

Human Resources Development at SMEs in the Manufacturing Industry (Machinery and Metals)

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1. Survey and Research Methods

In response to the various environmental changes that are occurring, and in the light of companies' needs to maintain and develop their activities, it is thought that SMEs have an even greater need to utilize the skills and know-how of individual employees than that within larger companies, whose facilities and capital situation may be superior to them. Regardless of this fact, because of restrictions in regard to time and resources, human resources development to train these skills and know-how are not always sufficiently available.

What are the elements that promote human resources development within SMEs? What sort of policy measures are required in order to ensure that these elements take root within companies and in the activities of individual employees? The research project, "Human Resources Development at SMEs (hereinafter referred to as "the Project")" was set up within the Japan Institute for Labor and Policy Training in fiscal 2007, chaired by Professor Atsushi Sato, Faculty of Lifelong Learning and Career Studies, Hosei University, and has been engaged in studying and considering the situation in relation to these issues. Since fiscal 2009, we have conducted questionnaire surveys, especially focusing on manufacturing SMEs, particularly those in the machinery and metals industries, with the aim to clarify (1) measures taken by companies to secure and retain their employees, system of evaluation and treatment, training and education programs, and other measures promoting career formation and human resources development, and (2) the awareness and evaluation of skills training in the workplace among employees, and what needs employees feel they have in terms of development of their own skills. This report implements further analysis of the data

gathered through questionnaire surveys, and aims to contribute to further stimulation of the discussion of these issues.

The questionnaire surveys focused on the machinery and metals industries, specifically (1) the plastic products manufacturing industry, (2) the steel industry, (3) the non-ferrous metals manufacturing industry, (4) the metal products manufacturing industry, (5) the press machinery equipment manufacturing industry (6) the production machinery and equipment manufacturing industry, (7) the business machinery and equipment manufacturing industry, (8) the electronic components/devices/electronic circuits manufacturing industry, (9) the electrical machinery and equipment manufacturing industry, (10) the information communications machinery and equipment manufacturing industry and (11) the transportation machinery and equipment manufacturing industry. These were chosen as the focus because, despite the fact that the training and retention of core employees has long been identified as an important issue in maintaining domestic and international competitiveness, the impact of the Lehman Brothers shock in autumn 2008 and the subsequent global recession has significantly changed business circumstances and the environment in which human resources are retained and trained in such companies, and the need for policy support is considered to be especially higher in these industries.

Focusing on the industries noted above, geographical areas where many companies in the machinery and metals industries are located were selected throughout the country as the focus of research. The machinery and metals industries are formed of various industrial clusters throughout Japan, each with their own particular focus, and local conditions within each region also have a significant impact on the business activities of companies. In order to understand and consider the level to which geographical attributes impact human resources development, the surveys were carried out in various different regions of Japan. Firstly, the three prefectures or areas with the highest concentration of machinery/metals-related industry (Tokyo, Osaka and Aichi Prefecture) were selected, after which the prefectures with the highest concentration of machinery/metals-related industry in the (1) Hokkaido/Tohoku, (2) Koshinetsu, (3) Chugoku and Shikoku and (4) Kyushu regions (specifically, Fukushima, Nagano, Hiroshima and Fukuoka) were selected for inclusion in the survey. Then, within these prefectures, regions with high concentrations of companies engaged in the metals and machinery industries were selected as survey regions based on data by region in METI's "Census of Manufacture."

The research involved questionnaire surveys, visiting one manager and two employees at each of the companies selected using the process above and picking up

survey sheets from them afterward. The employees questioned as part of the survey were selected by the company, from either “technical” workers (employees who were mainly involved directly with the manufacturing of products) or “technological” workers (employees involved mainly with design, development or quality control), depending on which category had more employees within it. In companies where both categories had roughly the same number of employees, those selected for the survey belonged to the category that is expected to grow more in the future. The surveys were carried out between 12th February and 19th March 2010. 3,282 company survey sheets were distributed, and 842 responses were collected (25.7% valid response rate). The number of responses of employee survey sheets was 903 (giving a 13.8% valid response rate out of 6,564 based on a distribution rate of 2 per company surveyed).

