss the Toyota Production System in the car industry, as Jones (1990: 6) and co-researcher Lamming (1993: 32) acknowledge. This Toyota Production System fulfills a leading role even in Japan (Womack *et al.* 1991: 68), and is the result of several decades of continuous development (Ohno 1988). As it is beyond the scope of this article to describe this process in detail, only these parts of it are discussed which clarify the main line of the argument.

One of the main elements of LP involves automatic fault detection. Machines are equipped with devices that stop the machine automatically as soon as one defective product has been produced. Such devices are called *jidoka*. They were invented by Sakichi Toyoda in 1902 (Toyota Motor Corporation 1992: 4). Toyoda invented a loom which stopped automatically when a thread snapped. This principle of automatic machine stoppage is currently being applied to 'nearly every machine that we use in the Toyota Production System' (Toyota Motor Corporation 1992: 5). A second main element concerns the just-in-time system, which was envisioned by Sakichi's son Kiichiro before World War II (Toyoda 1987: 57-58). The system was further developed

by Toyota engineer Taiichi Ohno, who experimented with 'pull systems', in which subsequent lines pick the items needed from the preceding line. *Kanban* cards play a vital role in this process, providing information on how much of each item is needed. The goal is to create continuous flow production as it is essential to group machines conducting subsequent operations in such a way that the transport of work-in-process is brought back to a minimum. Preferably, a line lay-out is used with so-called 'U-forms' as alternatives (Ikeda 1991). Buffers are eliminated wherever possible. The traditional balancing problems in line manufacturing are resolved by adjusting the cycle time (*Takt time*) to demand.

Ohno also fulfilled a pioneering role in the development of a third major element, quick die changes. The limited budget Toyota had available for capital expenditures around 1950 and the small scale of operations led him to work on methods of changing dies, which makes possible the economical production of several products on a single production line (Womack *et al.* 1991: 52-58). Well before 1980, Toyota had significantly reduced switching times (Sugimori *et al.* 1977). As the new techniques were easy to master, Ohno hit upon the idea of letting the production workers, who were idle during die changes, perform these die changes as well.

The new production logic proved to be less costly than the then dominant practices since inventory carrying costs were slashed and quality defects showed up more quickly. As with *jidoka*, this principle led to a quick detection of faults, and thus to a reduction of waste and repair expenses. For the same purpose, various techniques were developed in order to allow workers to intervene if they detected defects. Furthermore, unlike the conventional American mass production system the evolving Toyota Production System made possible the production of a number of different products at low cost.

Another essential item is the stress on continuous improvement or *Kaizen*. Production workers are expected to think of improvements with respect to productivity, quality, and their working environment. The employees gather in so-called 'small group improvement activities' (SGIAs), which is 'Toyota's name for what are also known as quality control circles' (Schonberger 1982: 30). Originating in the USA (Milkman 1992: 164), such group activities started in the Japanese steel industry in the second half of the

1960s under the name of *Jishu Kanri* (Sugisawa and Hirose 1977: 523; Sugita 1989: 262), and spread to other branches during the 1970s and 1980s. Thus, QCs were introduced relatively late in the evolution of the Toyota Production System. QCs use a variety of techniques, some of which were introduced by Americans as early as the 1950s, including the classic time-and-motion studies done in Scientific Management (Coriat 1992: 128), and Statistical Process Control.

Teams are often singled out as the most important factor in explaining the success of Japanese production (Womack *et al.* 1991: 99). They are formed in all functional areas, including the sales force. Team members are supposed to gradually learn to master all tasks within the team's area of work (see for example, Mueller 1992). A broad deployability is strived for which is relatively easy in the assembly stage as assembly tasks are often easy to learn (Benders 1993).

