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1. Purpose of paper

This paper aims to explain the transferability of the Japanese-style teamwork abroad, based on field research. I had a chance to visit Toyota Motor Corporation's overseas plants from 2004 to 2006. Teamwork constitutes one of the important elements of the Toyota production system. The system has two pillars: (1) Just-In-Time and (2) Jidoka. The JIT includes elimination of waste, small lot production, and zero parts stocks. The Jidoka includes automatic detecting of quality deficits on the line. Both elements need a high skill level in the workers. Team is an organizational frame to manage the workers. The group leader, who is responsible for managing the workers within the team, assigns tasks to each worker. He is also responsible for training workers to be multifunctional, by mastering a high skill level.

I will analyze a real situation of teamwork at four assembly plants: In the UK, France, Turkey and Argentina. The four plants are located in different areas, having different cultures and practices. The plants in the UK and France are located in the central region of the EU. Turkey is a candidate country for EU membership. And Argentina is located in South America (see the Table 1). However, under different cultures and practices, Toyota Motor applies the teamwork at the four plants. They have almost the same structure of teamwork at the four plants.

2. Teamwork at British Plant

The British automotive makers preserved an indirect type of management at the factory in general. The shop stewards organized group of workers. The trade union representative, who belonged to one of many unions depending on his particular craft, bargained with management over wage rates in a piecework system. The work groups headed by the shop steward were able to reorganize their own work. The so-called craft model prevailed more or less among the shop floors at the indigenous British makers. Although the management tried to adopt direct control on the shop floor through simplification of job classifications and reinforcement of foreman function, they could not succeed in it. The British makers attempted to introduce the Japanese style teamwork at the factory, which were called Japanization at work. There were several cases that the shop steward's control power over workers continued even in the factories where managers tried to regulate role of shop steward (Turnbull, 1996, Stewart, 1999). However, the work organization initiated by shop steward was difficult to survive, when the factories were exposed to international competition.

I am very interested in that how Toyota set the work organization at the British plant. It basically adopted the organizational framework modeled after the NUMMI (New United Motor manufacturing, Inc.), which is Toyota's first manufacturing plant in developed countries, located in Fremont, California. The British plant made use of the experiences at North America and added new elements in wage system, such as performance evaluation and yearly salary system for workers.

The team organization forms the senior group leader, the group leader, team leader and team members which are exemplified after the parent company in Japan. The group leader is responsible for management in production and workers. Typical numbers at each layer are one group leader, four team leaders and 20 team members.

The training for employees combined two ways to send British employees to Japan and Canada and to dispatch Japanese trainers to the UK. The British workers were sent to Tsutsumi plant in Japan, which plays a role of mother plant for British plant. The North American plants contributed to train British workers successfully as belonging to same English speaking region. The trained employees taught workers at British plant through the On-the-Job-Training, after coming back to the UK.

Managers encouraged workers to be multifunctional. I noticed the maintenance versatility chart at the welding process. The chart showed master levels of various tasks for maintenance workers at four grades, displaying worker's name at the vertical line and tasks at the horizontal line. Also I saw the process versatility chart for production workers at assembly process. For example, one chart at chassis process showed master level of various tasks for workers at four grades and also showed teaching ability at two levels. It comprised 22 names at the vertical line and tasks at the horizontal line and a sign by the Group Leader. The team leader checked the confirmation chart which included the team leader's tasks, such as team member attendance, job rotation chart, equipment check sheet, etc.

There were a lot of charts at the engine plant which showed various skills in detail. The training time table

showed skill levels at four grades, displaying worker's name and tasks. It exhibited four grades of skill, such as 'in training', 'able to perform task with supervision', 'can perform task without assistance', and 'able to assist in training others'. There were also the Work Standard Sheet, the Standardized Work Visual Control Board, indicating the standard work at shop floor.

The wage system was different from the US plant. Although it was modeled after two simplified job classifications from NUMMI, such as production and maintenance team members, the wage system was similar to Japan. In the US, the wage system was divided into 'hourly' and 'yearly salary', because of the provision in the Labor Law. The production workers were classified as 'hourly'. It was difficult to set performance evaluations for each worker in the US which would enable a reflection of skill level and work attitude on wages.

