

Chapter 3

A NEW TOYOTAISM?

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Toyota introduced innovations in industrial organization and labour force management throughout the 1950s and 1960s. By the early 1970s these innovations had evolved into the coherent and successful 'Toyota Production System' (TPS). Prior to the first oil crisis, the system was mainly geared towards mass production. The company had to find creative solutions in order to diversify its product range and make its production process more flexible during the turbulent 1970s. Emerging strengthened from these trials, Toyota revealed its capacity to achieve even higher performance levels during the 1980s. The company's success led numerous managers, observers and researchers to consider that its system had become the new best industrial model which all companies ought to adopt (Womack, Jones and Roos 1990). Yet by the end of the 1980s, at the very point at which it was being promoted as the industrial model for the twenty-first century, the system was encountering difficulties at Toyota itself. Toyota was having to modify its production organization to make work more attractive and humane. Its share of the Japanese market was declining, and it was suffering the adverse consequences of trade conflicts between Japan and several other countries.

3.1. THE TOYOTA MODEL BEFORE THE FIRST OIL CRISIS

In 1973, Toyota had four assembly factories. Honsha had been constructed in 1948, Motomachi in 1959, Takaoka in 1966 and Tsutsumi in 1970. Toyota produced 1,631,000 private and 676,000 commercial vehicles, of which around 40 per cent were assembled by

other automobile assembly companies belonging to the Toyota group (Toyota Auto Body, Kanto Auto Works, Hino, Daihatsu, and Central Jidosha). About 70 per cent of Toyota's components were delivered by suppliers according to just-in-time principles. In 1970, Toyota's four distribution networks, Toyota, Toyopet, Corolla and Auto, which were managed by Toyota's sister company Toyota Motor Sales (TMS), included 247 dealerships. The number of passenger car models rose from four to nine between 1965 and 1971, yet in general each model was assembled on a single assembly line with the aid of specialized production equipment. Toyota had still not arrived at the stage of diversified mass production.

3.1.1. The Toyota production system

The two main organizational principles of the TPS were just-in-time production and autonomisation (Ohno 1978). The principle of just-in-time, conceived by Kiichiro Toyoda, the founder of Toyota, arose from the idea that it was in a company's interest to buy the exact quantity of parts it required and to encourage suppliers to deliver these parts precisely when needed. Taiichi Ohno sought to apply this idea within the company by advocating just-in-time production, without intermediary stocks. He was first inspired, in 1948, by a supermarket system; downstream activities fetched parts and components from upstream. However, it was the use of tickets, or kanbans, to manage this system, from 1954, which made it efficient. Kanban were used in all the factories by 1962, and were extended to suppliers starting in 1965. The system was accompanied by a smoothing of production to avoid disruptions or overproduction.

The idea of autonomisation (ji-do-ka) was first conceived of by Sakichi Toyoda, father of Kiichiro; it consisted of equipping machines with an automatic system to stop them in case of problems. Autonomisation also applied to operators, who were supposed to stop their production line if they ran into problems so that product quality could be guaranteed and the problem solved on the spot. Thus autonomisation was a means of managing anomalies (Monden 1991a). This type of management was carried out by 'eyes', because if a problem arose, the machine or worker would emit an optical signal on an

'andon' board. Given that the machines were autonomous, workers were able to supervise several machines at once as long as they were positioned in such a way that the operator, who would have to be polyvalent, could move easily from one machine to another. Hence production lines were built in a 'U' shape. The primary goal of autonomisation was to increase productivity by reducing the workforce (Ohno 1978). To achieve this, the number of workers per line was diminished through the kaizen (continuous improvement) of production processes. This was the Toyota method of increasing productivity.

So just-in-time production was organized by the autonomisation of production lines and by the circulation of kanbans, which synchronised lines producing components with assembly lines. However, to be successful, the system required operators and managers to become actively involved in production and in kaizen activities.

3.1.2. Methods of involving workers

Lifetime employment, seniority-based wages and the company union are considered to form the triptych of 'Japanese-style industrial relations'. Yet this triptych does not help us understand the active involvement of Toyota workers, nor its results. Up until 1974 lifetime employment coexisted with the extensive use of temporary and seasonal workers (34 per cent of the workforce in 1960, 9.2 per cent in 1974 and under 5 per cent in 1975). Pay rises occurred from one year to the next, but they did not increase automatically as a function of seniority. Toyota's union was a company union, but different from its counterparts elsewhere.

The relationship between the union and management had been based on reciprocal trust, as embodied in the 1962 Management-Union joint declaration. This had been signed twelve years after a major labour conflict in 1950 which followed a financial crisis at the company. In fact, the declaration made official a cooperative relationship which had existed between the two parties since 1954. The declaration defined the company as a community composed of administrators and workers. Increased productivity was considered to be a precondition both for increasing company profits and for improving the living standards of workers. Management and union declared themselves ready to

cooperate in building mutual trust in order to obtain these increases (Shimizu and Nomura 1993). There were no more strikes after 1954. Collective bargaining was replaced by a summit conference organized by company administrators and members of the union's executive committee. While no labour agreement was signed between 1951 and 1974, the commitment to mutual trust prevented management from taking decisions which might undermine this trust, such as redundancies.

The basic work unit in the factory was the team (kumi, comprised of about fifteen workers divided into three han). Team leaders established and organized the tasks of their team members. Standard tasks and standard times were introduced in 1953; the standard task indicated the procedure and the time allotted for performing operations, the order and timing of movements, and the cycle time within which the operations and movements had to be finished. To establish standard tasks, team leaders analyzed and timed all operations undertaken by their team. They were advised by management to have their subordinates participate in the determination of standard tasks so that they would be able to perform their tasks with the feeling of having designed them. Toyota accorded a great deal of importance to the standard task. It allowed production operators to assure product quality and to work in safety; moreover, it became the focus of kaizen activities. Teams were expected to improve the way operations were distributed and carried out, with the aim of eliminating possible defects as well as reducing the number of individuals needed to carry out the tasks. The standard time served as the point of reference for manufacturing a product on a given line as well as for calculating the 'remuneration of production' (see below). It was considered to be the strategic parameter for managing production efficiency.