The crux of the argument here is that the Toyota Production System is the result of a long trial-and-error process during which manufacturing techniques were imitated from other domestic firms (for example, *Jishu Kanri*) or from abroad (Statistical Process Control), and combined with spontaneously emerged (*jidoka*), and\or consciously developed (*SMED*, JIT-system) manufacturing techniques. Ultimately, these became the system that is now known as the Toyota Production System. The role of Toyota's leading engineer Ohno, who envisioned a smoothly operating production process in which the individual elements had to fit, must not be underestimated. Furthermore, the Toyota Production System is still evolving (Toyota Motor Corporation 1992: 53). This developmental perspective is important in that it shows that the system may be a less coherent whole than is often assumed. Many of the techniques do support each other (Alders 1993: 39), yet there is always room for improvement.

In a similar vein, individual elements of the Toyota Production System can be used and integrated into a production system, geared to the requirements of a specific production process. Examples include Kawasaki's motorcycle plant (Schonberger 1982) and the Canon Production System. The same principles are applied in other production processes that can be classified as repetitive manufacturing of discrete products (Young

1992). In this respect, one can speak of a 'Japanese production system' in the sense of a balanced, yet continuously evolving, system of concrete production techniques which are applied to a specific production process. Yet, before one takes too idealistic a view of things it should be kept in mind that in reality, these systems may also form a model in Japan (Wood 1991).

Many of the individual elements mentioned above (as well as the production system as a whole) have been described in numerous publications. Although earlier publications are known (for example, Sugimori *et al.* 1977), the first large wave of literature on Japanese management techniques appeared during the first half of the 1980s (Monden 1983; Schonberger 1982; Shingo 1983). These publications in English brought Japanese manufacturing techniques to the attention of a broad public. Thus, with respect to manufacturing, LP can hardly be called new. The relabling of the Toyota Production System as LP by Krafcik (1988) and Womack *et al.* (1991) seems to have had a substantial impact on the popularity of these already known techniques with firms in the West. The contribution of their work is twofold. Firstly, based on quantified data they pointed to the superior performance of LP above traditional Western practices in the final assembly of cars. Although it is remarkable that the existence of this performance gap was not realized sooner, its quantification seems to have had a dramatic effect on the appeal of LP techniques. Secondly, Womack *et al.* gave attention to functional areas other than manufacturing, which has traditionally been the prime subject of research. LP includes the design and sale of cars as well as supplier relations. Yet, the description of lean assembly in 'The Machine That Changed the World' is far from clear and other sources, which were often published earlier, give a better description of LP than the book which gave the term its popularity and faddish appeal.

3. Modern Sociotechnology: Is it different from lean production?

The empirical part of this article contains a case study of DAF Trucks. Since 1982, DAF has initiated a number of organizational renewal projects, many of which have been based on the ideas of Modern Sociotechnology (MST). The main premises of MST are discussed in the first part of this section. The second part contains a comparison of MST and LP.

3.1 Modern Sociotechnology

The first Dutch sociotechnical field experiment was carried out in 1965 in a cheque-clearing organization (van Beinum *et al.* 1968). It was influenced by sociotechnical theories, and conducted with involvement of the Tavistock Institute. Besides some scattered earlier field projects, the approach really got off the ground through important theoretical work by de Sitter and his associates at Eindhoven University of Technology (e.g., de Sitter 1974a and 1974b; van der Zwaan 1975). The lack of a sound theoretical foundation was felt to hinder the development of sociotechnical work. A theoretical and thus transferable systematic approach had to be developed. Although the approach is quite complex and several variants are applied (Buyse 1987; Groep Sociotechniek 1986; Kuipers and van Amelsvoort 1990), an attempt is made to sketch its major principles, based on an summarizing publication by de Sitter (1989).