The managers introduced yearly salary system for all employees, including workers in the UK. The wages for employees were indicated yearly and paid monthly. The production workers have same wage system with the white-collar employees.

In addition, it set performance evaluation for production workers. There are two parts in wage increase; the core increase and the appraisal increase. The former increases equally for all employees, for example, at 4 % annually. On the other hand, the latter increases by performance evaluation which is carried out by the group leader. The group leader assesses team member's skill level and work attitude at five grades. Therefore he plays a role of the first assessor. The result of the evaluation is accumulated and effective in wage increase and promotion. There are differences in wage amount between production and maintenance members. The production members are paid £13,000 to £20,000 per year, and maintenance workers get about 20 % more than that¹ (note 1). Thus the group leaders play a role of management of workers and have a power of performance evaluation. Team leaders are responsible for production management and support the group leaders. Promotion to the position of the group leader and team leader depends on the result of performance evaluation and recommendation by his supervisor. Although posting system existed, the recommendation system worked well. Though the group leader and team leader were hired from outside at first, they were promoted within the company later.

2. Teamwork at French Plant

How do they organize the work system at the plant? Before explaining it, I should mention the managerial environment regarding to the work organization in France. The mass production system was established after the WWII and the wage system changed from the piece rate to the hourly rate in 1960s at the indigenous plants. The wage grades system had changed from the traditional skill levels to the professional skill levels in 1970s. The lean production, modeled after the Toyota production system, was introduced at the automobile plants in 1990s. The teamwork was also adopted as one of the constituents of it (Durand & Hatzfeld, 2003).

I should point out the wage grades table of the metal industry in 1975. The system matches to the Japanese wage system that encourages workers to be multifunctional.

First, there are three large categories of professions, such as workers, foremen, and technicians/clerks. The technicians are unique category in Europe. They are positioned at the middle between the production workers and engineers, graduated from university. This category gets larger in Europe.

Second, the table abolished the traditional skill classifications, such as skilled, semi-skilled, non-skilled, and set five wage levels; from the level I to the level V. Each level is divided into three ranks. Employees are placed on an appropriate rank, based on the professional skill at hiring.

Third, the three categories mentioned above were included in the same table. This makes ease employees to move within the category and to stimulate promotion upward. The workers were put in the levels of I to V, and foremen were placed in the levels of III to V. Also technicians and clerks were situated at I to V. The single table comprises every employee who came from high school and who graduated from university. The French wage grades table did not indicate traditional segmented jobs but manifested broad professional classifications. Therefore it matches to rise up multifunctional workers and to implement job rotation within same rank. Each company has unique professional table and wage system upon the industrial table and set performance evaluation for individual in general.

Back to Toyota's plant management system. The work organization at shop floor consists of three layers; the group leader - the team leader - the team member, that were set at NUMMI. The typical numbers for each layer are as follow; one GL – five TLs – 25 TMs. Before installing equipment, managers trained team members at overseas plants by dispatching them. Also Japanese trainers were sent to the French plant to train local employees. The overseas plants which were allotted to train them were Canadian, British and Japanese plants. British

¹ In 1997.

employees who understood French took a role of leader of trainers. Japanese trainers came from the Takaoka plant. Although Toyota has changed the typical mother plant system which the Japanese plant takes responsible in all to leave operation to local plant at relatively first stage, if I insisted it, the Takaoka is the mother plant. The Takaoka plant sent trainers and engineers to France. Trainers from Japan went together with French workers to the British plant and trained them there. Even the British plant had sent employees to North America at initial stage of operation, the French plant exploited the chance more effectively.

Although managers did not put great importance on an educational background in hiring, the team members are high school graduation or more, and the maintenance members are technical college graduation. The French workers get necessary skills very well. Managers expected them to implement job rotation even at the first stage. Although it is said that the job rotation is preferable after getting into stable operation, managers asked workers to implement job rotation at the first stage, with providing them necessary training. Managers thought that the job rotation at the first stage contributes to speedy master of skills. There was a table headed 'polyvalence' which indicates worker's level of mastering tasks. The table includes worker's name at the vertical line and tasks at the side line. It shows level of mastering tasks at four grades, and I noticed it at every process.