Rank	Qualification	Age		Post	
		minimum	Average 1993	Management	Professional post*
1B	Vice director		56,0	Ji-cho	
2A	Superior section chief		53,0		
2B	Section chief			Ka-cho	
30	Sub-section chief	41	47,3		
40	Superieur monitor			Ko-cho	CX (chief expert)
50	Group leader	35	43,5	Kumi-cho	SX (superior expert)
60	Team leader (1st rank)	33	40,4		
7A	Team leader (2nd rank)	29	36,8	Han-cho	EX (expert)
7B	Monitor	27	33,0		
80	Monitor (2nd rank)	24	28,2		
9A	Supérieur rank operator	21	23,4		Staff/engineer
9B	Middle rank operator	19	19,5		
9C	Inferior rank operator	18	18,0	Operator	

Until 1990, the monthly wage of employees classified below Rank 2B (see Figure 3.1.), that is, below section leader (kacho) was principally composed of basic pay, remuneration for production, and overtime pay (Nomura 1993). The basic salary of an employee was the salary at which he was hired plus annual increases. There were three levels of salaries for newly hired workers, reflecting their level of education. The average increase in basic salary was negotiated between the union and management in April of each year, during the shunto negotiations. This average increase was distributed according to the hierarchical rank, and as a function of the satei (skill and ability evaluation) score of each employee; the basic salary was therefore individualized. The remuneration of production was the product of the basic salary and a remuneration of production coefficient (RPC). This had been introduced by Taiichi Ohno to give workers an incentive to increase production efficiency. The RPC was calculated for each shift unit (hakari). It was determined by the standard time, production volume, and paid working time (the product of hours worked and number of production workers). In principle, an increase in

production volume and a reduction in paid working time for the same volume would increase the RPC, while a reduction in standard time would decrease it. Overtime pay was the product of the paid overtime coefficient (POC) and the sum of basic salary plus remuneration of production. The monthly salary (minor allowances excepted) was therefore calculated by the following formula:

$$\text{monthly salary} = \text{basic salary} (1+\text{RPC})(1+\text{POC}).$$

The management of production efficiency therefore focused on paid working time for a given volume, and on standard time. The production efficiency of a work unit was increased through the kaizen of its tasks and production processes, which was carried out with the encouragement of management. Its production efficiency coefficient (PEC) rose, and so did the remuneration of its members, since the PEC in part determined the RPC; productivity increases were therefore shared. However, when the PEC of a work unit surpassed the average PEC of the best performing units (30 per cent of all work units) its standard time was reduced in such a way that its PEC equalled this average. The reduction did not affect the remuneration of its members. Yet since other units were also pursuing their kaizen activities, its PEC was then classed below that of the best performing units. The work unit would have to initiate the kaizen processes once more. Toyota's wage system thus incorporated incentives for workers to engage in kaizen. Admittedly, this kind of kaizen initiative was started off by the supervisory staff, who alone were informed of the PEC classification. Consequently, wages varied from month to month due to fluctuations in the RPC (as well as variations in overtime).

In addition to monthly wages, there were also bonuses paid twice yearly, and a retirement bonus. The average sum of annual bonuses was negotiated during the shunto. It was of the order of six months standard wages, a proportion which remained stable from 1968, due to Toyota's high level of profitability. The retirement bonus that employees received at the end of their career was the product of their final basic salary and a coefficient for years of service (the coefficient of an employee with 30 years of service was 90).

The individual wage rose as the employee rose in rank. Newly hired workers were classed hierarchically according to their level of education: individuals with secondary school diplomas were positioned at rank 9C; individuals with the equivalent of two years of university study were positioned at 9B, while those holding full university degrees (four years) were positioned at 9A. Salaries for ranks 9B and 9A were approximately the sum of the basic salary of a rank 9C worker plus annual increases corresponding to the additional number of years of education. Workers were then all promoted up to rank 7B, from which point a selection process began. The company's personnel management department set the minimum age for supervisory staff and presented the factory with the number of promotions allotted per rank. In the factory, it was effectively the section leaders who had the right to nominate workers for group or team leader positions. Candidates, who therefore had a minimum level of seniority, were selected based on their satei scores. Their promotion was decided following a training period. What counted most was the satei score.

The wage system, promotion, and the satei were the three institutional instruments designed to get workers to participate actively in their work and in kaizen. However, management did not consider them sufficient. Following the major labour conflict of 1950, Toyota had developed various activities aimed at turning the company into a coherent working collective. These activities comprised basically the suggestions system and quality circles (QC) on the one hand, and human relations activities on the other (Nomura, 1993). Improvements made to production efficiency were essentially carried out by supervisory staff, engineers assigned to the factory, and the department of production technology. Those made by production workers through the suggestions system and QCs were of minor importance from an economic perspective. In reality, these activities fulfilled other functions in the eyes of management. Firstly, they increased the ability of workers by encouraging them to propose solutions to certain problems. Secondly, they gave them a feeling of ownership over their workplace through participation in its improvement. Thirdly, they reinforced bonds among workers by encouraging them to discuss and reflect upon their work. Lastly, they permitted leaders to

emerge and developed their ability to communicate. Human relations activities were also aimed at promoting the integration of the team ('personal touch', 'mentor' system) and a feeling of belonging to the company. Toyota's workers were organized into eight 'corps', as a function of their rank upon entering the company; a corps for holders of a Toyota school of technology diploma, a corps for holders of secondary school diplomas, a corps for university graduates, and so on. The corps were set up to reinforce human relations between their members and to reveal those who might be leaders. Employees over thirty years of age became leaders of their respective corps, and were made responsible for organizing activities (sports competitions, parties, excursions, etc.) in consultation with their superiors. Their leadership activities therefore went beyond the work place, but were definitely part of Toyota's industrial relations system, in the sense that they encouraged employees to involve themselves in their work and kaizen activities and to develop a sense of community.

3.1.3. Supplier relationships: partnership and competition

Suppliers delivered to Toyota according to just-in-time principles. They contributed to cutting production costs and increasing the quality of company products. Toyota's relationship with its suppliers was a long-term investment. In practice, Toyota treated them as if they were subsidiaries, sharing profits as well as risks with them. However, this did not mean that they were protected. Indeed Toyota exerted various forms of control over them, in terms of their production processes, work organization, production costs and product quality. Furthermore, the company exerted pressure on its suppliers to reduce component prices, according to the following system (Asanuma 1984; Ueda 1989).

In general, Toyota chose suppliers for each new model, the supplier contract being concluded as the product was launched. Roughly speaking, the price of a component was determined by applying a profit rate (r) to the cost of unit production (C), according to the following equation: $\text{price} = C(1+r)+d$, d being the depreciation per unit of the production tools needed. When sales of a model were substantially lower than forecast in the contract, some suppliers were unable to recuperate tooling costs. In this case, Toyota

reimbursed them their sunk costs, by raising the price for parts supplied in future. Profit rates having been agreed, price was fixed during negotiations between Toyota and the supplier over unit production costs (C). If the supplier were able to reduce the cost of producing a part at the design stage, the difference between the previous cost and the new cost became an extra profit which Toyota accepted the supplier should make for six months. Moreover, if in month $t+1$, the supplier had achieved $C_{t+1} = C_t - a$ by reducing costs, then this a (>0) became an extra profit. However, since price negotiations were conducted every six months, Toyota would at that point require its suppliers to lower the price of the part by a .

