

**Human Resource Development and Treatment of Skilled Workers in the
Monozukuri (Manufacturing) Industry
— Present State of Machinery and Metal-related Industries —
Summary**

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The figures presented in Part II and Part III, and the notes of the interview survey on which the case records in Part IV were based, have been prepared by Tomohiro Takami, Kosuke Himeno and Akiko Mita (all are research assistants at the Japan Institute for Labour Policy and Training and are doctoral students at the Graduate School of Humanities and Sociology, University of Tokyo).

1. Objective and Outline of Research

The sharp credit crunch triggered by the financial crisis in late 2008 produced a serious impact on the world and Japanese economy. In the Japanese economy, the foreign exports that had led the economic recovery after the collapse of the bubble economy decreased drastically, and Japan posted a trade deficit in fiscal 2008 for the first time in 28 years. Export reduction directly affected the business performance of manufacturing companies that rely heavily on foreign demand. As a result, large-scale employment adjustments were conducted, mainly for non-regular employees.

However, when we pay attention to the messages sent by labor and management, they seem to maintain an awareness of the issues of fostering of human resources and capacity development, even in such severe economic conditions and business environments. For the manufacturing industry, the key to remaining competitive amid harsh international competition and changes in the system of the international division is to foster and effectively utilize skilled workers who play a fundamental role in technological development and production. This had been considered an important issue, since the period prior to the financial crisis, when conditions were favorable for production and business operations. The various messages sent by labor and management seem to indicate that this issue will remain a challenge requiring active efforts.

In this research, two questionnaire surveys to business establishments and employees and interviews with establishments and companies were conducted for the purpose of grasping the actual state of the fostering and human resource development of the core personnel in the manufacturing industry and elucidating the factors that affect such state. The questionnaire surveys to establishments aimed to find out: what qualifications are required of skilled workers who form the core of the manufacturing industry within the ongoing changes in the business environment and the systems of international division; what efforts each company is making for the development of such qualifications and what problems arise during the process of such efforts; and how each company utilizes and treats technical personnel and skilled workers while fostering them.

Meanwhile, the questionnaire survey for skilled regular employees was designed to discover: how they have developed their skills at their respective workplaces; what needs they have for the measures taken by their companies; and what they think about the relationship between human resource development and treatment. Based on the results of this questionnaire and the one for establishments, we tried to consider the problems currently facing fostering and treatment of skilled workers and future

possibilities.

2. Summary of the Results of the “Survey on Fostering, Human Resource Development and Treatment of Skilled Workers in the Manufacturing Industry” (Questionnaire for Establishments)

(1) Present state, securing and fostering of core skilled workers

In this survey, among regular employees (called “skilled regular employees” in this survey), the core personnel of skilled workers are defined as “core skilled workers,” who particularly “play a central role in the business activities of each company (establishment) and support the advantages and competitiveness of the company (establishment).”

The largest number of establishments that answered the questionnaire said that their core skilled workers (= skilled regular employees) are “manager-type skilled workers” who can take charge of supervising production lines as leaders of production sites. Additionally, many establishments described their core skilled workers as “multi-process skilled workers,” who can work on (including process changeover and equipment maintenance of) a production line consisting of more than one process, “all-round skilled workers,” who can work on the whole production process, including improvement and conversion of equipment and production of tools and jigs, and take part in prototype and production development/design, or “multi-machine skilled workers,” who can be in charge of production activities (including process changeover and equipment maintenance) by efficiently handling a number of similar machines. Many establishments answered that they put the greatest emphasis on securing “manager-type skilled workers,” “all-round skilled workers” or “multi-process skilled workers.”

When asked about the knowledge and skills required of core skilled workers whom establishments have been putting the greatest efforts to secure, many establishments answered knowledge and know-how of “quality control,” “the streamlining and improvement of production lines,” and “the maintenance and improvement of equipment.” Particularly among the establishments that has been putting substantial effort in securing manager-type skilled workers, a high percentage of establishments that they “require knowledge and know-how of quality control and the streamlining of production lines.”