Production team members not only master their works well but also extend different tasks, such as maintenance and quality assurance. There was a card which headed 'adjustment of finger' at the press shop. Though the task was originally done by the maintenance member, the card showed production members tried to perform it with assistance of maintenance members. It was an experiment to increase worker's skill level by promoting communication and cooperation between production member and maintenance member. At the body welding shop, I noticed a card that showed worker's extension of ability in quality check. That is to say, workers extended focusing points in quality from detecting lack of part or wrong parts on the surface to fitting parts correctly.

It is important for workers to extend their operation not only in original tasks but also in maintenance and quality check, because the extension enables to increase productivity and quality level at the shop floor. I noticed the same card at each process and got the same explanation by the Japanese manager. The manager answered that the maintenance member does not make claim to extension of tasks by production workers, when I asked him whether maintenance member made objection to extension on the part of production members. And he added that management should find evaluation system for it.

There are two job classifications, production and maintenance. Toyota adopts simplified job classifications since an operation of NUMMI. As I explained above, different from the USA or the UK, the French grades table had changed from segmented jobs to three large categories. Toyota does not need to change job classifications radically in France. It adopts some wage ranks for different jobs and positions. Namely, it set three ranks for two jobs (production member and maintenance member) and two positions (group leader and team leader). Also it adopted performance evaluation for each member.

French workers hold wage coefficients, such as 170 or 180, which reflect skill level acquired at previous occupation or school education. When I asked manager whether they apply the system same as in other French makers, he answered that as the French grades table is a framework for the plant, they accept it. However, they revised it, because they did not rely upon it directly, establishing own wage system. They provided unique wage system which enables to evaluate progress in skill. Managers also set performance bonus which is paid equally to all employees. The bonus is accounted monthly on the base of records in safety, quality, production etc. The amount that I noticed was 284 euro. That is paid at every three months and aggregates to about 3000 euro a year.

The result of performance evaluation is effective to increase in wage and promotion. Team members are possible to be promoted to position of the team leader within three years, due to short time in plant operation. Although group leaders were hired from outside at first, half numbers of them are promoted within the plant.

The French working hour is 35 hours a week. This is a difficult element for manufacturing plant. Toyota adopts three shifts with three crews to get over the short working hour. One crew works seven hours a day, and all three crews work about 21 hours. The night shift is assigned to specific crew and other two shifts are rotated.

3. Teamwork at Turkish and Argentine Plant (oral presentation)

4. Discussion on transferability of Teamwork

Four plants have almost same structure of team (see the Table 2): job classifications, team organization, wage, job rotation, and training. But there are slight differences in skill formation, small group activities.

Job Classifications are simplified into two; production member and skilled member (or maintenance member). This is a prerequisite to train workers to get high skill level. If there are a lot of JC, assigned exclusively to specific worker, it is difficult to extend his tasks beyond his job. Under the teamwork, worker is not only expected to do his regular tasks but also extend his tasks beyond the job. The extension includes job rotation

within team and to tackle irregular work such as problem solving on the line. Simplification of JCs started from NUMMI in the US in 1984. After that Toyota set the same system at overseas plants.

They set team to organize work on the line. The team composed of four or three layers; senior group leader (SGL, chief leader in Turkey), group leader (GL), team leader (TL) and team member (TM). Senior group leader and group leader are responsible to manage team: task assignment, reallocation of tasks within team, job rotation, on the job training, performance evaluation for each worker, etc.

There are no differences in Role of leader at four plants. Leaders are responsible to train team members, to encourage team members to be multifunctional, to evaluate team member's performance, etc.

Local wage system is difficult to change, because it reflects a long history of labor relations. Especially performance evaluation for each worker is difficult to implement. In Japan, both white-collar and blue-collar have same wage system. Blue collar workers have same wage system as white-collar. Toyota tries to implement the same wage system at four plants. All employees are treated as "salary". Blue-collar workers are not called as 'hourly', but called as team members. They have set performance evaluation for each worker. This system encourages workers to be multifunctional. If workers master high skill level (job rotation, irregular work etc.), they will be evaluated highly and received high wage level.