According to Asanuma (1984) there were two categories of supplier: those capable of designing components (design-approved suppliers), and those without this capability, to which Toyota supplied the design (design-supplied suppliers). Generally speaking, suppliers in the first group possessed know-how which Toyota did not wholly possess. This gave them a hidden a . However, they could not impose any price, since Toyota ordered the same part from several suppliers and carried out cost studies. Conversely, the cost of parts from 'design-supplied' suppliers was well known to Toyota. It was difficult for these suppliers to conceal an a . They nevertheless participated in Toyota's research and development activities, either to develop new parts, or to improve the quality of parts.

Toyota informed its suppliers of its quarterly production plan so that they could prepare themselves. The monthly order volume was given to them before the end of the preceding month, although it might still be modified, within a margin of about 5 per cent of expected volume, as a result of daily orders made through kanbans. The cooperative relationship between Toyota and its suppliers was given a dynamic by competition amongst suppliers (parallel orders), and the price system incorporating incentives to kaizen. By creating competent suppliers, Toyota was able to improve its price/quality competitiveness. However, in the early 1970s suppliers had not yet begun to apply the TPS; they supplied Toyota just-in-time by holding stocks in their own factories.

3.1.4. Distribution network and production planning

The final element of the TPS was the distribution network, the interface between Toyota and its customers. The network was organized by Shotaro Kamiya, president of TMS (Toyota Motor Sales, separated from Toyota in 1950). The priority was satisfaction for customers, followed by dealers; both came before Toyota. The relationship between TMS and its dealerships mirrored that between Toyota and its suppliers. With the knowledge TMS had of their accounts, it could both control and help them. Dealer contracts prohibited them from selling other marques. Toyota gave them financial support on condition that they remained loyal. Each dealer signed an annual contract indicating sales per model, including retention of a small permanent stock. Toyota believed that the stock compelled them to try to increase sales. Eighty per cent of sales were made by the 'visiting' salesmen of the dealerships, the remainder being sold at the sales points, of which a dealer had several. The role of the dealers was not limited to sales, for they also diligently noted the complaints, requirements and desires of existing as well as potential customers, so that these factors could be taken into account in the design of new models.

Toyota established its production plan on the basis of the orders it received, as well as its own sales forecasts. In 1965, Toyota implemented a system whereby orders were sent in every ten days, which permitted orders to be delivered within 16 to 30 days. In 1970, it adopted a daily ordering system for the Celica model, which allowed customers to choose between 28 versions equipped with multiple options. The vehicles were produced on command and delivered between eight and eleven days afterwards. However, not only was this system not expanded, but it was abandoned following the first oil crisis. Contrary to what many in the West have believed, therefore, Toyota has never produced on command, with the exception of the Celica model over a brief period. Ordering on a daily basis actually contradicted the principles of the TPS, which required detailed planning production (annual, quarterly, monthly, and every ten days) in order to smooth monthly and daily volumes and thereby avoid stocks.

3.1.5. Design and the management of production costs

In the final instance, the viability of an industrial model depends on the competitiveness of its products. This in turn results on the one hand from the innovative design of the vehicle and its components, and on the other hand from quality and price. From the mid 1970s, each model was completely replaced every four years. The management of production costs and kaizen activities started in the 1960s (Monden 1991b; Tanaka 1991).

When a complete model replacement or new model launch was decided, TMS proposed certain characteristics and a price to Toyota, which then selected a style and target production cost. A chief engineer, responsible for the model's design, would then organize a team of engineers from the various relevant design departments. Components were manufactured and assembled into prototypes three times, allowing the factory to ask designers for modifications to the product, and suppliers to establish and negotiate the terms of their contracts. Meanwhile, a production cost committee, composed of senior managers and the chief engineer, oversaw changes to the estimated cost of production, seeking to reduce any gap between it and the target cost. At the end of this process, the definitive plans were adopted. The next stage unfolded in the production department. After having reorganized the production lines, the department of production technology determined the reference production cost by production line. The basic unit in this calculation was the working team, each team therefore having its own reference production cost. Then, after having commenced mass production, the production department instituted the kaizen process in order to achieve and improve upon the reference production cost.

In practice, management imposed the objective on the production department of reducing production costs every six months in order to achieve targeted profits. If anticipated profits were lower than targeted profits, the gap had to be made up. This took place as follows; half had to be absorbed by increased sales (increased economies of scale), and the remainder by reduced variable costs (raw materials, energy and workforce). Hence half the difference was the sum to be obtained through kaizen in the

production department. The production department succeeded in obtaining lower costs for raw materials and energy by reducing their consumption and by making suggestions for the modification of parts, the utilization of cheaper parts, and so on. Part of the sum thus saved would be paid to the factories, and then to the workers who had made the suggestions. This form of kaizen was controlled by a production cost committee which convened once a month at all hierarchical levels, from management down to work teams. Yet the key element was the management of production efficiency through the wage system, as discussed above. This was the kaizen process to reduce the cost of the workforce, an activity scrupulously supervised by management. The TPS would not have been so successful without this kaizen process.

3.1.6. The coherence and dynamism of the Toyota industrial model

Beyond certain general socio-production principles, such as additive production on assembly lines, the components of the Toyota model were all innovative compared to those of the canonical Fordist model. It was the management of production costs that orchestrated them and provided the dynamic. This was the core of 'Toyotism', which therefore had five basic characteristics. The first was mutual trust among Toyota, its employees, its suppliers and its dealers. The second was competition amongst the members of each of these categories. The third was the research and development capacity of the Toyota group as a whole, including its sub-contract assembly companies (Toyota Auto Body and Kanto Auto Works, for instance) and its suppliers, which shared technical information with Toyota. The fourth was the continual effort to reduce production costs, to increase production efficiency and improve quality. Lastly, improvements obtained through kaizen were shared, for a limited period, with those who had created them. The management of production costs and of production efficiency thus constituted both a means of controlling group members and an incentive to kaizen. This was the heart of Toyota management.

3.2. THE ERA OF TOYOTAISM: THE 1970S AND 1980S

Toyotaism continued into the late 1980s without significant modification. It was able to overcome the various difficulties the company faced, all of which arose externally, by further developing its principles. This was the case with the diversification of product variety and the flexibilization of production, two major challenges that followed the first oil crisis. Thus it was that the Toyota model appeared to be a post-Fordist model, and was named 'lean production'.

3.2.1. Long term evolution, 1974-1994

The sale of Toyota vehicles in the Japanese market was flat during the period from 1973 to 1985, except for a drop following the first oil crisis when Toyota lost market share (between 1975 and 1977). It then took seven years, until 1984, for the company to recover its 1975 market share (see Figure 3.2.). Registrations increased again with the advent of the bubble economy, before falling again after 1992 when the 'bubble' collapsed.