2. Basic Framework of the Analysis in this Report

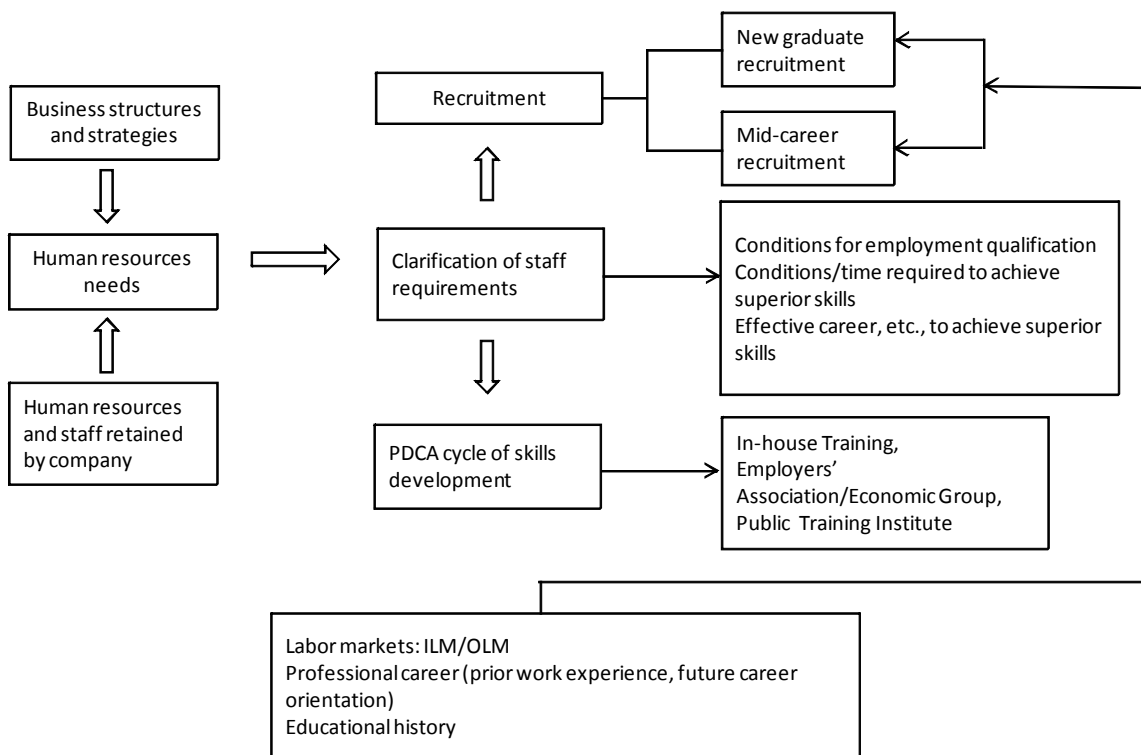
(1) Basic framework for the analysis of human resources needs, employment, skills development and the labor market

Fig. 1 shows the basic framework of analysis used in this research project. Companies have defined strategies consistent with the characteristics of their own business structures, and are engaged in a variety of administrative activities in order to implement these strategies (management of business resources such as people, assets and money). The authors’ interest here, however, is mainly in human resources, and their development. Companies can realize their strategies through the utilization of existing human resources, but in many cases there appears to be a gap between existing human resources and those required to meet the needs of strategy realization. This gap needs to be filled, and in order to do this, companies need to first clarify the human resources elements that they require (this is referred to in this research as “vocational competence”). There are broadly two ways to fill the gap: (1) employing human resources from outside the company to fill the gap (this can include both hiring new graduates, and recruiting new mid-career employees); or (2) filling the gap through improving the skills of existing employees within the company. The training required for this can take one of three forms: (a) day-to-day on-the-job training (OJT) and an accumulation of long-term work experience, in other words, the career formation method, (b) skills development policies based on off-the-job training (OFF-JT), and the implementation of the Plan, Do, See (PDS) cycle, and (c) self-development methods. These are the methods to fill the gap between existing staff skills and the human resources required for the realization of corporate strategies. In fact, it can be assumed that companies are in general finding appropriate combinations of the three methods above, in line with corporate strategy

and the main professions within the industry, the state of the labor market, and the enthusiasm and skills of employees.

The above is a summary of the need for human resources training and skills development from the perspective of corporations (the variables included in the zone in the upper half of Fig. 1), but in order to understand the current state and issues relating to human resources training and skills development needs, there is a need to also clearly include the variables relating to labor (the variables included in the zone in the lower half of Fig. 1, relating to labor markets). The reason for analysis of the variables relating to labor markets is primarily that, although this can be logically inferred from the company's need for skills development, recruitment activities – the procurement of human resources from the labor market – are given equal management significance to that given to improving the skills of existing employees, and recruitment requires the matching not only of the state of the labor market, but also workers' attributes and skill levels to the needs of the job. Another reason for analyzing variables relating to the labor market is to clarify the conditions for matching labor supply and demand through analysis of the state of careers from the labor perspective, and to explain the factors behind the mismatches, if any. There is a need to consider methods of policy support in order to reorganize the labor environment to allow such matching to take place.

