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Abstract

The purpose of this paper is to explain transferability of the Japanese production system in the United Kingdom. I had a chance to visit two Japanese-affiliated auto plants in October of 1991. Two plants have different character each other: One enterprise, in the form of a sole entry, was built at a green field site. It produces passenger cars. The other is a joint venture with an American-affiliated local firm, producing mainly recreational vehicles in a restructured plant. However, they both apply the Japanese production system successfully. It seems that both managers and workers in the UK are flexible enough in taking on the Japanese system.

1. Introduction

The main purpose of this paper is to explain transferability of the Japanese production system in the United Kingdom, based on field research. I had a chance to visit two Japanese-affiliated auto plants already operating there in October of 1991. I conducted interviews with Japanese managers and plant tours.

I'd like to state here in the beginning the main focus of this field research. It is imperative for Japanese multinationals to apply the Japanese production system in order to retain competitive advantage in local markets. On the other hand, they should adapt themselves to local managerial environments as long as they are operating there. There remains the question of whether or not the application and the adaptation can be realized without succumbing to a dilemma. Assuming that some balance between direct application and adaptation can be achieved in reality, what aspects of the system can be applied and how? How can enterprises combine the two antagonistic aspects of application and adaptation to local conditions? This is the subject of the research.

I'd like to explain the Japanese production system briefly. It consists of three pivotal elements: Shop-floor orientated work organization, production control with eliminating waste, and participative management. First, shop-floor orientated work organization consists of flexibility in work assignments, participation in work with on-going improvement and a merit system determining both wages and promotion. Work is assigned to a team managed by foremen. Though the task for a worker is to be specified clearly, it is not assigned exclusively for him. It is redistributed flexibly within the team. Workers are required to be multi-skilled, conducting different kinds of tasks within teams or even across teams. Also they are required to be responsible for quality

of product as well as ordinary maintenance of facilities. Work standards are written by foremen and not by industrial engineers. Both foreman and workers are required to participate in finding ways to improve production methods. The foreman has a right to assess performance of team members. Workers are promoted to higher positions within a company through acquisition of a wide range of skills and management ability.

Second, production control that eliminates waste is the key to realize both high efficiency and good quality. Parts are provided according to requests from the final manufacturing process. Each manufacturing process holds a minimum amount of parts and directs previous processes within plants as well as outside parts makers to provide parts according to specifications. Workers are given a right to stop the assembly line when detecting defect. Thus the quality of products is assured in manufacturing process.

Third, participative management must be responsive to the shop-floor orientated work organization. Managers need to keep in touch with the work place and grasp the real situation. Single status or egalitarian deal in employment condition is set for all employees. Also job security is offered for employees implicitly or verbally. Within these guidelines, company meetings or consultations at various levels are instituted to get consensus.

Because the production system stems from Japanese culture and society, it is very interesting whether or not the system is applicable in foreign countries where the culture and structure of society are different from Japan.

The Japanese Multinational Enterprise Study Group¹⁾, to which I belong, had conducted field research on Japanese-affiliated plants in the United States where European culture and traditions exist. After that we visited Korea and Taiwan, where their cultures exhibit greater similarity with Japan, to do research on the same theme. The result of the research shows that Japanese-affiliated firms applied the Japanese system successfully though in some areas only certain elements could be applied selectively. In the U.S., automobile firms were able to apply a greater parts of the system, while electronics firms had a tendency towards adaptation to local environments (Abo *et al.* 1991). In Taiwan, enterprises applied it more smoothly, because local environments are agreeable with the Japanese system (Kumon 1992b).

Regarding the UK, I had expected somewhat negative conditions for transferability of the system beforehand. On one hand, there seemed to be a history of resistance to transfer. In the case of the automobile industry, the American mass production system was diffused only reluctantly in the UK, and indigenous auto firms declined after World War II without making shop floor changes successfully. Even though moving assembly lines were transferred, American-style work organization and production control were not applied easily in the UK. Because workers controlled work effort and trade unions had strong bargaining power against management in the UK, the American system by which management had the right to control and set production standards was not accepted by workers (Lewchuk 1987). Although there are different opinions on the decline of the British auto firms, spot contracts and the large number of trade unions contributed to the decline (Willman 1986).

On the other hand, I could also expect the existence of certain positive conditions for application of the system. Firstly, British auto industry had a long history of excellence in terms of skilled workers as well as good parts makers. Secondly, labor relations have

been changing rapidly from an adversarial posture to more cooperative type, and the single union system is spreading. Also, government welcomes foreign investment in the UK.

There are conflicting judgements on operation of Japanese-affiliated auto plants in the UK. Wickens claimed transferability of the system in the UK based on his own experience. He presented evidence clearly that principles of flexibility, quality and teamwork are transferable in the UK (Wickens 1987). Contrary to this, Garrahan and Stewart criticized the system that it shares the same goal with Fordism, though in a different way, and pointed out problems on the shop floor with predicting future instability of labor relations (Garrahan and Stewart 1992). Interesting enough, the two different works cited here targeted on the same plant.

2. Japanese-Affiliated Auto Firms in the United Kingdom

2.1 An advancement of Japanese auto firms in Europe

The European market is not easy to enter for the Japanese auto firms. Though the sales volume of cars is comparable with the U.S., the European market is composed of different countries having specific prominence. Export of Japanese cars to Europe has been monitored by Japanese MITI (Ministry of International Trade and Industry) since 1986. I'd like to explain a specific feature of advancement of Japanese auto firms in Europe: They have begun to consider local production in Europe after having finished decision making concerning North America. Production plants for passenger cars are relatively concentrated in the UK. The majority of enterprises are joint ventures with local firms and different from the case of the U.S.

What stimulated advancement in Europe is the export restriction on cars, completion of making inroads into North America, and probable continuation of the export restriction to Europe after integration of the EC.