On the other hand, sales turnover continued to rise until 1993 (with the exception of 1987 when turnover was particularly affected by the appreciation of the yen). The rise in turnover in fact reflected not only the sale of vehicles, including exports, but also Toyota's other activities. Increased turnover was less a result of housing construction (Toyota entered the construction business in 1976 but this only accounted for 0.48 per cent of turnover in 1994) or the production of industrial vehicles (which began in 1983, and accounted for 1.38 per cent of turnover in 1994), than of increased sales of components, including those destined for overseas transplants (the contribution of these sales to turnover increased from 18.7 per cent in 1980 to 33.5 per cent in 1994).

Toyota's production also rose constantly between 1970 and 1991, with the exception of a small dip in 1974 and a flattening between 1980 and 1983. The growth of output between the first oil crisis and 1985 was due to rising exports. In 1985, Toyota began production in the United States, which led to a structural decline in exports. This fall was more than compensated by a strong upturn of Toyota sales in the Japanese market until

1991. However, after 1992 exports and registrations in Japan declined together, causing domestic production to contract by 16.3 per cent between 1991 and 1994.

Put here Fig 3.2.

Toyota's workforce, including temporary workers, only increased by 12.1 per cent between 1970 and 1979, whereas total production (passenger cars and commercial vehicles) rose by 88.7 per cent. By contrast, the 1980s were marked by an inverse tendency: the workforce in Japan expanded by 66.4 per cent between 1979 and 1992, even though total production in Japan only rose by 40.9 per cent. The increased workforce can partially be explained by the merger of TMS and Toyota in 1982. Yet even if the whole rise in the workforce between 1982 and 1983 is imputed to this merger, the increase due to Toyota alone would still be 51.3 per cent. Hence during this period, the workforce grew more rapidly than output. The workforce began to decline in 1993, a year after the fall in production. This was accomplished through the non-renewal of temporary worker contracts and the partial non-replacement of workers taking retirement. Toyota had thus avoided redundancies and could continue to take on employees, although in much smaller numbers. Indeed the company had not made anyone redundant since 1951, thanks to the 'mutual trust' expressed in the joint declaration of 1962, and to the fact that after 1950 Toyota experienced no major crises.

3.2.2. How Toyotatism responded to obstacles: 1974 to 1980

During the first half of the 1970s, the Japanese automobile industry had to deal with both issues of pollution and the first oil crisis. Rising air pollution led the Japanese government to adopt American standards of acceptable levels of toxicity for exhaust fumes, and to use tax exemptions to encourage research and development in this domain. From 1976, the engines of new Japanese car models had to comply with these standards. However, Toyota was slow to develop engines conforming with the regulations. Moreover, the first oil crisis increased the cost of energy used in manufacture (see Figure 3.3.). Toyota was forced to increase the price of its vehicles, and then new taxes were levied on automobiles from 1974. Sales fell off and operating profits declined markedly

(see Figure 3.4.). At that point Toyota decided to go on the offensive with a sales strategy, known as 'T23', designed to sell 230,000 vehicles in the two months from June to July 1974. To achieve this Toyota modified its order system in March; it was at this point that the system of daily orders for the Celica model was eliminated. At the same time the company introduced into its ten day order system the opportunity for clients to change certain technical specifications of the car ordered up to six days before production, and the company was committed to delivering the car within an average of under ten days.

Put here Fig 3.3. and 3.4.

However, the company's slowness to develop low pollution engines led to a fall in market share (see Figure 3.2.). While the company did not lose money in 1974, it did decide to modify its production system and its sales strategy.

Once the technical problems with low pollution engines were resolved, Toyota reinforced its range by replacing six models and launching four more models with the objective of regaining its position in the market (for a discussion of product diversification in detail, see Bélis-Bergouignan and Lung 1994). The concept of diversification was also modified. From 1972 to 1976, Toyota had increased the number of variants per model. After 1977, the company designed models which shared the same platform: hence the Mark II and the Chaser in 1977, the Tercel and the Corsa in 1978, the Corolla and the Sprinter in 1979, the Camry and the Vista in 1982 all shared platforms. This diversification of products, even if limited with platforms shared, required a flexibilization of the production system as well as efforts to contain production costs.

Three types of modification were made to the production system (Toyota 1978). Specialized equipment was replaced by equipment which could be rapidly adapted to a change of models or even be used to produce different models (mixed model production). This was concretized through quick tool and die change; so that stamping dies, for instance, could be replaced in under ten minutes. However, this flexibilization was not introduced into the engine factories or body shops at this stage. The second reorganization consisted of creating linked U-shaped production lines so that the number of operators could be adjusted according to fluctuations in production, and the number of operators be

reduced in general (Monden 1991a). Thirdly, preventive maintenance was re-emphasised in order to increase the reliability of equipment.

Meanwhile, Toyota had consolidate its management of production costs. In 1974, the company formed a team responsible for lowering the production costs of the Corolla model (Toyota's best selling car). The team surpassed its target by 28 per cent. Their method differed from previous methods in that the team was comprised of members from all departments concerned: design, production technology, manufacturing, purchasing, general affairs and accounting (Toyota 1978). It was at this stage that the management of production costs was systematised all the way from design through to production. Moreover, Toyota now required all its first tier suppliers to utilize the TPS and produce without stocks.

Toyota was able to re-establish its competitiveness and profitability through these strategies of diversification and production cost reductions. The company was able to build up significant financial reserves to the point that borrowing was eliminated from its balance-sheet in 1977, since when Toyota has become known for its debt-free management and internal reserves which have brought considerable financial benefits to the company.

On the strength of these excellent results, in 1978 Toyota launched a production plan to reach 3.5m vehicles and set a target for domestic sales of 2m vehicles (a 40 per cent share of the passenger car market). To this end, the company increased its production capacity by building a factory at Kinuura and a second factory at Shimoyama in 1978, along with three factories at Tahara between 1978 and 1981. Toyota now owned two transmissions factories (Tsutsumi and Kinuura), two engine factories (Kamigo and Shimoyama) and nine assembly factories (not including those of its sub-contract assemblers). From 1979 onwards, the company also undertook a programme of robotization .

3.2.3. The zenith of Toyotaism in the 1980s

The growth programme was maintained despite a change in the economic environment. Like the other Japanese producers, Toyota had to confront the yen's appreciation in 1978, followed by the second oil crisis in 1979, and finally United States pressure to voluntarily limit exports in 1981 (with a quota of 1.68m Japanese cars per year, of which 516,659 were allocated to Toyota). The domestic market stopped growing, exports contracted in 1981-2, and profit rates dipped in 1981. Toyota continued to strengthen its management so that it would remain profitable even at 80 per cent capacity utilization (Toyota 1987).

The company began designing cars that used less raw materials and energy (with engines designed to consume less fuel), incorporated lighter raw materials (aluminium, plastics, ceramics), and included electronic technologies and front-wheel drive. The components supply system had also been reorganized, with the production of certain parts outsourced. Suppliers and sub-contract assemblers were also involved in production management and now had to implement Toyota's methods of planning production costs.