Four plants implement on-the-job-training. Workers get initial training course after hiring, they are trained on the line. Trainers are leaders and experienced team members.

Interestingly enough, I can notice that skill formation and small group activities are slightly different at plants. Skill formation includes standard work, job rotation, and versatility. Standard work refers to do regular work on the line. Worker is expected to do his job within the cycle time correctly. After that he is expected to extend his job within team and even beyond team. And he is expected to deal with irregular work, such as detecting defects, and problem solving on the line. Argentine plant is lagged behind in skill formation, comparing with other plants. It stands still on the level of standard work. Managers expect workers to master standard work correctly at the plant. As the plant is expanding capacity recently, it is increasing number of employees. This is one reason of that. The other is that managers need much time to expect workers to be multifunctional.

Small group activity is also different at plants. Both British and Turkish plants have not implemented it so far. As it is a voluntary activity, Toyota Motor did not implement it early 1990s. However, it seems to put into practice at every plant overseas recently. Therefore, the two plants are under preparation for it.

5. Concluding Remarks

Four plants are located in different regions, having different culture and practices. Even though managerial environments are different, they apply the teamwork successfully. The formal elements of teamwork, such as job classifications, team organization, role of leaders, and wage system, are applied at the plants at almost same level, but skill formation is different. Argentine plant stands at an initial stage of skill formation. Strictly speaking, three other plants seem standing at different place at skill formation, especially problem solving on the line. Therefore, although they apply the teamwork successfully, its functional level is still different.

Japanese-style teamwork puts a great importance into skill formation and equal treatment for all employees. I have explained that both high skill formation and equal treatment are transferable at four plants. Teamwork seems universally transferable.

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Table 1: Profile of plants

Company Name	TMUK(Toyota Motor Manufacturing UK, Ltd.)	TMMF (Toyota Motor Manufacturing France, S.A.S.)	TMMT (Toyota Motor Manufacturing Turkey, Inc.)	TMMA (Toyota Argentina, S.A).
Location	Burnaston, Derby, UK	Valenciennes, France	Sakarya, Turkey	Zarate, Buenos Aires, Argentina
Establishment	Dec., 1989	Oct., 1998	July, 1990	May, 1994
Start-up	Dec., 1992	Jan., 2001	Sep., 1994	Mar, 1997
Ownership	Toyota 100%	Toyota 100%	Toyota 90%, Mitsui 10%	Toyota 100%
Products	Passenger Car: Avensis, Corolla	Passenger Car: Yaris	Passenger Car: Corolla	Truck: Hylux
Capacity	240,000 units/year	210,000 units/year	175,000 units/year	65,000 units/year
Process	Press, Welding, Painting, Assembly, Plastics	Press, Welding, Painting, Assembly, Plastics, Engines	Press, Welding, Painting, Assembly,	Press, Welding, Painting, Assembly
Sales	EU	EU	EU, Turkey	Argentina, South America
Employees	4,291	3,250	3,453	2,100
Japanese	30	27	23	6
Shifts	2	3	2	2
Union	AMICUS	5 unions	No	Auto Union
Research	2006	2004	2006	2006

Table 2: Teamwork at four plants

Plant	TMMUK	TMMF	TMMT	TMMA
Job Classifications	2 (production, skilled)	2 (production, maintenance),	2 (production, maintenance)	2 (production, maintenance)
Team Organization	Senior Group Leader-Group Leader-Team Leader-Team Member	Group Leader-Team Leader-Team Member	Chief Leader-GL-TL-TM	SGL-GL-TL-TM
Role of Leaders	Training TM, management of TM and production on the line	Training TM, management of TM and production on the line	Training TM, management of TM and production on the line	Training TM, management of TM and production on the line
Wages for Workers	Range job wage, performance evaluation, Salary	4 grades (production, maintenance, GL, TL), 3 ranks for each grade, performance evaluation, Salary	16 ranks, Performance evaluation, Salary	Performance evaluation
Skill Formation	Standard work, Job rotation, versatility	Standard work, Job rotation, polyvalence	Standard work, Job rotation, versatility	Standard work, Less job rotation
Training	On the job training	OJT	OJT	OJT
Small Group Activities	No, under preparing		Under preparation	Yes