Japanese auto firms had chosen exports of product to developed countries to avoid risky local production. Export restriction stimulated a change of the strategy. At first, Japanese firms restricted exports to the U.S., beginning in 1981. Then they decided to produce cars at local plants in the early and middle 1980's. Start-up of local production in the U.S. by Japanese firms was concentrated both before and after 1983 and 1988. In 1986, MITI started monitoring exports of cars to Europe. Except for one company which had just started production in the UK, major companies began to prepare local production in mid-'80s. In July of 1991, an EC committee and Japanese MITI reached an agreement for continuation of monitoring for seven years after 1992. Because the agreement did not make clear whether it would include local production by Japanese companies or not, different opinions are presented on the point.

Regarding locations, four Japanese firms chose the UK. Three auto makers selected the UK, and another company produces recreational vehicles there. In addition, Hungary, Holland and Spain are selected as locations for production of passenger cars. As for trucks, production started in Portugal, Spain and Greece, which are peripheral areas in Europe and then spreads into developed areas such as the UK and Germany.

The entry form in majority are joint ventures with local makers rather than sole operation. Though, of eleven plants, only three are in the form of joint ventures with

the Big Three in North America, the majority are joint ventures in Europe. That is to say, only two passenger car plants in the UK are sole entry and other plants are in the form of joint ventures or licensing agreements.

2.2 Japanese-affiliated automobile plants in the United Kingdom

Now let me describe the character of the four plants in the UK in terms of location, products, plant scale, Japanese expatriates, and trade unions (Table 1).

Regarding locations, companies A, B and C selected prudently. Company A chose Sunderland in the northeast England as their location. Large, white buildings spread out in the rural area. Workers in this area have a good work ethic, and the company succeeded in hiring diligent people. Local government welcomed an investment of the company A in this area, because the unemployment rate was high due to decline of traditional industries such as ship building, coal mining, and iron and steel. Japanese maker 'b' (Jb) established company B in Swindon in 1985 to do cooperative research

Table 1. Japanese-Affiliated Auto Plants in the UK

Plant	Plant A	Plant B	Plant C	Plant D
Type of Entry	Sole entry	Joint venture with a British car maker	Joint venture with an American car maker	Sole entry
Established	April 1984	February 1985	September 1987	December 1989
Equity Share	Japanese Company 'a' (Ja) 100%	Japanese Company 'b' (Jb) 80%, British Company 'b' (Bd) 20%	American Company 'c' (Ac) 60%, Japanese Company 'c' (Jc) 40%	Japanese Company 'd' (Jd) 100%
Location	Sunderland, England	Swindon, England	Luton, England	Burnaston, England and Deeside, Wales
Products	Pass. cars, Engines	Pass. cars, Engines	Recreational vehicles, Vans, Pickup trucks	Pass. cars, Engines
Start-up	July 1986	Oct. 1989 (eng.), Oct. 1992 (car)	September 1987	Sep. 1992 (eng.), Dec. 1992 (car)
Annual Capacity	200,000 cars	100,000 cars, 70,000 engines	60,000 – 70,000 trucks	100,000 cars, 100,000 engines in first phase
Employees	4,000	2,000	2,100	1,900
Japanese Expatriates (% of all employees)	40 (1%)	100 (5%)	3 (0.1%)	50 or 60 (2.6 or 3.2%)
Table Union	AEU	No	AEU, EETPU, TGWU, MSF1, MSFA	AEU
Total Investment	£900 mil.	¥70 Bil.	£34 Mil.	£840 Mil.

Note: The engine plant of D is located in Desside, Wales.

Sources: Japan Automobile Manufacturers Association, Inc. 1992. *The Motor Industry of Japan*. Tokyo: JAMA. And interviews.

and development with a British company, with which Japanese company B has had a technical tie-up since 1979. Though company B built only inspecting and parts plant for cooperative development of cars, it also had a large site including the plant. 'Jb' seemed to expect building a new assembly plant there in the near future. In fact, company B started to build an engine plant in 1987 and declared a plan to manufacture passenger cars there with the British company.

Japanese maker 'd' (Jd) announced entry into the UK in 1989 and selected Burnaston out of many locations offered by local governments. The reason why 'Jd' chose the neighboring district of Derby is that local government gave good incentives, many parts makers are located close to the plant, and diligent workers are living there. Japanese maker 'c' (Jc) took over the existing plant of an American maker, which shares 40% of Jc's equity. The plant is located in Luton.

Regarding products, it is very interesting that each company plans to produce upper class cars with large displacement volume and high prices rather than their best selling compact cars, which is different from the case in the U.S. This choice seems to aim at selling cars not only in the UK but also in Continental countries. Company C produces mainly recreational vehicles which sell well in Europe. Though it also produces vans and pick-up trucks, it will increase production of recreational vehicles.

Each company starts production at a low volume in tens of thousands of cars, having a plan to increase capacity later. They consider the market situation both in the UK and the Continent where auto firms are suffering from overproduction capacity. Company A started production from small knocked-down types. Then it increased capacity gradually, and adopted a second shift in 1987. In 1988, it began engine production to raise up local content of parts so as to make possible exports of products to the Continent. Accordingly, the French government recognized it as an EC made car. Now it has a 200,000 capacity and employs 4,000 workers. Company B and D will start from tens of thousands cars. Company C produces about 30,000 recreational vehicles and has a plan to increase it.