A new distribution network was created in 1981 for the Vista model. The five Toyota networks each sold three passenger car models. Toyota merged with TMS in 1982 in order to be able to react more rapidly in a context of fierce global competition. The dealers were obliged to undertake kaizen activities and start quality circles, and to open on Sundays. The ordering system was modified once more, so as to reduce delivery lead-times and to permit the technical specification of the vehicle ordered to be changed up until five days prior to its manufacture. To resolve quality problems raised by customers (scratches, traces of glue, loose screws, and so), the company introduced tools which prevented certain assembly errors, and created inspection posts on the assembly lines.

Between 1980 and 1985 Toyota replaced ten models and launched seven others. Some models had their own platform: Starlet, Carina, Soarer, Supra, Corona, Crown and Century. Others shared platforms: Corolla and Sprinter; Mark II, Chaser and Cresta; Celica and Carina ED; Camry and Vista; Corsa, Tercel and Corolla II. Toyota's strategy appeared to be to offer models with their own platform at the top and bottom of the range

in order to make their production profitable, and to share platforms among models in the middle of the range, where competition was greatest. The renewal and broadening of the range was accompanied by an increase in the quality and specification of models. Despite the stability of wholesale prices (0.6 per cent average annual increase) between 1981 and 1984, production costs increased by an average of 10.3 per cent (see Figure 3.3.). Between 1982 and 1985 Toyota's profit rate was the highest in its history. The company reached a 44.9 per cent share of the domestic passenger car market (Figures 3.2. and 3.4.). 'Operation T50' was launched in 1986, with goal of obtaining a 50 per cent share of the passenger car market.

However, Toyota's plans were compromised by the rapid appreciation of the yen (over 70 per cent from 1985-7), which brought about two years of economic recession. Output stagnated in 1987 as exports declined despite increased sales on the domestic market, and operating profits fell from 8.3 per cent in 1985 to 4.1 per cent in 1987. As ever, Toyota focused on reducing production costs in order to recover its profit level. This was done by reducing the costs of raw materials, purchased components and wages (Figure 3.3.). The company also increased the flexibility of its production system. In 1984, an assembly line was installed in one of the engine factories that was capable of mixed production but in which production costs were the same as for a specialized line (Toyota 1987). In 1985, the company installed a Flexible Body Line (FBL) in one of its body welding factories, which enabled different bodies to be welded on the same line. To control the assembly process and robots in real time, a new Assembly Line Control (ALC) system was adopted in 1989. Moreover, in order to adjust the workforce to fluctuations in production with increased precision, the reorganization of U-shaped lines into linked U-shape lines was extended, the sending of workers from over-staffed areas to under-staffed area was systematized, and the hiring of temporary workers was resumed. In 1986, the installation of a computerized network (Toyota Network System) embracing Toyota and its dealers enabled the company to control orders, production and deliveries in real time. The TPS was being made more flexible, and being computerized from upstream to downstream. Having reached this level of development, it served as a model for the

construction of Toyota transplants in North America and the United Kingdom (see below).

A second reason Toyota was able to regain its former level of profitability was the strong recovery of domestic and global markets under the impact of the economic bubble which began in Japan in 1987. That year, the company announced its 'Global 10' objective, signifying its intention to control 10 per cent of the global market. To this end, Toyota diversified its range even further, by launching luxury models (the Celsior in 1989). It was also during this period that Toyotism, appeared to be the world's most successful and robust industrial model. And yet certain statistics already suggested that the Toyota model was entering a difficult period. Despite the rapid growth of its sales, Toyota's share of the domestic passenger car market fell from 46.2 per cent in 1987 to 42.9 per cent in 1991, running counter to the objective of 50 per cent. Profitability did not grow as rapidly as during previous phases of market growth, and in fact fell in 1991 even as output continued to rise.

3.2.4. The construction of transplants and the transferability of the Toyota model.

Trade conflict between the United States and Japan created a structural problem for the Japanese automobile industry. Toyota's exports to North America had increased rapidly between 1975 and 1986. With a desire to avoid conflict, in 1981 Toyota followed Honda and Nissan and decided to produce in the United States. Hesitating to manage a factory alone, and having failed to form a joint venture with Ford, in 1982 Toyota accepted an offer by General Motors (GM) to reopen one of the latter's closed factories, where each company could produce a model. GM's Fremont factory became the joint subsidiary New United Motor Manufacturing Inc. (NUMMI), the management of which was entirely entrusted to Toyota. When this experience showed Toyota that its system was transferable, the company decided to build its own factories in North America: Toyota Motor Manufacturing USA Inc (TMM) in Kentucky, Toyota Motor Manufacturing Canada (TMC) in Ontario, both in 1988, and Toyota Motor Manufacturing

United Kingdom (TMUK) in the United Kingdom in 1992. These subsidiaries were true 'transplants', since Toyota effectively transferred its industrial model, requiring only a few adaptations to accommodate local industrial relations.

Toyota's strategy for transfer can be summarized in the following statement: 'risk is truly great if both the workforce and the equipment are new' (TMM, cited by Suzuki, 1991). For NUMMI, Toyota had to use some equipment from the old factory. However, a new stamping plant was built, and the body plant was replaced with the installation of two welding lines identical to a standard Toyota line. In the paint and assembly areas, Toyota divided the old lines (two kilometres long) into several sections, thereby creating intermediate stocks which would allow operators and supervisors the time to resolve problems without stopping the entire line (Shimada 1988). By contrast, when the TMM factory was constructed, Toyota installed equipment similar to that used in its Japanese factories, in particular the Tsutsumi factory (Mishina 1995). By and large, the TMM and TMUK factories resembled the Tsutsumi factory. Both engineers and supervisory staff were sent out from Japan to train maintenance workers for the machines they knew well.

The greatest difficulties encountered during the implementation of the TPS at the transplants lay in industrial relations and components supply. Toyota had to discover a way to forge relations based on mutual trust with local workers, whether unionized (NUMMI, TMUK) or not (TMM, TMC), and with suppliers. As far as industrial relations were concerned, NUMMI has been studied extensively (Parker, Slaughter 1988; Shimada 1988; Suzuki 1991). The Fremont factory was known for having one of the worst records for industrial relations at GM. Toyota was nonetheless able to create a model of cooperative industrial relations in North America, despite the fact that 85 per cent of the workforce had worked at the factory previously, and were therefore members of the United Automobile Workers (UAW) union. The work relationships Toyota wished to develop at its transplants were clearly expressed in NUMMI's collective agreement, which was accepted by the UAW and management in 1985. This American version of Japan's 'joint declaration' stipulated that the parties would make every effort to create the most innovative industrial relations in the United States, on the one hand to deliver customers

vehicles of the highest quality in the world at the lowest possible cost, and on the other hand to assure equitable wages to the employees. According to Suzuki (1991), the principal clauses of this agreement were: the classification of blue-collar workers into three categories, direct workers, indirect workers and maintenance workers, instead of 84 at GM; hourly wages and bonuses fixed according to scales negotiated by the UAW and GM; redundancies to be avoided at all cost (not one worker was made redundant despite a loss of \$100m in 1987-8); management to discuss with the union its intentions regarding production planning and changes in the distribution of the workforce as well as working hours; lastly, the union to accept the rules governing work under the TPS: team work, quality circles, operating according to standard tasks, and so on. This collective agreement contained the minimal conditions necessary for implementation of the TPS. In order to reconstruct, within a different social context, the sense of mutual trust which characterized industrial relations in the TPS, NUMMI's management guaranteed employment and planned to meet with union representatives to explain company strategy and discuss any problems that might arise.