About one-fourth of all respondent establishments said that they “have been securing exclusively by fostering” of the core skilled workers whom they have been putting the greatest efforts to secure. Including those who answered that they “have been secured

mostly by fostering,” the establishments that have been securing the core skilled workers mainly by fostering them occupy about 70 percent of all respondents. Although the percentage of the establishments that mentioned fostering as the main way of securing core skilled workers is less than 50 percent among those that have been putting the greatest efforts in securing “management-type skilled workers” (skilled workers who can take charge of the management of all the production activities of the establishment or part of the management of the establishment, such as sales and financial affairs), there is little difference in this percentage among the establishments that have been putting the greatest effort in securing other types of core skilled workers.

About half of the respondent establishments said that they have been successfully securing core skilled workers whom they have been putting the greatest efforts to secure. These establishments think that the strong commitment by skilled regular employees to the companies they work for and to their ability development, as well as the atmosphere of the workplace and establishment that affect such commitment, resulted in the success in securing core skilled workers, rather than the state of the management of human resource development. On the other hand, the remaining half of the establishments that have not been able to secure core skilled workers as expected consider the difficulty in recruiting itself not only of skilled workers but also of other employees and the state of the management of human resource development as problems.

(2) Efforts of capacity development of skilled regular employees

In the questionnaire survey to production establishments, the state of human resource development of skilled regular employees was also surveyed. It is supposed that, in most companies and establishments, securing and fostering core personnel is the immediate or eventual result of securing, training, and skill development of skilled regular employees. If so, securing and fostering core personnel is supposed to be substantially affected by securing, fostering and developing the capacity of skilled regular employees, including core personnel (or prospective core personnel). The general state of fostering and human resource development of skilled regular employees at the respondent establishments is described below.

When asked about the policy concerning human resource development of skilled regular employees, more than half of the respondent establishments answered that they are “carrying out human resource development with the aim that each employee will acquire the ability necessary to perform their present duties,” i.e., they carry out

human resource development for the purpose of securing immediately necessary personnel. Regarding the means of proceeding with human resource development, we first examined the state of implementation of the means to provide on-the-job-training (OJT) effectively. About three-fourths of the establishments questioned said that “the boss and superior employees instruct on work procedure on a daily basis” as an effective way of providing OJT, and about 60 percent of establishments said that they “examine the content of work and let employees experience the gradual change of easy work to more difficult work” or they “provide OJT using work standards and work procedure instructions.” It seems that these are the mainstream ways of implementing OJT.

On the other hand, about 60 percent of establishments provide off-the-job training (Off-JT) to skilled regular employees. Most of them conduct Off-JT for the purpose of “having employees acquire specialized knowledge and skills necessary for smooth operation of work and tasks” or “having employees acquire basic aptitudes required in the production site such as the Five “S”s: *Seiri* (sort), *Seiton* (straightening up), *Seiketsu* (sanitizing), *Seiso* (cleaning) and *Shitsuke* (discipline).

The above-mentioned policy on human resource development and the degree of actual implementation of the efforts for such fostering and human resource development differ largely by the total number of employees working at the establishment or the company to which the establishment belongs. As for the policy on human resource development, the larger the number of employees, the higher the percentage of the establishments that answered that they “grasp the number of employees currently working at the establishment and their skill level using the skill map, etc., and conduct human resource development measures accordingly,” or they “conduct human resource development measures based on the estimate on the number and skill level of employees required for business development in the years ahead.” Additionally, both the percentage of establishments that conduct OJT “using the work standards and work procedure instructions” or “according to the plan under the supervision of the instructor they appointed” as an effective means of implementation and the percentage of establishments that provide Off-JT get higher as the number of employees increases.

3. Summary of the Results of the “Survey on Fostering, Human Resource Development and Treatment of Young and Middle-level Skilled Workers” (Questionnaire for Employees)

(1) Knowledge and skills that have been required to date

When asked about the skills and knowledge that became necessary during the course of work, the largest number of respondents answered: “more advanced skills and knowledge relevant to the assigned duties” and “extensive skills and knowledge relevant to the assigned duties and related duties,” both accounting for about 70 percent of all respondents. In addition, many skilled regular employees mentioned: “being able to instruct subordinates and juniors,” “being able to operate more than one machine,” “knowledge and skills necessary for the maintenance and improvement of equipment” and “skills of assembling and adjustment.”