MST involves a number of steps, aimed at certain design parameters. Although attention is given to employee participation, these prescribed steps need to be strictly adhered to. The first step is 'parallelization of the production structure', the clustering of products into groups. The aim is to reduce the variety of product flows by creating independent parallel flows, preferably corresponding to market combinations. The MST design process is, therefore, top-down. The second step involves the 'segmentation of the production structure'. The operations necessary for the formation of the product groups are clustered into segments in order to reduce the number of interfaces between the segments. By assigning all supportive and preparatory tasks to the segments, the

number of interfaces is further reduced and the segments can function (relatively) independently of other segments. In the third step, so called 'whole task groups' are formed, which are to carry out all tasks within a certain segment. In the ideal situation, all group members ought to be capable of fulfilling all of the tasks which may possibly occur. The next step involves the design of the control structure. The reduction of the number of interfaces in the previous steps leads to a reduced need for control, as it is no longer necessary to manage a substantial number of interfaces. The remaining control functions are assigned to the task groups, enabling them to cope with problems on their own. The control structure is designed bottom-up, assigning control tasks as low as possible in the organization. The same approach is used for the design of individual jobs. In MST job content is viewed as being the most important element of the 'quality of working life'. A job should consist of executing tasks as well as those controlling tasks, that are relevant for the execution of the executing tasks. The individual must have sufficient job decision latitude in order to make decisions concerning his own work process. Furthermore, there must be sufficient variation in the task structure of jobs.

An important claim of MST is that it is aimed at an 'integral design'. All aspects which are relevant to the new organization design are taken into account, instead of the focus being on one specific aspect. Rather than focusing on the improvement of jobs characterized by low work content, MST sees the traditional fractionized organization as the root of these problems with respect to both organizational functioning and work content. Although the approach may have been and still is advocated primarily because of the resulting job improvement (Pot *et al.* 1991), its goal is broader than just the 'quality of working life'. MST's goal is organizational design of which job design is just one part.

3.2 A comparison of LP and MST

LP and MST are both design-oriented approaches. As such, both are idealtypical, and 'pure' applications of either one of these approaches are unlikely to be encountered.

Yet, the logic behind both approaches does have its influence on the design of actual production systems (Scarbrough and Corbett 1992; Benders 1993). This is reflected in the application of the elements, c.q. techniques, of which the approach consists. Therefore, idealtypical images of both approaches are compared.

Table 1 contains some key elements of LP and MST, based on the idealtypical descriptions presented above.

TABLE 1 ABOUT HERE

An explicit comparison of the elements of LP and MST, in which differences and similarities are made more clear, is provided in Table 2.

TABLE 2 ABOUT HERE

It follows from Table 2, that both design approaches are compatible in some areas, but are fundamentally at odds in others. The fundamental differences can be explained as relating to the different goals: unlike LP, MST stresses the quality of working life as an explicit goal to be achieved. MST's approach to job design is incompatible with LP: MST is aimed at making workers and working units more independent, enabling them to solve problems as much as possible at the local level. LP, on the other hand, creates maximum dependency, stressing that decoupling tends to obscure problems. Furthermore, LP can be regarded as a refined version of Taylorism, as it employs many of the same techniques, for example, time and motion studies and standardization.

Organizational performance is stressed in both approaches, though MST also emphasizes the importance of the quality of working life. Whereas LP stresses the elimination of buffers in order to make quality problems visible and lower inventory costs, MST sees buffers as essential to decoupling individual workers from the pace of the line. In the MST logic, eliminating buffers is detrimental to worker autonomy, something that is not seen as problematic in LP. The views with respect to buffers and worker autonomy

are undoubtedly one of most critical differences between LP and MST.

Furthermore, LP strives toward standardization and short cycle times; the latter ensures that quality defects will show up quickly, whereas the former allows other workers to take over their tasks without requiring extensive periods of learning. Though their importance is acknowledged, it is striking that MST lacks an explicitely worked out vision with respect to the logistical concepts, orientation to quality and orientation to improvement. With respect to the labor organization, both emphasize team work, with LP aiming for maximum deployability of team members and MST allowing for specialists within teams. This difference is included in Table 1 by following the German distinction between teams and groups (Dankbaar 1988: 169-176; Eichener 1991).