Work organization at the transplants is characterized by team work, task rotation, kaizen activities conducted by quality circles and flexible assignment of workers. The training of supervisors was particularly important, to enable them to fulfil their role of establishing standard tasks and encouraging kaizen activities. Future team leaders were sent to one of Toyota's Japanese factories, and even to TMM and TMC in the case of TMUK, for on-the-job training in TPS principles, quality circle activities and team work. Japanese 'monitors' were despatched to help managerial staff at the transplants. However, the Toyota wage system was not transferred. In the North American transplants an hourly wage system was adopted, whereas at TMUK in the United Kingdom wages were calculated on an annual basis. In both cases Toyota opted to respect local practice.

As far as components supplies were concerned, NUMMI selected 104 American suppliers, nine of which were joint ventures with Japanese companies. In 1987, these suppliers permitted NUMMI to reach 60 per cent local content for the Nova and 50 per cent for the Corolla. In 1987 TMM had already selected 60 American suppliers,

permitting it to attain 60 per cent local content. Suppliers belonging to the Toyota group also transplanted operations to North America (Nippondenso, Toyota Gosei, Aisin and members of the Kyoho Association). TMUK achieved 70 per cent local content, with parts and materials provided by 200, mainly European, suppliers. The principal criterion for choosing suppliers was their cooperative attitude and their acceptance of TPS rules: quality, respect for delivery lead-times, and use of kanbans. Once selected, suppliers were helped by the Toyota transplants to improve their technology and to improve the quality of their products. This helped establish mutual trust as the basis for long-term cooperation. Frequent deliveries in small batches were not necessarily required by the Toyota transplants; the company displayed a degree of flexibility in its thinking, and just-in-time production could assume different forms according to the industrial context. What remained important was that suppliers delivered components and materials in compliance with the required level of quality and lead-times previously established. The rest of the system was not going to be established immediately.

Above all, however, the success of the transplants depended upon the commercial success of the models produced. To begin with, NUMMI manufactured the Nova for GM and the Corolla FX16 for Toyota. But the Nova was a failure and had to be replaced by the Prism in 1988, while the four-door version of the Corolla replaced the three-door version (Suzuki 1991). These changes permitted adequate sales to be made. TMM quickly benefitted from its 1990 adoption of the Camry, one of the best selling models in the United States. However, the Carina E, produced by TMUK, did not succeed in the European market and had to be replaced

In short, Toyota's transplants performed better than had been expected. Their output steadily replaced Toyota exports from Japan. The Toyota model had proved that it could be transferred outside Japan. However, this did not mean that all of the model's components should be transplanted to the host country. With their different social structures, the way the system was applied could vary across host countries, so long as the minimum necessary pre-conditions for the TPS to function were met.

3.2.5. The crisis of work at the end of the 1980s

A crisis of work emerged in Japan during the so-called bubble economy period between 1987 and 1991, paradoxically at the very moment Toyota seemed to have reached its apogee. The crisis was the result of structural change in the labour market and a growing rejection of assembly line work by employees. While the demand for automobiles grew rapidly, by the end of the 1980s companies found it difficult to recruit the necessary labour force. A declining birth rate had reduced the younger active working population. Young high school graduates wanted to avoid jobs characterized by the 3K (kitanai: dirty; kitsui: difficult; kiken: dangerous). Moreover, turnover of newly hired young employees in the automobile industry had increased, since employees were rejecting assembly line work, which was monotonous, repetitive and fast, in contradiction with the reputation of Japanese workers as polyvalent and motivated.

In Toyota's case, the way production efficiency was managed meant that the factories worked with the minimum number of operators necessary and a fast work pace. While this was viable during a phase of regular growth in demand, these working conditions were not consistent with rapid growth. The bubble economy pushed the TPS to the limit, revealing that it had become too lean. Toyota was incapable of responding to rising and diversifying demand. To fill the gaps in its labour force, from 1987 Toyota was hiring temporary employees on a large scale; by 1991, they constituted 10.38 per cent of the direct labour force. Far from resolving the nascent crisis of work, the recruitment of temporary workers precipitated it. The fact that temporary workers were less competent, combined with the growing complexity of tasks due to the wider variety of components, disrupted production, requiring more overtime to produce the planned output. Annual working hours in the factories rose from 2,224 in 1987 to 2,315 in 1990. Fully one quarter of new recruits left Toyota during their first year in 1990, unable to cope with the heavy work loads. Supervisory staff, the hard core of the TPS, who had to intervene directly to resolve all the problems, themselves became exhausted (Shimizu 1995). The shortage of labour had been transformed into a crisis for the whole working collective due to the characteristics and logic of the TPS.

The management and the union at Toyota therefore began to question the Toyota way of managing work. Simultaneously, management concluded that it had pursued product variety too far, and decided to reduce the number of variants and reorganize design into four departments, each specializing in one domain: rear wheel drive, front wheel drive, commercial vehicles and future automobiles such as electric vehicles.

3.3. A NEW TOYOTAISM AND GROWING UNCERTAINTY

The reorganization of the Toyota model began by a questioning of work relations and by the publication of a new set of 'guiding principles at Toyota', of which there were seven: be a company of the world, serve the greater good of people everywhere by devoting careful attention to safety and to the environment, assert leadership in technology and customer satisfaction, become a contributing member of the community in every nation, foster a corporate culture that honours individuality while promoting team work, pursue continuing growth through efficient global management, and build lasting relationships with business partners around the world. The reorganization of the management of human resources and work appeared to be the most advanced and promising transformation. These changes could justifiably be labelled a 'new Toyotaism'. Yet, by the mid 1990s there were already uncertainties over its future, since Toyota's financial results did not appear to be recovering satisfactorily.

3.3.1. Rethinking the Toyota approach to work relations

In 1990, a committee composed of union representatives and company management was formed in order to consider methods that might make factory work more attractive. The notion of 'humanizing work' appeared to this committee to be the sole means of resolving the crisis of recruiting and involving workers. Between 1990 and 1992 the group met to discuss a number of problems, issues related to the very foundation of the Toyota model: the management of production efficiency, the wage system, training, and assembly work (Shimizu 1995).