Japanese multinationals are likely to send a lot of Japanese managers to local plants because they have mastered the unique production system. On the one hand, the more Japanese managers they send, the easier it is for local plants to apply the system. On the other hand, it creates more cost for the company and possibly discourages local managers. The headquarters in the home country is annoyed with such a dilemma. There are three patterns in this matter in the case of North America. The first one is to set the number of Japanese to 5% of all employees. The second one is for Japanese headquarters to delegate power mainly to local managers and have less than 1% of all employees be sent from Japan. The third pattern is to take a moderate stance between the two with dispatching enough Japanese to constitute 2% to 3% of all employees. Every Japanese-affiliated auto plant in North America has settled down to fit any one pattern out of the three. How about in the UK? It is difficult to get fixed numbers for employees and Japanese expatriates, because companies A and C are still increasing employees and companies B and D are preparing for full-scale production. If I must find some image about the rate of Japanese expatriates, I can get an interesting result. That is to say, in the case of companies A, B, and D, they have same result even in the UK as in North America (Abo *et al.* 1991:134–135). The rate shows that company A is 1%, company B is 5% and company D is 2 or 3% (Table 1). Company C sends small numbers of Japanese, amounting to 0.1% of the total, which reflects the position of the

company. The company was lagged behind in making inroads to Europe and did not have its own sale network over there. Given its restricted management resources and the form of joint venture which uses an existing plant, the Japanese headquarters would not want to invest too much. However, it is able to apply the unique system with such small numbers of Japanese, which is completely different from the case in the U.S.

Japanese companies were very anxious about labor relations in the UK before making decision about investment. But labor relations have been changing rapidly. Given the decline of manufacturing industries and Thatcherism, the traditional contract system whereby plural trade unions negotiate with management to get spot contracts has diminished. The single union, even the non-union system, and cooperative labor relations are spreading.

Companies A, B and D display the new trend in labor relations clearly. That is to say, as shown in Table 1, companies A and D have a single union (AEU), and company B chose to be non-union following experiences in North America. Company C has five unions because it took over an existing plant with intact trade unions. On occasion of restructuring, the management asked unions to work together. The form of negotiation and contract changed from a traditional one to a new style by which managers would negotiate with representatives of five unions and get a single contract.

3. Plant A: Green Field Site

I visited plant A on 21st day of October in 1991 to do interview as well as plant tour. Although I had already known of the successful application of the Japanese system at the plant through some studies (Wickens 1987, Abo 1990), the interview and plant tour made me possible to grasp real situation concretely and to get important facts, being different from the brother plant in the U.S. I was especially surprised to know the wage system, quality assurance system and labor relations, because it applied unique system in those items beyond my expectation (Table 2).

Table 2. Progress of Plant A

1984,	2	Agreement signed with Her Majesty's Government to build a car manufacturing plant in the UK.
	10	First British employee appointed.
1985,	4	Amalgamated Engineering Union established as the single trade union to represent Plant A employees.
	5	Training program in Japan for Plant A staff commenced.
	12	Construction of first phase of plant completed.
1986,	4	First trial production car built.
	7	First commercial production car completed.
	9	Plant opening conducted by The Prime Minister, Margaret Thatcher.
1987,	1	Two British Directors appointed to the Board of Plant A.
	9	Thousandth British employee appointed.
1988,	9	First exports to Continent commenced.
1989,	2	100,000 cars completed.
	6	A British Manager appointed Managing Director.
1990,	9	New car launched.

Sources: Company A. *Profile*. And interview.

3.1 Plant structure

I'd like to explain the result of the plant tour at first. The white, large plant is easily noticed from a distance and stands in the rural area of Sunderland. Plant A, a test course, and two smaller plants of related parts makers are spread about in the large site of about 3,000,000 m². The plant was designed by Japanese at the first phase and a second phase of construction added an additional capacity was done by both Japanese and British. In a simply and rationally designed plant, the main four shops; stamping, welding, painting, and assembly, are aligned side by side. Engine, plastic moulding, and casting shops, aiming for realization of 80% of local content, also are placed within the same plant site. Plant facilities, are arranged to resemble English letter 'E'. Both the stamping and welding shops are continually aligned, constituting the top part of the 'E'. The central part is allotted to the painting shop and the bottom part is allotted to the assembly shop. Bodies, after added necessary work at each shop, are sent back to the vertical stem of the 'E', and then transferred to the next shop. They said that this E-shaped type of facilities allocation has an advantage in extension and general purpose.

Let's look at specific features of each shop. The stamping shop is composed of transfer-type machines like in Japan and the U.S. Next to the blanking machine, five transfer-type machines are placed side-by-side, and in addition, one set of press machines is arranged in tandem, which is a traditional layout for press machines. All of them are made in Japan. Large parts of the body shell, such as the body itself, bumpers, and doors are made here, though small pressed parts are manufactured at a related company located in the same site. Next comes the welding shop where each pressed part is welded together. The specific feature of this line is that in addition to the main welding process for framing a body, there are also sub-welding processes, making body sides, hoods, and doors. The welding line flows from the floor main to main respot, body main, body respot and metal line. On the side of the body main line, where the car body is framed, there is placed the body side line. At the metal line, doors, hoods, fenders which are manufactured at the side line are then attached to the main line and put together onto the body. The installation of 90 robots imported from Japan for new cars resulted in augmentation of the rate of automation to 70% or 80% of the welding spots.

The completed body-in-white is transferred to the painting shop, where it is painted in three coats. The painting facilities and conveyer belt are imported from Germany. Painted bodies are transferred to the storage once, where the line-up cars are adjusted to the sequential order of the next assembly line.

The assembly line is composed of trim and chassis. During the plant tour I was able to notice some boards displaying a skill training scheme and Kaizen plan. I was impressed that each worker was working hard with brisk movements at shops. Of course, nobody smoked or ate while working.

3.2 Work organization

Now let me explain the main issues of this paper. I conducted interviews with Japanese manager to grasp whether or not they could actually apply the shop-floor orien-

tated work organization. According to the answers to my various kinds of questions, they surely apply the system successfully even more than their brother plant in the U.S. does.

Human resource management starts from hiring, so I'll explain this stage first. They adopt a very prudent way of hiring, composed of various steps, finishing with a supervisor's interview of applicants. In the first step, they screen candidates by examining their papers and require them to take some tests, such as mathematics or skills, etc. After that, supervisors carry out interviews with candidates and make final decision about hiring. The supervisor is responsible for training employees so that they learn to become team members easily. The company has had a policy to raise ordinary workers to the position of supervisor and skilled workers within. But now that it has started operation recently and has been expanding capacity, both supervisors and skilled workers are being hired separately from the ordinary workers.