Fig. 1: Framework for Analysis of Human Resources Training within SMEs in the Manufacturing Industry



(2) Issues for consideration

This research into SMEs focuses on the following perspectives and areas of interest.

(a) The main focus of surveys was small and medium enterprises, and at the same time the labor market that includes core technical and technological professions requiring expert skills training.

(b) Given that, in general, SMEs have lower retention rate than large corporations, and greater restrictions on education and training, there is a need to solve the mismatch between labor supply and demand, and to clarify the future policy direction with the aim of achieving effective expert skills formation. More specifically, there is a need to clarify (“visualize”) the work skills required for the effective development of skills on an OJT basis within individual companies, as well as support systems for Off-JT to complement OJT, and to consider the need for reorganization of infrastructure to clarify the conditions for cross-organizational professional skills.

(c) In addition to the above, given the restrictions SMEs are subject to in terms of human resources training, consideration must also be given to the efforts being made to overcome these restrictions by utilizing networks between regional companies, public organizations and universities or other tertiary education agencies, in other words, partnerships between industry, government and academia (referred to as “learning resources” or “social capital” networks in this report). It will be necessary in the future to shine the light of analysis on existing local functions that learning resources and social capital achieve.

Based on the areas of interest above, the second, analysis part of the report is categorized into the following chapters.

Chapter 1: Human Resource Needs and Activities to Secure Human Resources in Manufacturing SMEs

Chapter 2: Internal Labor Markets (ILM) and Occupational Labor Markets (OLM)

Chapter 3: Visualization of Required Skills, Education and Training, and Skills Development

Chapter 4: Corporate Education and Training Activities, and Strategies of Use of Employers’ Associations and Economic Groups

Chapter 5: Features of, and Issues with, Education and Training Activities (Skills Development) by Companies and Employees in Region – Focusing on Learning Resources “Embedded” in the Local Area

Chapter 6: Social Capital and the Manufacturing Companies

Chapter 7: Production Systems and Human Resources Development in Manufacturing SMEs

Chapter 8: The Role of School Education in Professional Skills Development in Manufacturing SMEs

Chapter 9: The Tension between Work that Must be Done and Skills Development

Chapter 10: Female Workers in Manufacturing SMEs

3. Discovering basic facts in line with the analysis framework

The most basic analysis results gained from the surveys in line with the analysis framework in Fig. 1 are as shown below.

(1) Human resources needs and employment – just under 10% vacancy rate, with 40-60% of companies reporting a sense that they do not have enough staff

Human resources needs tend to emerge when working towards the realization of a company's management strategy. If these needs cannot be met by human resources stock (existing staff) within the company, then the company will have to clarify the required human resource elements in order to fulfill these needs, and decide whether to achieve this through skills development within existing employees, or fill the gap by recruiting new staff. This is the basic awareness shown in Fig. 1. Let us take a look at how this applies within SMEs as covered by the surveys in this project.

Firstly, the survey looked at the level of need for human resources. This can be estimated from analysis results based on the responses to two questions, relating to (1) the existence or otherwise of recruitment employment and the level to which the company has sufficient staff, and (2) the extent to which the company has insufficient key human resources. In regard to new graduate employment relating to (1), more than half the companies surveyed (54%) had not recruited in the past three years, although the remaining 46% had done some recruitment. Of these, 25.5% had been "able to recruit all the staff we expected," while 4.5% responded that they had "not been able to recruit as many staff as we expected," and 3.4% stated that they had "implemented recruitment, but were not able to employ anyone." Based on this, it can be seen that 7.9% of respondents had carried out recruitment procedures but not employed sufficient staff. In terms of mid-career employment, however, during the same three years, 36.3% of companies stated that they had not recruited from this sector, indicating that a majority – around 60% – of companies had carried out recruitment. Of the companies who had carried out mid-career recruitment, 38.4% had been "able to recruit all the staff we expected," while 5.9% responded that they had "not been able to recruit as many staff as we expected," and 3.3% stated that they had "implemented recruitment, but were not able to employ anyone." This indicates that just fewer than 10% of companies have insufficient staff, despite carrying out recruitment activities. In other words, the

proportion of companies needing to fulfill their human resources needs by further employment was around 40% for those implementing new graduate recruitment and 60% among those implementing mid-career recruitment, and from this we can infer that between 40-60% of companies have human resources needs.