Overall, LP covers more aspects than MST, but the latter approach is largely sympathetic to the former's standpoints on these issues. Finally, MST is theoretically more solid, whereas LP was developed with more pragmatic considerations in mind.

In conclusion, LP and MST show many similarities, but the partial difference in goals does have an effect on their positions concerning buffers and worker autonomy. In practice, one may find organizations striving to introduce elements shared by both approaches under one of either flags. Yet, any research into the actual effects of introducing these approaches will need to concentrate on the basic differences. Otherwise, it will be impossible to discriminate between the two approaches.

4. Continuous reorganization at DAF

DAF is a Dutch truck producer. Its two major manufacturing plants are located in Eindhoven and Westerlo (Belgium). This article concentrates on the manufacturing facilities in Eindhoven because the events in this part of the firm are documented most elaborately and because it forms the heart of DAF's manufacturing facilities.

The company experienced substantial financial difficulties in 1991 and 1992. DAF was able to continue its operations albeit in a more modest form partially because of support

provided by the Dutch and Flemish Governments. This unfortunate course of events meant that the normally very open company was no longer accessible; data had to be gathered via indirect sources and existing material. These include official company records, a large number of master's theses written at several universities, and articles written by (former) DAF employees. Interviews with managers and persons known to have been involved in reorganization projects were conducted, as well (cfr. Vloet 1993). By corroborating the interview data with the information from other sources and by confronting the interviewees with the interpretation the quality of the data was secured.

In the following, DAF's program 'Quality of Working Life and Organization' (KvdA\O) is discussed. Next, DAF's approach to LP is dealt with. At the end of this section some general conclusions are given concerning the impact of both programs.

4.1 'Quality of Working Life and Organization' (KvdA\O)

After an internal study had been completed, DAF started the program 'Quality of Working Life' (*Kwaliteit van de Arbeid* in Dutch, commonly abbreviated as 'KvdA') in 1982, rebaptized 'Quality of Working Life and Organization' or 'KvdA\O' in 1986/7. Mr. Frank Sweens, responsible for Social Policy and a member of DAF's board of directors since 1977, was a driving force in setting up, sustaining, and developing the program (Cuppen 1990). KvdA\O was heavily influenced by MST as can be seen in DAF's official documents, which make extensive use of MST-jargon. DAF was also an important consumer of externally produced sociotechnical courses. Furthermore, many students from the nearby Eindhoven University of Technology's Department of Industrial Engineering, where at that time MST's most prominent proponent De Sitter held a chair, conducted graduation projects at DAF.

The basic tenets of the programm were the following:

1. production workers determine to a very important degree product quality and production costs;
2. the educational level in society at large, and therefore of labor supply is rising,

which has led to higher demands being placed on the level of the work content;

3. production automation demands for independently functioning workers rather than 'button pushers'.

The existing Tayloristic organization was characterized by the separation of 'thinking' and 'doing', rigid mechanization, many hierarchical layers, and functional departmental structures. The program aimed at resolving the dysfunctional effects of this method of organization by creating 'cells', i.e., teams of workers responsible for a rounded-off part of the production process, integrating direct and indirect tasks, delegating control tasks as much as possible, and requiring the installment of *DAF-kringen*, DAF's equivalent of quality circles (DAF 1989: 8). In the beginning of the 1980s, some other projects were started as well, namely Flexible Production Automation, Total Quality Control, and Kanban (Willenborg 1987: 79-80).