I attach great importance to numbers of job classifications or titles which show employee's job content and wages. Because the Japanese-style work organization needs flexibility in work assignments, its numbers show plainly an institutional condition for implementation of the system. Needless to say, the less the numbers are simplified, the more operational conditions are able to be flexible.

The manager's answer to my question was that they have only two job categories; manufacturing staff, meaning ordinary workers and technicians, indicating skilled workers at the shop floor. So there are basically only two job categories for workers, and then come such positions as team leaders and supervisors (Figure 1). This is the same occupational system as in the brother plant in the US. However, in the U.S., supervisors who have a right to assign work can not possibly be members of the labor union, as determined by the labor law. This is different from the case in the UK, where a supervisor can be a member of the union. Figure 1 shows the administrative organization at the shop floor of the plant A. The supervisor manages teams composed of 20 members with two team leaders.

Next I'd like to explain wage system which is more like Japanese system and different from the brother plant's in the U.S. All employees are considered to be salaried workers. The company established single status for every work condition including the wage system. Even though in the case of Japanese-affiliated auto firms in the U.S., managers treat every employee equally in promotion and employment security, in reality ordinary workers are called 'hourly' workers and their wages are counted hourly, as determined by the American labor law. The egalitarian system is more easily institutionalized in the UK, due to lack of regulation by the labor law, and working conditions

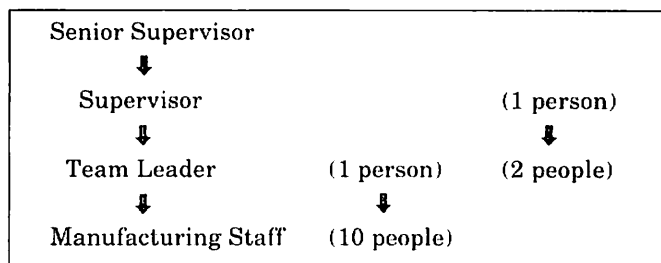


Figure 1. Team System at Plant A

can be set voluntarily within company, following common terms and condition of employment. In addition, the company adopts a performance evaluation system which determines wage. So the amount of wage for workers is different from each other. The manager called this system as ability-based wage system similar to the Japanese system. In the U.S., Japanese-affiliated auto firms did not adopt such a wage system whether or not they had a labor union. Labor union (UAW) would resist it because labor union movement has fought against a merit system due to its history of promoting favoritism. Even if a labor union is not organized, U.S. firms would not adopt it, being afraid of potential attack for organization from the union in the U.S.

There are eight job categories which are potentially subject to union members. They are known as occupational classifications consisting of 'AA' (Administrative Assistant), 'MS' (Manufacturing Staff), 'TECH' (Technician), 'TL-MS' (Team Leader-Manufacturing Staff), 'AO/TO' (Administrative Officer/Technical Officer), 'TL-TECH' (Team Leader Technician), 'E/S/C' (Engineer/Supervisor/Controller), 'SENIORS' (Senior Engineer/Senior Supervisor/Senior Controller). Wage increases are divided into two parts: a general increase and merit increase. General increase is determined through the negotiation at the company council, considering the Consumer Price Index, company performance, and nation-wide wage increase. Merit increase is determined by performance evaluation for each worker. Regarding real wage amount, wages for MS range from 10 thousand pounds to 12 thousand pounds. TL-MS's wages range from 12 thousand pounds to 15 thousand pounds. Also, SV get from 18 thousand pounds to 23 thousand pounds. The wage difference rate between skilled workers (TECH) and ordinary workers (MS) is about 15%, which is narrower than the case for the U.S. plants, which are at about 18%. Supervisors get the same amount of wages as engineers. Supervisors are responsible for assessing each worker's performance. Performance assessment is divided into five ranks, namely, 'outstanding', 'fully proficient', 'highly recommendable', etc. The real range of assessed ranks extends normally without readjustment as a result.

I was curious with reaction by the union to a performance evaluation system. The manager answered my question about it by saying there has been no argument on the matter so far. Management negotiates with the union about the general increase. But the merit increase is not negotiable; it is decided by the company.

Supervisors make a plan and direct job rotation which aims to raise up multi-skilled workers. At present, managers require workers to master related jobs within each team. So job rotation is implemented within team by team leader's leadership in reality. Managers ask workers to master their job accurately now. Because the company has been extending production capacity and many new employees are assigned at each shop. It has a policy to extend a range of job rotation in the near future.

Regarding training and education, the company places great importance on it and has a policy to send core employees to Japan. At the first stage of start-up, all SSVs, one third of the SVs and three hundred of the TLs have gone to Japan to learn how to manage team members, how to set and improve work standards, and so on. The Japanese manager assessed that one of the main requisites for success in plant management depends on the training system sending core members to Japan continually.

As for the promotion, the company has a priority to promote workers internally without setting any limits. One supervisor has been promoted to position of manager already. The deciding factor for promotion is a recommendation by direct supervisor.

There were three different kinds of entry for promotion in the case of the U.S. plants; posting, recommendation by supervisor, and recommendation by team members, and the majority of cases fit the first one; that is to say, posting at the entrance of promotion and application. But plant A adopts the recommendation system following the Japanese example.

Here I'd like to confirm the role of the supervisor. The company places great responsibility and authority on supervisors. They are responsible for work assignment, training for new team members, establishing work standards, promoting team meetings, and so on. So they are given high wages, equal to engineers. The company gives especially great importance to direct communication as the main pillar of the human resources management through supervisors. Supervisors conduct two meetings during company time: the morning meeting and the shift-end meeting. Supervisors give team members various kinds of company information determined by managers and go over problems of previous shift, etc.

Though job security is not written into the agreement, the company regards it as a basic condition for successful human resources management and explains to employees its policy of no lay-offs verbally.