Next, let us look at the over- or under-supply of key staff. 31.6% reported that they had “insufficient” staff who are able to “complete tasks on their own” (the definition of independent and experienced staff within most companies). Furthermore, 45.6% of companies reported that they had “insufficient” staff who are able to “work while at the same time giving instructions or advice to their subordinates or juniors.” The trend towards insufficiency rises with increasing levels of skill, but between 30-40% of companies reported that they feel that they have insufficient experienced key staff.

(2) “Visualization” of human resource requirements – just over half of companies surveyed are engaged in the “visualization” of human resource requirements

When a company has a need for staff, it is required to consider what sort of human resource it requires, with what level of skill in what type of work. In other words, the company has to clarify the skills required for its work. This clarification of work skills (= “visualization”) is the basis for considering effective career development, and allows the effective utilization of the PDS cycle in skills development based on Off-JT. The relationship between actual “visualization of skills” and the training cycle implemented by companies of Plan-Do-See can be seen in the fact that the more a company progresses with the process of visualization, the greater its investment in education and training at the Plan-Do stage will be, along with greater progress in the visualization of its education and training. In addition, the effects of this education and training will be significant at the “See” stage. These tendencies are seen both at the corporate and at the employee level. The more a corporation presses ahead with its visualization of skills, the more likely it is to have established a policy regarding the skills required for its “future” in relation to the training and skills development of core professions at the Plan stage, and the more likely it is to have established leaders and are proactively implementing training and skills development (OJT) according to a plan at the Do stage. In order for a company to develop efficient and effective education and training practice, it can be seen that the clarification of skills required is absolutely vital.

Furthermore, the “visualization” of required skills is also related to employment. According to the analysis results, the more a company clarifies the skills it requires in its key staff, the more likely it is to achieve full recruitment when employing new graduates.

This demonstrates the significance of the “visualization” of skills requirements, shown in the center of Fig. 1. In fact, if all trends in regard to this are looked at together, a total of 51.3% of companies are either “clarifying to a significant extent” (15.8%) or “clarifying somewhat” (35.3%). In other words, only around half of all companies are clarifying the skills required of their key staff, indicating that there is still room for many companies to engage with the process of “visualization.”

(3) Methods for dealing with the lack of key staff – approximately 60% of companies use the logic of the internal labor market

As has already been seen, around 40% of companies need to fill new graduate posts, and 60% still need to fill posts with mid-career employees, and between 30-40% of companies feel that they lack key, experienced staff. So how do they try to fulfill these requirements? There is a need to focus on the methods used to make up the insufficiency in key staff. With regard to the level of being able to complete tasks on their own, 47.6% of companies responded that they “trained human resources within the company to meet our staffing needs,” while 12.4% stated that they “transferred staff from other departments to fulfill the requirements,” and 16.5% said that they “employed staff immediately able to fulfill the requirements from outside the company.” Assuming that both companies responding that they “trained human resources within the company to meet our staffing needs” and those that “transferred staff from other departments to fulfill the requirements” are utilizing an internal labor market (ILM), it is possible to assume that approximately 60% of companies surveyed are using an ILM.

This is not the only solution, however. It is a fact that some companies and employees are more geared to an OLM, a point that will be important for policy implications.

(4) Effective careers in order to become a key, experienced employee

It takes some time to become an experienced, key member of the human resources in a company. The average length of time required to become a key employee according to company survey results was 6.4 years. But what training methods are effective during that time? According to our surveys, 72.1% of companies responded “spending a long time working continually in one company,” while 10.2% responded that the key was “engaging in the same type of work, even if you change companies,” and 5.1% said “continuing to work in the same workplace until you build up experience, and then changing companies in order to gain different experience.” If working over a long period in a single company while forming a career is an example of ILM, then it could be said

that the main way of developing human resources within manufacturing SMEs is via the ILM.

Furthermore, this tendency to prioritize ILM can also be seen from the analysis results relating to the relationship between manufacturing technology and human resources development. According to this, it is clear that companies focusing on small-lot manufacturing engage in positive assessment of support for OJT, prepare careers within the company for employees to move into managerial or supervisory positions while in fact the content of their work remains the same, and are engaged in skills development to allow their existing staff to increase their abilities.