On the one hand, the KvdA\O program was not uncontested within the organization. Peters (1986: II: 7-16) illustrated this point when describing the introduction of CNC-machines in the Motor Factory. He mentioned plans for assigning indirect tasks such as machine setting, quality inspection and some planning tasks to production workers, but he also remarks, that the progress was modest and that not everybody saw links between the implementation of CNC-machines and the quality of working life. On the other hand, however, respondents characterized DAF as an organization which was open to and even stimulated innovations of all kinds, including the KvdA-program. It was described by various respondents as 'one large and ideal garden of experimentation'. Departmental managers enjoyed a relatively large degree of freedom in carrying out experiments, which made the progress of the program dependent on bottom-up initiatives. By 1986 cells were operational in a number of different departments (Peters 1986). One of the major projects concerned the reorganization of two parts of the final assembly line (van Eijnatten et al. 1987). This project was rather typical of DAF's approach to sociotechnical reorganization, i.e., participative and pragmatic. Sociotechnical principles were applied as far as the existing structural and political situation allowed. However, the emphasis was on quality of working life rather than on structural measures concerning organizational design.

The KvdA\O program stagnated in 1987 because of production-technical reasons (logistics, the introduction of a new product, production increases, and a reorganization project) and the 'lack of general support' (DAF 1989: 8). In 1987, a new department 'Quality of Labor and Education' was founded as part of manufacturing operations. This department was to give the program a new impetus. One of its actions consisted of writing an informative brochure about the program. About the programms' stagnation it states (DAF 1989: 12):

> Organizing in processes (KvdO) is a top-down approach; improving KvdA has up till now been a bottom-up approach. Both approaches can be applied separately, but in the longer run both are necessary. KvdA without KvdO is restricted by departmental boundaries. KvdO without KvdA leaves human potential unutilized and does not achieve the desired levels of flexibility and controllability.

Probably the most elaborate project of that period consisted of a complete reorganization of the Motor Test Hall. This showcase (Buyse and Verlaar 1990; Verlaar and Buyse 1990) was started in the middle of 1987 and lasted until the beginning of 1990. In that respect, it was typical of the sociotechnical approach at DAF. The changes not only involved a structural reorganization, but also, even more radically, changed employees' attitudes and behavior. This process dimension of the reorganization was seen by the program's advocates as perhaps the most essential part of the reorganization. Yet, the approach remained limited to various parts of the factory, mainly in job shop environments, and some staff departments. 'Many experiments were conducted, but some were turned back as well.' Obviously, there was resistance within the organization from those persons whose jobs were threatened, i.e., lower and middle managers and indirect personnel.

In a speech delivered in September 1988, Sweens (1988) acknowledged the existence of internal resistance, but was rather optimistic about the progress so far and in the future: the project 'sold itself', and some 60 cells were already operational. However, on February 18 1989 Sweens passed away, unexpectedly. With that, support for KvdA\O on the Board of Directors ended as well. Although there had hardly ever been open resistance to the program, the badly needed active support was often absent. The

project slowly died, as one of the respondents put it. Furthermore, 'technicians viewed the program as a soft approach'. Its advocates tried to revitalize the program by pointing to its economic advantages. While it was repeatedly stated that the experiments paid off handsomely, cost-benefit ratio's of a conservative 1 to 2 (Sweens 1988; DAF 1989: 11) to even 1 to 5 (DAF 1990: 22) being stated, other sources mentioned the practically insurmountable difficulties in establishing the exact economic effects of reorganization projects (Bell 1990). An internal memo from the KVDA\O department summarizes the achievements of various internal projects in an attempt to legitimize sociotechnology 'without having the illusion that the main question was being answered'.

In conclusion, DAF's KvdA\O program consisted of a number of scattered experiments, which were conducted during an eight year period. It enjoyed the full support of top manager Sweens, but was not uncontested within the firm. DAF being an open organization favourable to innovations, the program's progress was dependent on the initiatives of individual middle and lower managers. There have been successes, but almost exclusively at the lower levels of the organization. The necessary full support of top management and an overall sociotechnical vision, needed for larger scale results, were lacking. Favourable financial data could not change this situation.