3.3 Production control and procurements

Japanese production system is distinguished by production control without waste. It presumes that workers are vital in carrying it out. The key to realize both high efficiency and high quality depends on active participation in work by manufacturing members. This is because they know well how to deal with problems occurring at the shop floor accurately. I focused my questions about this matter on how managers set up the participative method for production and how workers come to grips with it. The answers indicated that they apply it successfully and especially have implemented a system of quality assurance in the manufacturing process more thoroughly than in the Japanese plants of the parent company. The 'Blue Book', or standard operation manual which shows work method for each team member, is written by the supervisor and team leader. The work methods are different from Japan a little bit because their particular car model is designed in the UK to use local parts.

The cycle time is from 2 minutes to 1 minute and 50 seconds. Workers are required to pull the code (blue code) when they detect any defects. Team members are required to perform Kaizen activities under the guidance of the supervisor. I noticed a kind of slogan, (1) skill control, (2) standard operation, and (3) 3 S (Seiso, Seiri, Seiton) during plant tour.

As for Kaizen activities, they are put into effect by team members within duty hours. If they were conducted even after duty hours, there is an overtime pay.

Regarding the quality control system, there are two fundamentally different systems in the world. One is to assure quality by inspectors especially at final test process. The other is to assure quality in manufacturing process by workers. Although inspectors are assigned in the process even in the latter case, ordinary workers are responsible for quality. The quality control department is responsible for the quality of shipped products. Japanese system corresponds to the latter case. However, there are still two sub-types of quality assurance in the latter case. Namely, either the manufacturing department is obliged to assure product quality thoroughly during manufactur-

ing process, or the department cooperates with the quality control department through assigning inspectors from both departments. The parent company plants in Japan use the system of assigning inspectors from both departments. But the plant in Sunderland adopts the system by which the manufacturing department has responsibility for quality assurance. Also the plant has a quality audit room where samples are picked out at random for inspection and the data fed back to manufacturing process so that it is used for improvement of quality. The parent company has a standard of world wide quality evaluation system called the Vehicle Evaluation System (VES) and the system is applied at the plant in order to attain the high quality expected by consumers in developed countries.

Skilled workers have been hired separately from ordinary workers so far. They are highly motivated to master needed skills, and are not accustomed to the preventive maintenance. As for tool and die job which require the highest level of skills, 70 or 80 employees are trained by two Japanese. The time spent on die changes has been reduced to five minutes.

Rational procurement system is also a specific feature of the Japanese system. Locally produced components comprise 80% of the new models. Even though some functional parts, such as cylinder blocks, crankshafts, transmissions are imported from Japan, other parts are either bought in Europe or produced within the plant itself, including engines. In 1991, plant A contracts for parts with 180 different suppliers. Of these, British makers comprise about 70%, and the other 30% are French, German, Dutch, and Spanish makers. The company is not still satisfied with the quality of parts etc. Consequently, it has been creating special teams composed of about ten members each to advise and instruct parts makers. The suppliers have accepted such advice and so the company has extended the number of associated makers from 12 to 30, and on up to 50. As for length of contract, the company has adopted one-year renewable contract, which are adjusted according to the production cycles for particular models. However, the company aims to build long term with them, and also aims to deal with same suppliers for future models. As for delivery, the 'Just-In-Time' system is not being implemented. Very few makers deliver parts at intervals of a couple of hours. The plant keeps parts stocked for about 1.5 days. Imported parts from Japan are stocked for one month. Cold stripped coils, which are the bulkiest materials, are inventoried for 2 or 3 days. In order to improve delivery system, it will maintain another depository for parts near the suppliers plants. Shipments from several different suppliers are accumulated and subsequently transferred to the plant routinely by truck.

3.4 Labor relations

As stated above, plant A has a single union, AEU. The potential subject for unionization is positions under Senior Supervisor (Table 1). After having hired its initial employees in October of 1984, company A selected AEU as the sole union to represent all plant A employees. The rate of organization is 35% of all employees and more than 50% are at the shop floor. I'm presuming the possibility that the reason for such a low rate of organization is that employees have low expectations of it or that a single union which is likely to represent specific trades has limitations on organization. In any event, the trade union does not actually represent all employees. The company council seems to be playing an important role in labor relations. The company accepts this as

the best way to create good communication and cooperative relations with employees. The members of the council consisted of representatives selected from employees and representatives nominated by the company. At the council meeting, investment plans, business conditions, production volume, market share, profit, and other labor conditions are discussed and the results of the meeting is reported to employees twice a year. So wage and other working conditions with which workers are concerned keenly are negotiated at the council meeting.

Regarding grievance procedure; any problems occurring at the shop floor are expected to be solved through informal talks between the employees and their direct supervisor. However, if issues can not be resolved informally, a four-stage series of discussion within the company is initiated. Talks at the final 4th stage consist of discussion within the council or between representatives of both parties. If the problem is not solved at the fourth stage, it will be referred to the Advisory, Conciliation and Arbitration Service. Both parties follow the decision reached by the outside arbitration.

3.5 Management

Next let us focus on the management of the plant. First we'll investigate the role of Japanese managers. The Japanese headquarters of company A has a policy to rely on indigenous management more than other major Japanese auto firms do. However, this is connected with revisions appropriate to conditions at this particular plant. The plant has more Japanese expatriates than its respective plant in the U.S. The ratio of Japanese expatriates to total employees is also higher than that of the U.S. plant. Based on expatriate/total employee ratio, there are basically three configurations of affiliated U.S. plants; (1) 5%, (2) 2 or 3%, (3) less than 1%. In the corresponding U.S. brother plant, Japanese expatriates comprised only 0.6% of all employees at the time of our research (Abo *et al.* 1991:122). The British plant figure of 1% might indicate it is in the same category. However, the slightly higher rate of Japanese expatriates has significant meaning. It applies a different approach in the UK, under the same policy of localization of management, than that of the U.S. plant.