(5) The basis of career formation in manufacturing SMEs is ILM + OJT – issues remain outstanding

From the analysis above, it can be concluded that the basis of training key staff within manufacturing SMEs is the concept of remaining within the same company over a long period of time and developing one's skills on an OJT basis. This does not mean, however, that all the companies surveyed are able to engage in human resources training based on this philosophy. In other words, the research uncovered the following: (1) in some companies, the stated position was that skills development took place through OJT, but in fact OJT was not being implemented properly, and there were additional needs for Off-JT too; (2) companies to whom this applied also tended not to be able to create an ILM (this was therefore more strongly visible in companies with greater tendencies towards OLM); (3) there were significant differences in the effectiveness of human resources training depending on whether or not the region in question had established partnerships and networks between industry, government and academic sectors.

4. Issues and Policy Implications

(1) The need for supplementation of OLM-type companies and staff needs by Off-JT

The basis of human resources training in manufacturing SMEs has already been identified as ILM + OJT. As shown in the analysis with this report, however, there are not a small number of companies that wish to create an ILM but are unable to do so.

These OLM characteristics were strongest in companies who had not developed a rank hierarchy for employees to move up, and in which employees who had gained experience and skills still found that there was no career path into management for them. Staff who worked for companies such as this had a high tendency towards identifying problems in regard to the education and training of employees with OLM

characteristics, and it is highly likely that their education and training needs will increase in the future. What is important is that these companies need to provide additional supplementary Off-JT, while continuing to utilize the function of OJT. Firstly, it is often noted that OJT, which is vital in this area, is not functioning correctly within companies and employees with OLM characteristics. Alternatively, there may be a significant gap between the awareness of the company and that of its employees in regards to the knowledge and skills being acquired through OJT (owners of businesses with OLM characteristics tend to assume that “OJT is going well” or “OJT is going fairly well,” but around 40% of their employees stated that “it is not going well” or “No OJT is being implemented”).

In addition to this, companies and employees with strong OLM characteristics need to utilize Off-JT as a means to supplement OJT. According to analysis based on actual employee survey data, people with OLM characteristics often wish for more Off-JT than those with ILM characteristics, expressing opinions such as “I wish I had more access to Off-JT in order to gain qualifications relating to my work.”

Moreover, Off-JT needs to be led not by individuals but by the company in question. In other words, according to the analysis results in chapter 8, employees who did not have high levels of study skills in school will show a tendency to put off training in the workplace if it is left up to their own initiative. For this reason, education and training needs to be the responsibility not of individuals, but of the company as a whole.

(2) Needs and benefits of Off-JT

– Important to link it to the PDS cycle. The key to this is “visualization.”

As has been stated above, the more a company progresses with the process of “visualization” of required skills the more it invests in education and training at the Plan and Do stages. In such a company, visualization of education and training progresses, and the benefits of training at the See stage are also more significant. This same tendency is seen in both companies and employees.

The important policy implication here is to note that within manufacturing SMEs, the basis of skills formation may be OJT, but there is still a significant need for Off-JT. Off-JT can be offered by the company itself, or by a range of external education and training providers, but in either case, it is not an overstatement to say that the benefits of such training are strongly affected by whether or not the purpose of the Off-JT is clear – in other words, what purpose the training is serving, and for the acquisition of what skills.

Improvements in the effectiveness of Off-JT resulting from “visualization” are clearly shown in the analysis of the relationship between the education and training activities within the companies surveyed, and their management/industry organizations. In other words, companies who have clarified the required key professional skills have a tendency towards utilizing external education and training organizations.

(3) The significance of regional industry-government-academia sector partnerships

Analysis of “learning resources” and social networks embedded in the region clearly indicates the significance of creating partnerships between a company in a particular location and other companies, universities and public bodies in its region to share a whole range of information, skills and know-how. These represent regional industry-government-academia partnerships. In order for this to supplement the development and growth needs arising from business opportunities within manufacturing SMEs, partnerships should be developed not with a single company but between companies within a particular region, promoting interchange and learning.

The results of interview surveys, implemented in parallel with the questionnaire surveys, showed the importance of networking and partnerships between companies, as well as between industry and the public sector, and industry and academia. Significant policy implications are apparent here, highlighting the significance of supporting partnerships between industry, the government and academia in the area of human resources training – an area that is so important for business expansion within manufacturing SMEs.