4.2 Lean Production at DAF

The first signs of attention to lean production within DAF date back to the second half of 1990, a time at which DAF started experiencing financial difficulties. An article presented by D. Jones at a conference at Warwick University in May of that year (Jones 1990) was distributed within DAF. LP drew the attention of Mr. Klaasen, member of the Board of Directors and responsible for manufacturing. Soon, top management embraced LP: 'LP was the only idea that got the Board enthusiastic in ten years time', according to one of the respondents. This enthusiasm probably had much to do with DAF's financial difficulties, which might have been resolved by enhancing performance

through the introduction of LP. As such, the coming implementation of LP served as an indicator to banks that DAF was working seriously on its problems. DAF became increasingly dependent on the banks for a continuous supply of short-term loans.

One of Klaasen's cooperators was given the assignment of introducing LP in the organization. He even hired Jones to give a lecture to DAF's management in the beginning of 1991. LP's main, and according to some respondents only, feature was 'head count reduction' to cut costs. DAF had too many (eight) hierarchical layers and staff departments. The KvdA\O program had been able to reduce the number of layers, but with its *de facto* bottom-up approach, it failed to have an impact on the higher levels of the organization, where new layers and departments had been formed simultaneously with the implementation of sociotechnical ideas at DAF's lower levels. This partly explains why a national newspaper reported in the beginning of 1992 that DAF had to change from a bureaucratic mass producer, where 'employees are busy eight hours a day with only a small part of mass production', to an organization with 'independent groups of DAF employees working together on a total product' (Horsten 1992).

The head count reduction was pursued rigorously. The man in charge reportedly had as his motto: 'I shall eliminate every job of which I do not understand the job description'. During a public discussion in September 1992 Klaasen announced that the first landmark had been reached in the beginning of 1992 and that DAF would be 'lean' at the end of 1993. The 1991 annual report contains similar statements: DAF was implementing a 'lean enterprise culture' in all aspects of the organization' (DAF 1992: pp. 4 and 39), which in manufacturing 'has led to a new organization structure for the 1990s, that already has been partially implemented, with a reduced number of management layers, team working and an integration of direct and indirect staff' (DAF 1990: 14).

An important difference with the sociotechnical approach was that LP aimed at eliminating the lowest managerial level of 'work masters'. These had been made the spearpoints of the sociotechnical approach. A second important difference between the two approaches concerns the time reserved for implementing them. Whereas the

sociotechnical approach was characterized by a slow and gradual process of organizational change, LP was to be implemented fast. Not surprisingly, the stress was on directly visible elements. Yet, 'one had understood LP's slimness, but failed to understand its suppleness'. A salient example illustrates this point: although the sales forecast had been adjusted downward twice in 1992, Klaasen refused to cut back production because that would make the factory's efficiency look bad (Reijn 1993).

Yet, there were similarities between LP and MST too. As indicated in the former section, LP and MST have much in common. Elements mentioned within DAF include the stress on flow production, team working and fewer hierarchical levels. In an MBA-thesis it is stated as follows:

> 'Sociotechnique has strong resemblances with Lean Production [...] which fits into DAF's endeavors to achieve a "lean" organization structure' [...]
> and
> 'DAF strives for Lean Production. This means, among other things, organising in independently operating task groups with a large self-organizing capacity' (Grabert 1992).

This indicates that especially LP's team concept was little understood: whereas Japanese teams have little freedom once work procedures have been established, here the emphasis is on typical elements of sociotechnical teams such as 'self-organizing capacity' and 'independent task-groups'.

The perceived similarities between LP and MST, together with a lack of detailed knowledge about the exact contents of both approaches, made it possible to carry out sociotechnically-inspired projects under the label of lean production. Furthermore, for the more structural projects, the experience with change processes that had been built up with the sociotechnical program proved to be of good use. At the same time, projects were carried out that clearly fit into the lean production philosophy, such as a 'Single-Minute-Exchange-of-Die' project for the heavy presses (Vroomen 1992). But these were isolated projects started by individual DAF employees without being incorporated into a larger 'lean' design philosophy.

At DAF, lean production was mainly used to cut personnel costs. LP was important to

secure bank support. Yet, its underlying design philosophy was hardly understood, let alone followed.