It was decided that the target for labour force reduction, hence the number of operators needed, would be set according to the results obtained during the three months following the launch of a model, and not according to the best results obtained with the preceding model. The target for reducing other variable costs would be set according to objectives fixed by each individual factory, with top management restricting itself to ensuring the coherence of the various objectives proposed. Thus management withdrew from unilateral management of production costs, and above all production efficiency, in order to grant greater autonomy to the factories. Moreover, the company committed itself to think about reducing production costs as a whole, instead of always compelling the factories to increase their production efficiency. This effort focused more on the design stage, in which it was possible to make substantial savings in terms of raw materials and components.

The method used to evaluate production efficiency was also modified. The classification of the coefficient of production efficiency (PEC) was now to be carried out with reference to homogeneous groups, taking account of the specificities of work in different production processes: with a 'foundry, forging, stamping and welding' group, a 'mechanical components' group, a 'bodywork, painting and plastic moulding' group, and an 'assembly' group. Moreover, the determination of standard time was to take into consideration the time needed by older and female operators. A reduction in annual working hours was also planned, by 300 hours between 1991 and 1993. In practice, hours declined from 2,284 in 1989 to 1,915 in 1993. In short, the management of production efficiency became less constraining and more reasonable.

The wage system was revised simultaneously. In 1990 one form of change had already occurred. The introduction of two new criteria for remuneration, age (hence Age Pay: AP) and ability (hence Ability Based Pay: ABP), each accounting for 10 per cent of the average standard wage, had reduced the significance of the remuneration of production from 60 per cent to 40 per cent, with the remaining 40 per cent corresponding to the basic salary (BS). Making ability an autonomous criterion, whereas it was formerly integrated into the basic salary, meant there were now two distinct types of evaluation: a

satei for competence which affected increases in the basic salary and promotion, and a satei for the results of worker activities upon which the non-cumulative increase in their ABP depended. However, reform did not extend to methods of calculating the remuneration of production.

The new system established in 1993 again reduced the significance of this criterion in determining the wage. It was simply eliminated for engineers and salaried staff (section S), who considered production efficiency irrelevant to them. Remuneration based on ability (ABP) now accounted for 40 per cent of the standard wage. As for other employees, those in production and maintenance (sections P and M), the proportion of the remuneration of production, renamed remuneration of productivity (RP) in the wage was cut from 40 per cent to 20 per cent, while the AP and ABP each rose from 10 to 20 per cent. The method of calculating the RP was also modified; the RP was the product of its coefficient (CRP) and a sum determined by the employee's rank within the hierarchy.

Hence for section P and E employees, the standard wage, excluding bonuses and overtime pay, was calculated by the following equation:

$$\text{Wage} = \text{BS (40\%)} + \text{RP (20\%)} + \text{ABP (20\%)} + \text{AP (20\%)}$$

For section S employees, it was calculated as follows:

$$\text{Salary} = \text{BS (40\%)} + \text{ABP (40\%)} + \text{AP (20\%)}$$

When in the 1950s Taiichi Ohno applied the RP to salaried staff and engineers too, it was because he wanted to mobilize them too in kaizen activities to increase production efficiency and to involve them in managing working time and workforce numbers (Toyota 1958). The new wage system implied that Ohnoism no longer applied to white-collar workers. Furthermore, workers of the same rank in a team received the same RP sum, and this constituted a truly collective incentive to increase productivity. The ABP was determined by hierarchical rank and was increased according to the satei score. Because the increase was not cumulative, it was possible for employees with poorer evaluations to catch up by working harder. In addition, the new system aimed to modify the progression of wages during an employee's working life, since thirty-to-forty year old employees were relatively less well off than employees aged over fifty, given the expenses the younger

workers incurred: house purchase, school fees, and so on.

The break with the Ohnoist wage system was even clearer at Toyota Motor Kyushu (TMK). This subsidiary of Toyota, located on the southern Japanese island of Kyushu and founded in 1991, began production of the Mark II in 1992 with a production capacity of 160,000 vehicles per year. The monthly salary of all employees was comprised solely of the BS (60 per cent) and the ABP (40 per cent) (with the exception of minor bonuses). As a consequence, the monthly salary remained the same all year, and was only revised each April, during negotiations between management and the union. As the wage did not include the RP, TMK's employees were not directly encouraged to increase production efficiency as they were at Toyota. Instead, TMK introduced PIT (Production Incentive of TMK), a second bonus paid every six months based on the results of kaizen activities evaluated by work section (ka).

To resolve the problem of high turnover amongst new production operators, in 1993 Toyota also modified its system of post-recruitment training. Training was now entirely devolved to the factories, and its duration was prolonged to nine weeks for workers assigned to stamping, welding, body, and assembly areas, and six weeks for others. The factories organized two weeks of general training, and then assigned workers to work areas for on-the-job training by rotating them among work posts where they did half an operator's task. Their first work post was decided after this training. Moreover, in 1991, a new form of professional training had been introduced to instill in all operators a more systematic know-how and a 'delight in producing'. Management instituted four certificates of professional competence based upon the results of tests following training. These certificates objectively stated the skills and know-how of the holder. The holder of the highest level certificate would possess the skills and know-how necessary to assemble a whole car. To help establish this training, task rotation was also systematized.

Reforms of production cost management, the wage system, and training were therefore pursued in an attempt to overcome the crisis of work and motivate workers more by granting them greater autonomy, reducing the pressure to reduce standard time, reducing the number of hours worked, and enriching training. Of even greater importance

was the new conception of the assembly line and group work.

3.3.2. New assembly lines and the 'humanization of work'

The first experiment was undertaken at the Tsutsumi factory in 1990. One of the two assembly lines was divided into four segments, between which were placed buffer stocks. At this point it was believed that all problems regarding work derived from a rigid application of the just-in-time principle, which meant that the whole line stopped any time and anywhere a problem arose. In 1991, when the fourth factory at Tahara was being constructed (Toyota's most automated factory, where the luxury models Celsior, Lexus, Crown-Majesta and Aristo were produced), the assembly line was divided into 8 mini-lines, separated by buffer stocks. Toyota quantified the degree of difficulty at each work station through its TVAL (Toyota Verification of Assembly Line) method. To reduce or eliminate the difficulty of certain tasks, variable height body-carrier platforms and automation were installed. Ordinary conveyors were replaced by large rectangular platforms linked together. Operators were able to perform their tasks standing on the platforms without having to walk. The heights of the platforms could be varied according to the task to be performed and the height of the operator. The most tedious tasks from an ergonomic standpoint were replaced by automated operations. Lastly, some tasks related to final quality control were transferred to the end of the mini-lines. However, the transformation of the assembly line was not fully realized, nor was a new type of teamwork introduced.