Although local managers had initiative in management in the U.S. from the beginning of operation; in the case of UK plant, the first president and some department managers such as those in quality assurance, and engineering, were Japanese. Eventually, those positions were transferred to local managers. A British manager was promoted to Managing Director (president) in 1989 (Table 2). Only two Japanese managers are placed in the official, responsible positions such as Deputy Managing Director and Finance Department Director now. All other departments are managed by British directors. The British president is in charge of managing the Personnel, Finance, and Purchasing departments and a Japanese deputy managing director holds the position of managing other departments such as Production, Quality Assurance, Production Control and Engineering. Though 40 Japanese are dispatched there now, they will be reduced to 25 or 30 people after completion of the manufacturing process for the new cars. Top local managers had experience working for auto companies. They are highly motivated by a desire to implement novel ideas which they had been difficult to put into effect at former plants. As a result, the management style of the plant is a blend of both Japanese management and new British management alternatives to traditional local management. In fact, I was told that British managers initiated adoption of completely

open-style office procedures and insistence on face-to-face communication.

Concerning parent-subsidiary relations, company A's Japanese headquarters established regional headquarters both in Europe and North America, and thus promotes delegation of power from Japan to local affiliates much more than other major Japanese auto firms. Except for new investment, which needs the approval of the Japanese headquarters, company A has the final word on various management matters, such as personnel promotions, procurements etc.

3.6 Successful application of the system

Thus company A applied the Japanese system more successfully than I had expected. It applied the system in work organization, labor relations, as well as production control. Surprising enough, even performance evaluation for every worker was brought into effect.

Lastly, I'd like to present indicators of management performance. Both rates of turnover and absence, which reflect performance of labor relations, are lower for company A than the average in the UK. The rate of staff turnover is 7%. The main reason for this is that the form of work is not familiar to workers coming from the region. They are not accustomed to the highly standardized work like automobile industry. Traditional industries, such as ship building and iron and steel had been prosperous there and farming is the main industry now. The rate of absence is also very low. Absence without due notice is quite low at 1 or 2%. There is no penalty for absence other than the corresponding deduction from salary.

Productivity is difficult to assess due to expansion of capacity as well as increasing of employment. It is said that it is equal to the mother plant in Japan manufacturing the same model. Quality level is also equal to Japan because of strict control based on the Vehicle Evaluation System. Production volume expands very smoothly and has reached a totalled 124,000 output in 1991. The company plans to record profit after depreciation in 1992.

4. Plant C: Restructuring the existing plant

I visited company C's plant in Luton some distance away from London on 23rd day of October in 1991. I toured the plant and conducted an interview with the Japanese president. In addition, I had a chance to conduct a supplementary interview with him at the headquarters office in Japan on 6th day of November ²¹.

I have a specific concern on the plant. Because Japanese company 'c' (Jc) has taken over an existing plant which had been operating in the red under the American-affiliated company 'c' (Ac) and has restructured it marvelously. In the US, a closed auto plant operated by the American company was restructured by a Japanese auto company through application of the Japanese system. In the UK, 'Jc' has restructured the existing van plant which had been operated by the same American counterpart. What contributed to restructuring was the introduction of the Japanese production system as well as new product design. Besides, the restructuring has been implemented by a small number of Japanese in cooperation with local managers through setting up organizational reform.

4.1 Restructuring strategy

I am interested in the process of taking over the venture on the part of 'Jc'. There is a division of roles between share holders. 'Jc' provides manufacturing technique and product design and 'Ac' takes a role of sales and finance.

The joint venture produces mainly recreational vehicles designed by 'Jc' and sells it under the American partner's brand name through the sales network of the American maker. 'Jc' gets a license fee. Let me introduce the process resulting in the joint venture. The American partner had produced small-sized vans including vans designed by 'Jc' there but was operating at a deficit. At the final stage of operation it had recorded deficits of a half million pounds per week. The partner had offered a plan for joint venture which would be initiated in operation by 'Jc' in 1987.

'Jc' executives pondered over whether or not accept the proposition. They were forced to decide whether to embark on ventures in Europe or not. At first, a negative atmosphere was prominent in the company due to an established image of the 'British disease' in the 1970's and the EC integration had not been talked enough within the company. Given existing management resources, it was difficult to go into the Europe independently. Sole entry to build a new plant at a green field site was a hard choice for the company. The company was lagging behind in advancement into the European market and had not had its own sales network there. A joint venture was a probable choice. The company thought about its competitive advantage. Both manufacturing technique and product development including that of recreational vehicles are potential competitive advantages. If the company were to agree with the American partner to enter into a joint venture using the existing plant, it would be able to get a license fee. Due to its weak sales network, the company could not take the risk of selling its products under its own brandname. If the joint venture could manufacture good products and sell it through the partner's sales network, 'Jc' would be able to get royalties. Given the situation, this seemed to be the best choice for the 'Jc'. So it decided to enter into a joint venture with the American partner. The partner was very credible, due to the fact it held 40% of Jc's stakes. Royalties would be paid for each product sale.

In this way, 'Jc' eventually decided to take over the plant, but it is not easy to restructure a plant which had been recording continuous deficits. Strategy for structural renovation was needed on the part of 'Jc'. 'Jc' went into a feasibility study with 'Ac' on the condition of the structural renovation. There were two measures to cope with. One measure was to reduce fixed costs drastically, including personnel expenses. Although production of 92,000 vans per year would have been a break-even point according to the financial analysis, the actual production capacity was only 54,000 vans per year. The second measure was to set up new labor relations so that the joint venture could implement the Japanese production system. 'Jc' required some agreements from the partner: Given the five unions, 'Jc' demanded that a single representative be appointed out of five unions with whom to negotiate. Also it required a so-called 'non-strike' clause be accepted by the unions. It also demanded a single status for all employees. Former employees previously had been classified into two groups such as hourly and salary. They had been separated in terms of such labor conditions as working hours, sick leaves, wages, etc. For example, wages had been paid bi-weekly for hourly workers and monthly for salaried employees. Longer sick leave had been given to the salaried than

the hourly. In order to eliminate those class distinctions, a single status was a necessary condition. In addition, it required the establishment of a company joint council. 'Ac' accepted all conditions offered by 'Jc'. 'Ac' reached an agreement with the unions through negotiation on the condition that they renovate the plant. Eventually, the joint venture started operation in September of 1987 (Table 3).