4.3 Interpretation

In section 3 it was concluded that LP and MST as idealtypical concepts have many similarities. This conclusion acquires a new dimension in the DAF case. Whereas this conclusion has a strong objectivistic character in section 3, the DAF case shows the importance of the perceptions of individual organization members about the content of both concepts, i.e., a more subjectivistic approach. From an objectivistic point of view, one can conclude that throughout the 1980s, many projects have been conducted that would now be recognized as 'lean production', a term which had not yet been coined at that time. These include the KANBAN en TQC projects as well as the *DAF kringen*, but also successful attempts to implement just-in-time production in final assembly and to reduce the number of suppliers (van Empel 1985). Such projects were carried out along 'pure' sociotechnical projects. Here, 'pure' is meant to denote that many of these non-sociotechnical projects fit in nicely with sociotechnical thinking, but cannot be seen as part of a sociotechnical design philosophy.

The sociotechnical program, however, was contested within the organization as shown, among other things, by the program's stagnation in 1986/7 and the lack of support after Sweens' death. At the risk of being speculative, the main reason for this is the KvdA\O's soft image, which did not fit DAF's organizational culture, which has been described as pragmatic, straightforward, and a-theoretical. The attempts to justify the program financially proved insufficient to overcome this controvers. Lean production, on the contrary, proved to be appealing precisely because of its promise of fast financial gains, especially in DAF's precarious financial position. The quantitative material summarized handsomely in the easily accessible book, 'The Machine That Changed the World', must have suggested an easy, yet drastic road to recovery. The main action taken under the flag of lean production, however, was 'head count reduction'; a plan to design the organization based on 'lean principles' was not present

(or was not encountered), which is not surprising given the book's vagueness about the actual work organization. Yet, as far as the work organization is concerned, no moves seem to have been made in the direction of LP's idealtypical work organization.

Although there were at least two main differences between MST and LP, their many similarities and the insufficient comprehension of especially LP as an idealtypical concept made it possible for essentially sociotechnical ideas to be pursued under the faddish flag of lean production. The vagueness of LP allows different people to interpret the concept in a different way, or even consciously use the term to cover ideas which are at odds with an idealtypical version of lean production. The picture of DAF's manufacturing facility in Eindhoven during the last decade that results is one in which local initiatives have changed parts of the organization. However, a dominant and widely accepted view with respect to organization design has not been able to set through.

5. Conclusions and discussion

The basic question underlying this article is whether or not LP can be considered to be a fad, a question that can be answered at two levels. Firstly, does lean production provide new theoretical insights? Secondly, does lean production constitute a new approach for a particular organization, namely, DAF?

With respect to the first question, it was concluded in section 2 that LP is nothing more or less than the Toyota Production System, which was gradually developed over several decades. Through various publications it had become known in the West roughly in the first half of the 1980s. The book which made LP famous is rather vague in describing the exact working of the Toyota Production System. Nevertheless, the well-chosen adjective 'lean' in combination with the elaborate quantitative data which proved LP's superior economic performance to many proved to be appealing to managerial and academic audiences alike. A factor which may have made this fad popular might be the economic recession in the beginning of the 1990s, which made

management look for solutions to overcome the crisis. Whether or not this suggestion is correct, LP is clearly a fad and does not provide new insights as a prescriptive design--oriented approach.

The second question was investigated by studying DAF Trucks, a firm judged to be of special interest as it was known to have promoted Modern Sociotechnology, an approach to organizational design which, at face value, differs drastically from LP. To answer the second question, it was first necessary to make a more thorough comparison of the idealtypical design-oriented approaches of LP and MST. Otherwise, there would have been no norm by which to judge the events at DAF.