When asked about the means that were effective in acquiring the skills and knowledge mentioned above, the largest number of respondents answered: “being instructed by seniors and the boss at any time,” regarding every area of skill and knowledge. The percentage of the respondents who gave the above answer is particularly high among employees who are required to have “skills of assembling and adjustment,” “skills of changeover on automated machines” and “more advanced skills and knowledge relevant to the assigned duties,” while it is relatively low among employees who are required to have “knowledge on operation of the company, such as financial affairs and sales” and to “be able to instruct subordinates and juniors.” A high percentage was recorded for respondents who said that the “training programs provided inside and outside the company” were the most effective means of acquiring and further developing “knowledge and know-how of design,” “knowledge and know-how of measurement and control,” “knowledge and know-how of electric and electronic circuits,” “knowledge and know-how of mechatronics,” “knowledge and skills necessary for streamlining the production process,” “knowledge and know-how necessary for the management of production lines,” and “knowledge on operation of the company, such as financial affairs and sales.”

(2) Awareness towards human resource development at the workplace, and requests for the company

With respect to human resource development at the workplace, 94.2 percent of the respondent employees said that they “would like to actively acquire the skills and knowledge that will become necessary,” showing that they generally have a strong willingness to develop their capacity. In the workplace, about 70 percent of the respondents said, “there is a boss or senior close to me who provides sufficient instructions concerning the skills and knowledge necessary for the performance of work” or “the present level of my skills and knowledge is understood” respectively. On the other hand, the percentage of those who said that “the atmosphere at the

workplace (company) shows a strong willingness to foster skilled workers” or that they are “clearly told by the company (establishment) what skills and knowledge will be necessary for them in the future” hovers only around 50 percent.

Looking at their needs for education and training provided by the company: 1) a relatively large number of employees said that they desire Off-JT be provided in connection with the company’s activities, be provided systematically, and be helpful in obtaining qualifications; and 2) also a relatively large number of respondents mentioned “knowledge and know-how of streamlining and improvement of production lines,” “knowledge and know-how necessary for the maintenance and improvement of equipment,” “knowledge and know-how of quality control,” and “knowledge and know-how of design” as skills that they want to acquire in the future.

(3) How they think of their career

About half of the respondents intend to pursue a career as a skilled worker, while about 40 percent of the respondents have not decided “Yes” or “No”. The higher the educational level, the higher the percentage there is of those who intend to pursue a career as a skilled worker. No correlation is found between this percentage and age or length of service.

When the respondents who intend to pursue careers as a skilled worker were asked which type of skilled worker they aim to be, the largest number answered “all-round skilled worker,” followed by “manager-type skilled worker” and “multi-machine skilled worker.”

4. For Future Efforts to Secure and Foster Core Personnel (Core Skilled Workers) in the Manufacturing Industry: Based on the Results of Survey and Analysis

In this study, we further conducted an analysis of the questionnaire surveys presented above. The analysis gives the following suggestions for the securing and fostering of core skilled workers in the manufacturing industry.

(1) From the perspective of securing and fostering core personnel

The analysis of the questionnaire survey to production establishments clearly shows that the companies and establishments that have been successful in securing core skilled workers are those that secure core skilled workers primarily through fostering them. It is also found that, among the establishments that do not make efforts for effective implementation of OJT, that do not provide Off-JT or that do not make efforts to develop employees’ ability to make proposals and create new ideas, the probability of

answering that they have been securing core skilled workers through fostering tends to be low.

However, the establishments that do not make efforts for effective implementation of OJT account for only 3.4 percent of all respondents. Regarding the efforts made at the production site, 8.9 percent of the respondent establishments do not make efforts to develop the ability of skilled regular employees to make proposals and create new ideas, which are made by many establishments. On the other hand, the number of establishments that do not provide Off-JT for skilled regular employees is no small, accounting for nearly 40 percent. These observations on the degree of implementation suggest that, in considering various measures to make it easier to secure core skilled workers through fostering by companies and establishments in the manufacturing industry and successfully secure core skilled workers, particular attention needs to be paid to the implementation status of Off-JT for the skilled regular employees of each company/establishment and the environment of implementation.