After restructuring of the company, Japanese managers set up the environment for adoption of Kaizen activities which they believed to be essential in the Japanese production system. For example, it adopted a new approach to deduce cost, called IPS (Inventory and Production System). It prepared special rooms for group activities to implement the IPS. IPS meetings are held monthly at each shop such as stamping, welding, painting, trim and final. Excellent team is given a chance to go to Japan to make a presentation at QC meetings at 'Jc'. It also introduced newly designed products following the recommendations of the stock-holder. Looking towards increasing demand for recreational vehicles in the U.S., the partner proposed producing the same model manufactured at 'Jc's U.S. plant. It decided to introduce it into the plant in March/April of 1989. The design for the recreational vehicles was provided by 'Jc' and company C revised it so that it would fit regulations in European markets.

4.2 Plant structure and management

The plant has main four shops; stamping, body assembly, painting, and trim and final. New investment costs were very small, because it used existing facilities. Plant C saw 100 million pounds investments in both facilities and products improvement. It constructed a new body framing station, initiated a new range of solid colors and two coat metallics for recreational vehicles, and introduced the use of one robot in the trim shop. As the company started under the conditions stated above, Japanese headquarters did not want to dispatch many Japanese. If one Japanese is sent to the UK, it costs from 100,000 pounds to 125,000 pounds for the company, which is double or triple personnel cost in Japan. On the other hand, the company can employ one person with about 35,000 pounds including company car cost in the UK. So there were only 4 Japanese expatriates. Their positions were president, one vice-president, manager of quality control department, and liaison engineer. This small number of Japanese caused me to reconsider whether or not it is possible to implement the production system. The president responded to this question by stating that the Japanese production system is possible to make it work in the UK providing proper management environments exist. The essential factor is to implement Kaizen. So managers should shape organizational reformation so as to be able to implement it. The most serious problem in the UK was

Table 3. Progress of Plant C

1987	Established Company C.
1988	IPS (Inventory and Production System) adopted. Exports to Continent commenced.
1989	Decided to produce new recreational vehicles.
1990	Modernization of paint shop for new recreational vehicles.
1991	New recreational vehicles launched.

Sources: Company C. 1991. *Profile*. And interview.

distrust between managers and workers. Managers should respond to the question of probable job loss due to Kaizen by workers. The most important factor is job security. Managers must maintain a no lay-off policy to respond effectively. Managers must understand and respond to its employee's essential concerns.

4.3 Work organization

After having reached the new agreement stated above, managers adopted a flexible work organization whereby workers participate in ordinary labor and can implement Kaizen. They did this by changing traditional work organization. The new forms of work organization are functioning.

Regarding hiring, 1,200 employees were transferred from the old company to the joint venture and the number of employees has increased to 2,200 in accordance with the business expansion. When it started the second shift, it hired additional 700 people and the total number of employees reached to 1,900. But this figure eventually settled at 1,700 people due to turnovers or retirements. After that, it hired 500 people who stay with the company very well.

There are seven job grades: Jobs categories are prefixed with 'TG' (Team Group), and consist of 'TG7' (ordinary workers); 'TG6' (clerks in office), 'TG5' (team leaders); 'TG5S' (skilled workers); 'TG4' (senior office staff); 'TG3' (supervisors); 'TG2' (head clerks in office); 'TG1' (managers, assistant managers). Newly hired operators are classified in the lowest level as TG7's and transferred to the normal level after six months of probational period. Wages are paid monthly for all employees and the average wage for TG7's is 12,500 pounds per year. The company adopted a performance evaluation system for all employees. Wages for each employee are potentially different within the same grade due to performance appraisal and merit payment. There is an overlap of wage level between the highest level of one grade and the lowest level of the next grade. Supervisors assess performance for each team member. After discussion with the supervisor, workers sign a written agreement. On occasion of interviews, a controversy over assessment contents arose in some cases. Supervisors and workers are not accustomed to performance assessment, so managers are searching for the proper method to implement it (Figure 2).

The company has implemented training for team leaders and supervisors who play pivotal roles in shop-floor orientated work organization. They are in charge of various kinds of tasks such as training team members, operation control, and quality control etc. It is a controversial issue whether team leaders should do line work or not. Man-

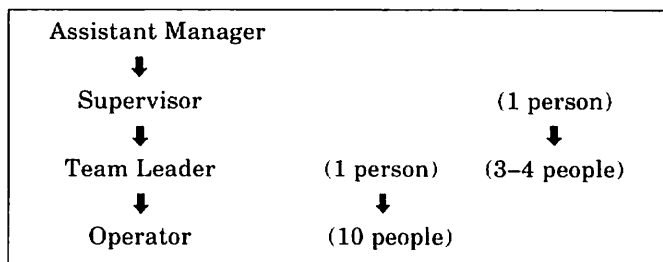


Figure 2. Team System at Plant C

agers order them not to leave the work place. Job rotation, called 'flexibility', has been implemented so that every team member can carry out any of the tasks done within the team. The company has a policy to advise them to extend their work across the team in the near future. The president explained me a necessity for job rotation that if a team member is absent, one worker from another area should be called into the team to fill the vacancy. At that time, if the most difficult task happens to be the responsibility of the absent member, it may be hard for a substitute worker to do it. He should be allotted an easier task. Other team members should master any of the team's tasks in order to be able to change jobs within the team. Team members welcome job rotation and are not dissatisfied with it. This system had not existed before the joint venture was initiated. Training is done mainly through On-the-Job-Training. The company does not send local employees to Japan regularly, though five or six employees have been sent to Japan. At the start of operation, about ten Japanese came to the plant to teach local employees. Regarding promotion, posting is done necessarily as an entrance to it and then managers have the right to decide who is proper to promote according to an appraisal by direct supervisor of the applicant.