From the comparison of LP and Modern Sociotechnology, it was concluded in section 3 that as idealtypical concepts they have much in common. LP covers more different functional areas and is more pragmatic than MST, but in these aspects MST is sympathetic to the ideas of LP. The main difference is the approach to 'quality of working life'. This item is ignored by LP, whereas achieving a high quality of working life is one of the goals of MST, next to organizational performance. This partial difference in goals had important consequences for the views on structuring work. Thus, there are both similarities and differences between LP and MST. In order to judge whether or not DAF, as an individual organization, had decided to embrace a totally new approach, it was decided to concentrate on the key differences between both approaches.

In section four, a brief overview of the contents of both approaches as far as DAF concerns was given. From the viewpoint of LP as a fad, several conclusions can be drawn about its impact within DAF. Firstly, many elements of LP had already been introduced successfully by the beginning of the 1980s, when the first big wave of attention for what was then known as 'Japanese manufacturing techniques' occurred. Secondly, DAF's management was quick to apply LP, but, as had been the case during DAF's sociotechnical period, did not depart from an overall design philosophy. Instead, LP was used in the first place to fire personnel in order to cut back labor costs. The faddish appeal of and wide-spread attention given to LP served as a powerful legitim-

ator for this head count reduction. Thirdly, except for the reduction of the DAF workforce and its effects on the organization, DAF's LP period does not seem to constitute a drastic break with past practices. Because the nature of LP is little understood within the a-theoretical firm DAF, it is possible to carry on sociotechnical experiments under the new label of 'lean production. If this conclusion is true for other organizations as well, the development of hybrid systems, combining Western and Japanese elements leading to the creation of 'lean' production systems which are acceptable to Western standards (Alders 1993; Young 1992), may lose much of its relevance as such hybrid systems are created more or less automatically in practice.

What might be the importance of fads for organizational change? Organizations can be viewed as continuously evolving entities. Organization members may all have their own ideas about what changes are necessary. A fad, especially if it has the support of top management, may serve as a powerful legitimator of certain proposed changes because it promises improvements in organizational performance. To the outside and inside world, improving organizational performance is a rational way to act (Meyer and Rowan 1977), although it may be far from clear where the organization is heading. In particular if the actual content of the fad is little understood, individual organization members may all interpret it in their own fashion (Scarbrough and Corbett 1992) and use it in a way that fits their own ideas. As is the case with lean production at DAF, the specific interpretation of a fad's content is more important than its idealtypical content. This is to a greater extent the case when a clear and dominant view on organization design is missing and when individuals are given a large degree of freedom to conduct experiments within the organization. It remains to be seen, however, whether or not the performance of the resulting organization will improve. Fads may be used in a fashion that leads to improved organizational performance, but the reverse may also be true (cfr. Guillén 1993). Thus, the 'value added' of a fad may lie in its role of gaining support for organizational changes in general rather than in its content.

Table 1 : Key Elements of LP and MST

Characteristic	LP	MST
Goal	Organizational performance	Organizational performance; Quality of Working Life (QWL)
Organizational design	More or less coherent evolving set of techniques	Explicit approach
Worker deployability	Maximum	Optimal
Cooperative form	Groups	Team
Worker autonomy	Limited	Extensive
Flow production	Yes	Yes
Lay-out	Line or U-form	Group
Use of buffers	Have to be eliminated	Absolutely necessary to decouple
Machine-paced work	Yes	No
Logistical concepts	Pull system: JIT, *Kanban*	Not included in approach
Orientation to quality	Pervasive, among others, *jidoka*	Sympathetic, yet implicit
Standardization	Strongly emphasized; time and motion studies	Not included in approach
Orientation to improvement	Kaizen; SGIAs	Not included in approach; but sympathetic
Cycle time	Short	Long

Table 2 : Similarities and differences between LP and MST

Characteristic	LP-MST
No difference	Flow production
Somewhat different	Goal Worker deployability Cooperative form Lay-out Orientation to quality Orientation to improvement Organizational design Logistical concept
Fundamentally different	Worker autonomy Use of buffers Machine-paced work Standardization Cycle time

Note

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