These latter changes were, however, accomplished in construction of the TMK assembly factory. The assembly line was divided into eleven mini-lines in such a way that each mini-line corresponded to a function of the vehicle, which could be made the responsibility of a work group. This line made a number of advances over the one at Tahara (Shimizu 1995). The body carrier platforms (the same as those used in the 4th Tahara factory) were equipped with a device to automatically adjust their height to accommodate the height of the operator. The rate of automation was lower, though the objective remained to eliminate as many ergonomically arduous tasks as possible through

the TVAL system. Each work group was responsible for a mini-line. A quality control post was added to the quality control each operator had to carry out on his own work; the group leader could stop the line by taking advantage of upstream and downstream buffer stocks of three-to-five vehicle bodies. Operators rotated work posts within their group, and learned how to do all the jobs. If they wished, they could be transferred to another group to learn more tasks. This form of organization granted greater autonomy and responsibility to the work groups, yet it was also more efficient than a traditional line, since a stoppage at one point did not paralyse the entire assembly factory. Production without stocks, also known as 'one-by-one' production, had been abandoned, and was now seen as too-rigid an application of just-in-time principles to assembly line production.

Some elements of the TMK experiments were transferred to other factories. Toyota's older factories lacked the space to construct similar assembly lines, and the opportunities to make substantial investments were reduced by economic recession. Nevertheless, the same principle of work and production organization was adopted at the Motomachi factory during the restructuring of the assembly line for the RAV4 model. The assembly line was divided according to vehicle function into five segments. Body carrier platforms were not used, but conveyor belts were installed at ground level, upon which the operators could stand, similar to a system used at Mitsubishi.

Another significant change that had been implemented at TMK was diffused throughout Toyota in 1995. The night shift was eliminated. Instead, alternating shifts worked only during the day; from 06.00 to 14.50 and 15.05 to 23.55 at TMK, and from 06.30 to 15.15 and 16.15 to 01.00 at Toyota. It was therefore no longer possible to lengthen the working day by adding overtime worked between the two shifts.

By humanizing work and modifying its management and wage system, Toyota had most certainly not renounced all that it had created based upon just-in-time principles and autonomization. The kanban system continued to be applied, and kaizen activities to reduce production costs still took place. What was different was that the rigid application of Ohnoist principles had been rejected. The concept of 'autonomization' had even evolved to include the autonomization of the working group.

Changes were not restricted to the domain of production. In 1992, Toyota created the DUO sales network to sell Volkswagen/Audi cars, and eliminated the clause which prohibited dealers from selling the vehicles of other marques. From 1996, Toyota planned to sell GM cars (the Cavalier model). The volume of imported components was also increased. The internationalization of purchases, like the construction of transplants, was designed to attenuate trade conflicts and to create an image of the company as a 'good citizen' in each of its host countries.

3.3.3. Uncertainties over the future

Yet by the mid 1990s uncertainties about the future of the new Toyotaism began to emerge within the company. Toyota's share of the Japanese domestic market fell to below 40 per cent between January and June 1995. The rate of profit was lower than it had been during the first oil crisis (see Figure 3.4.). Toyota now faced three uncertainties.

The model range had not been adapted rapidly enough to meet the demands of a changing market. The increased demand for minivans and recreational vehicles had encroached on the four-door saloon market, formerly a bastion of profitability for Toyota (see Figure 3.2.). Shifting the product range upmarket had brought with it increased production costs (see Figure 3.3.), and reducing vehicle equipment levels in order to reduce production costs had not enabled the company to recover adequate levels of profitability. Moreover, Toyota was slow to equip its cars with airbags to improve their safety. In 1995, a new managing director, Hiroshi Okuda, was named as replacement for the ailing Tatsuro Toyoda. Cars were now being equipped with airbags and their safety levels increased. It nevertheless seemed that Toyota would be forced to radically revise its commercial strategy if it was to recapture lost market share.

Faced with the American threat to impose a prohibitive tax (100 per cent) on Japanese cars, Toyota was obliged to promise to increase the proportion of its production undertaken in the United States. In 1995 the company decided to transfer all production of its Aristo model from the Tahara factory to TMM in Kentucky as well as to produce V6 engines in Kentucky. With domestic markets stagnant or in recession, the further

relocation of production began to threaten the security of Toyota's employees and suppliers in Japan.

Other uncertainties derived from changes in the TPS itself. Toyota announced the implementation of a new order system in 1996. This would allow dealerships in Japan to transmit orders daily, with vehicles delivered within ten days. Dealers would therefore be able to respond more appropriately to the market and reduce stocks of vehicles at sales points. However this would make the smoothing of production volumes, an essential principle of TPS, more difficult to achieve.

The inappropriateness of the product range in the face of market developments could certainly be overcome. But relocation of production outside Japan and the new order system would probably have structural impacts on the Toyota model. In this respect the future of the 'new Toyotatism' remained uncertain, and further restructuring appeared likely.

3.4. CONCLUSION

The Toyota industrial model has been considered to be a post-Fordist model. Its successes are undeniable. In fact, between 1951 and 1995 Toyota never lost money. Yet by the mid 1990s the model had entered a period of restructuring.

It might be thought that this restructuring was only a new adaptation of the TPS, similar to the many changes the company had introduced previously. Each time difficulties were encountered, Toyota was able to overcome them, and even turn them to advantage to improve its system. The company was able to continue in this vein until the end of the 1980s without questioning its management of production costs and personnel, in other words the core of its system. Yet by the mid 1990s reorganization focused on this very form of management, making it possible to speak of a new Toyotatism emerging.

This new Toyotatism could be seen in the design of the new assembly line, the greater autonomy of working groups, and the new industrial relations frameworks (wages system, training, duration of work, working hours, and so on). The goal was to create a

production system which was both more successful and more humane.

Yet, the new Toyotaism had not broken completely with the old system. Just-in-time principles were still alive, even though their rigid application had been abandoned. The concept of autonomisation remained, although it developed towards giving greater autonomy to the working group. The unilateral management of production costs was replaced by autonomous kaizen activities focusing on the costs of raw materials and components, and by a management of labour force costs and production efficiency which was more rational and less constraining. The wage system had been radically changed, but the remuneration of productivity, which grew out of Ohnoism, still applied to blue collar workers. These links to the older form of Toyotaism suggested that both management and the union were acting carefully to preserve the viability and coherence of the TPS. Their prudence partly explained the slow implementation of reforms; further explanation lay in the economic recession which began in 1992.

The differences between Toyota's management of production efficiency and wage system and those at its transplants and its Kyushu subsidiary pose questions about the future of these subsidiaries. In the mid 1990s productivity increases at the subsidiaries were comparable to those at Toyota. Perhaps they were benefitting from know-how acquired from Toyota. But without incentives to raise production efficiency, such as the remuneration of productivity, would they be capable of manifesting the same dynamism in the future? If they could create another form of incentive just as efficient as the Toyota wage system, they would have contributed to the invention of the new Toyotaism.

At this stage in Toyota's history what did appear certain was that the Toyota model glorified by Womack, Jones and Roos (1990) was already out of date, and that Toyota was searching for a new system in an uncertain social and economic environment.

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