The company expresses its intention to maintain job security as much as possible, though it has not written it down officially. The company only declares that if the plant is closed, it will pay wages for six weeks a year. But it assures employees of its no lay-off policy verbally. In fact, when it faced an excess of 250 workers due to decreased production volume in 1990, it did not resort to lay-offs. It bore personnel costs and the arrangement was understood well by unions.

4.4 Production control

As the president explained earlier, they consider Kaizen is crucially important part of the Japanese production system. The company introduced it from the start of production under the label of IPS. It consists of strict quality control and the JIT system etc., referring to so-called Lean Production. The rooms for IPS activities are provided at the shop floor. Team leaders are struggling with improvement activities supported by engineers through trial and error. They are very interested in the activities. Kaizen activities are done by a unit of the production team. Some suggestions to solve problems which stretch over across teams has already been proposed. The president said that such activities are possible to implement in the UK by eliminating barriers to participate in work and giving workers motivation to participate in it. Presentation meetings are held at each shop monthly. The prominent team has a chance to go to Japan and make a presentation at a 'Jc' QC meeting. Some teams from the UK got certificates at the QC meeting in Japan. In fact, I noticed it displayed in the show case at the entrance of the company C.

Regarding the quality control system, company C changed the system to assure quality in the manufacturing process in October of 1991. The manufacturing department is in charge of quality assurance with the members assuring responsibility for quality. The quality control department checks assembled cars at the final stage and directs manufacturing process check points to review how to build quality in the line. The quality control department is also in charge of the insuring quality of shipped products. This is because the manufacturing department was apt to attach more importance to production volume than quality when the department was responsible for

both production volume and quality.

In addition, there is an audit room where three vehicles made the previous day are checked in detail by management members including the president, every morning. Each shop must make a plan to deal with any quality problem raised by them. Accordingly, the quality level is almost equal to Japan. One Japanese expatriate has been posted as manager in the quality control department for the first time via reviving management organization. His role is to check finished vehicles and make a plan to raise quality in the line.

A standard operation sheet which shows each worker's standard task is written up by supervisors and team leaders. The company does not have a policy to transplant standard job descriptions into the plant from Japan, because it is necessary for employees to give their consent to it. Before the joint venture, the industrial engineering department created the standard operations but now supervisors and team leaders are in charge of this with satisfaction. Shop floor workers are given the right to stop the line, which is also different from the system in the old days.

As for the parts control system, the company is promoting 'Kanban' system which provides parts following demand from the final manufacturing process. Though parts shelves, which are larger in space and number than those in Japan, are installed along side the line, Japanese managers persuade local managers to stock parts in the warehouse as much as possible. They have a policy to extend the Kanban system to outside parts suppliers after completing to make the system work within the plant. Gears boxes, front-suspensions are imported from Japan, but the company buys engines from the company of the partner. The rate of local content is 83% for recreational vehicles and 70% for vans.

4.5 Labor relations

There are five unions; the AEU, EETPU, TGWU, MSF1, and MSFA organizing 95% of the employees. On occasion of restructuring, management required them to make single agreement. Because it is necessary to eliminate demarcation among unions. As a matter of fact, work conditions for five unions became equal, but final negotiations used to hold separately before the joint venture. Although management negotiates separately with unions if they have different positions regarding conditions proposed by management. So it's not strict a single union system. Although management does not officially recognize shop stewards selected by workers at the shop floor, they have a substantial role in reality. The company put great importance on communication at various levels of meetings, such as the employees meeting held twice a year, staff members monthly meetings, and at team meetings twice a month. Those communication systems contribute to increase credibility of the company in the eyes of its employees.

4.6 Application of the system at the restructured plant

Firstly, I'd like to explain management performance. The present rate is 94%. The absent rate without due notice is only 1.5%, lower than the average British plant. Sales volume has been increasing very smoothly after reopening the plant and the bottom line went into the black in 1988. IPS activities have contributed to the profit, so the company has gotten substantial results after restructuring. The result depends on the

Japanese production system adopted after reforming traditional labor relations. The company represents a very interesting example of successful renovation of an existing plant with small number of Japanese expatriates. But as I explained earlier in this part, there was some difficulty in working out of the performance evaluation system. I also happened to notice workers taking soft drinks while working as well as a relatively slow line speed, which are symptoms of still existing habits carried over from the old days.

5. Concluding Remarks

The main purpose of this paper was to explain the transferability of the Japanese production system in the United Kingdom, based on the field research. The result shows that two plants applied more effectively than expected. Plant A, which manufactures passenger cars at the green field site, applied the system successfully. For example, it adopted performance evaluation for all employees and quality assurance in manufacturing process. Though plant A localized management staff according to the policy of its headquarters in Japan, it adopted different approach from the corresponding U.S. brother plant. Namely, at first Japanese managers took responsibility in management and then gradually delegated authority to local managers.

Plant C, which is a joint venture with an American firm, produces mainly recreational vehicles using existing facilities. Japanese 'c' is responsible for the manufacturing and development of the product. The Japanese president, who believes that Kaizen is the essential part of the system, set up necessary organizational measures through reforming traditional systems. Both performance evaluation and quality assurance in manufacturing process are applied as well. Even though the two plants have different characteristics in both their products and physical plants, they both applied the system successfully. Comparing with the applicatory situations in the U.S., they applied it more effectively. It seemed that both managers and workers in the UK are more flexible and receptive to the system than those in the U.S.

Notes

- 1) The Japanese Multinational Enterprise Study Group conducted field research on Japanese-affiliated manufacturing plants in the U.S. in 1989. The result of the research was published (Abo *et al.*).
- 2) I had a chance to visit plant C again in 1992. It has entered into the second phase of operation, based on successful restructuring of the plant. By calling 22 Japanese engineers from Japan, it has started a new campaign to increase productivity and quality. For example, I noticed remarkable improvement in cycle time.

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