There are noticeable differences in the degree of implementation of Off-JT for skilled regular employees by size (number of employees) of the company that the production establishment belongs to. The smaller the size of a company, the less the percentage of implementation is. Additionally, looking at the indexes of sales and shipment values of establishments for FY 2004 = 100, the less the indexes in FY 2007, the less the percentage of implementation is. Based on these results, we can first point out that creation of a favorable environment for medium-, small- and extra-small manufacturing companies to carry out Off-JT for skilled regular employees is one of the issues to be addressed in society for the fostering and human resource development of skilled workers for the future. The above results also suggest that the companies with worsened business performance, which have been significantly increasing in number due to the economic depression caused by the financial crisis, may reduce their investment in fostering and human resource development, mainly within Off-JT. It is feared that this reduction in investment will make it difficult to secure core skilled workers in the future. In the severe economic and business environment, how to create an environment in which manufacturing companies and establishments will not lose their commitment to fostering and human resource development is considered another important social challenge that needs to be addressed.

(2) Recent trends in the efforts by establishments and companies for education and fostering of employees

The analysis of this research clearly shows that manufacturing companies reconsider

the existing independent policy of “fostering skilled regular employees in house on the basis of OJT” as a means of education and training and are shifting towards utilizing educational and training institutions outside the company, when considered necessary from the standpoint of investment efficiency. Based on this analysis, we can say that it is becoming more important to establish social infrastructure to support education and training activities of manufacturing companies and for the individuals working for them. In doing so, the role expected of relevant regions is becoming larger.

The first step for each region to formulate an effective policy for the establishment of social infrastructure is to comprehend the structure of each type of out-of-company educational and training institutions in the region (schools, public institutions such as the chamber of commerce and public-interest corporations, public training institutions, private training companies, etc.), i.e., which institutions provide what levels of educational and training services in the market of educational and training service in the region, and which companies are provided with what kind of educational and training services. Furthermore, the accumulation of this information will make a great contribution to the discussion of “which part should be carried out by public institutions” within the region.

According to the analysis of the relationship between obtainment of certification of ISO9001, which is rapidly increasing among manufacturing companies in recent years, and the fostering, education and training of employees provided by companies and establishments, the percentage of companies and establishments that visualize the current number of skilled regular employees and their ability to perform duties and develop employees’ ability from a relatively long-term perspective is high among those that are active in their efforts to obtain certification of ISO9001. The percentage of implementation of Off-JT for skilled regular employees is also high among these companies and establishments.

The education and training required by ISO9001 standards cover a wide range of activities, including skill training to ensure and enhance ability to perform duties of employees who engage in work that affect quality of the products in those divisions, such as design and development, manufacturing, assembling and inspection, as well as education and training on quality control. Therefore, it is important to establish a system to provide various educational and training programs so that companies can use the ones appropriate to their situation with a view to encouraging their efforts to obtain ISO9001 certification as one way of helping revitalize personnel training by companies. As for small- and medium-sized companies, in particular, what is required of the providers’ side of education and training (all providers of education and training,

including public and private sectors) is to create an accessible environment to make it easy for companies to use the programs that meet their needs at a low cost, taking into consideration the time of day and time of year that are convenient for them.

(3) Survey and analysis of behavior and awareness among employees

The analysis of the questionnaire survey to employees shows that the efforts by companies and establishments for fostering and human resource development of skilled regular employees, such as OJT, Off-JT, the support for self-development and efforts to improve the ability to make proposals and create new ideas, contribute to the enhancement of positive awareness and evaluation of human resource development among skilled regular employees, though fields in which such awareness is reflected vary, and that the enhancement of positive awareness and evaluation helps increase the possibility for skilled regular employees to actively pursue careers as skilled workers. The above observations suggest that efforts by companies and establishments to develop the skill of employees are likely to increase employees' motivation for career formation and thus lead the company's fostering and human resource development efforts to success. In other words, it can be said that the efforts by companies and establishments to foster and develop the capacity of employees are not in vain, but are considered to produce favorable results from the standpoint of skilled regular employees.

However, company resources available for fostering, education and training of skilled regular employees are limited. The analysis of the questionnaire survey to employees conducted this time shows that the employees working at the companies that “grasp the number of personnel currently working at the establishment and their skill level using the skill map, etc., and conduct capacity development measures accordingly” and those working at the companies where support for self-development is available have been making use of the opportunity of off-the-job training (Off-JT) in acquiring skills and knowledge necessary for their work more effectively than others. This result suggests that, in order to make Off-JT more effective with limited investment, companies need to clearly define “what are the abilities that form the basis for competitiveness” and introduce a system to grasp the current personnel situation from the perspective of achieving a clear target for capacity development, and that various support mechanisms that encourage individual employees to upgrade their capacities are necessary, including support for self-development.