Follow-Up Review of Development Studies in Mining and Industry (Kaizen)

(Overview)

March, 1996

Mining & Industrial Development Study Dept.
Japan International Cooperation Agency

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Overview

The objective of this study is to contribute to a smooth and effective transfer of productivity technology to developing countries as part of Japan's international cooperation.

Major tasks of the study during the fiscal year 1995, which are aimed at the comprehensive understanding of productivity improvement technology through employees' participation, are as follows:

1. To present basic concepts and definitions of "productivity".
2. To review the history of the "productivity" concept.
3. To review the history of productivity improvement activities from the theoretical viewpoint, along with the development of management studies, mainly in the United States.
4. To review the history and present status of productivity movement and productivity improvement activities in Japan.
5. To review the history and present status of productivity improvement activities in the United States.
6. To analyze the differences in productivity improvement between Japanese and American companies from the financial perspective.

The tasks to be conducted during the fiscal year 1996 are as follows:

7. To review the present status and problems of Japan's technology transfer for productivity improvement.
8. To review the present status of productivity assistance policies to developing countries with their domestic companies.
9. To work out an effective procedure of technology transfer for productivity improvement.
10. To prepare a Technology Transfer Manual for productivity improvement, to be used by productivity experts in Japan's technological cooperation.

This summary is intended to show some important points of the study.

Contents of this study are divided into 3 Sections:

Section 1 Technology Transfer to Developing Countries and Productivity Improvement

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Chapter 1 The Basics of Technology Transfer for Productivity Improvement

Chapter 2 What is "Productivity"

Chapter 3 Productivity Improvement Activities within the Framework of Management

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Section 2 Evolution and Present Status of Productivity Improvement in Japan and the United States

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Chapter 4 Evolution and Present Status of Productivity Improvement in Japan

Chapter 5 Evolution and Present Status of Productivity Improvement in the United States

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Section 3 Basic Stance of Technology Transfer for Productivity Improvement and the "First Step" in Introducing Productivity Movement

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Chapter 6 The "First Step" in Introducing Productivity Movement (Case Study of Saudi Arabia Joint Venture and Conclusions of This Report)

Section 1 Technology Transfer to Developing Countries and Productivity Improvement

Section 1 describes basic thoughts with regard to technology transfer for productivity improvement(Chapter 1), the productivity concept and definition(Chapter 2), and the activities and theories for productivity improvement(Chapter 3). In order to present the basics of productivity improvement, Section 1 is written from the theoretical standpoint.

Chapter 1 The Basics of Technology Transfer for Productivity Improvement

Currently, technology transfer for productivity improvement is implemented mainly with a two-tier system: one, from Japan's experts (transferors) to developing countries' experts (transferees); two, from developing countries' experts (transferors) to local companies (transferees). However, the results differ from country to country. Some are successful, and others are not.

Under these circumstances, because ultimate ownership of productivity

activities belongs to transferees, transferors' first task must be the encouragement of the transferees to tackle productivity activities. This should be done with a strong commitment to meeting specific targets. In order for the transferors to accomplish such a task, several requirements for the successful transfer must be clarified.

First of all, there has to be a concept of "partnership" between the transferors and the transferees with regard to the technology for the productivity improvement. "Partnership" can be described as the attitude of learning from each other. By learning country specific matters, such as the country's history, culture, and so on, from the local experts[1], Japan's productivity improvement experts will be able to find the clue to adapt and apply the productivity improvement technology to the developing country concerned. Also, the local experts need to learn the way to effectively transfer the technology to local companies by utilizing the partnership with the companies concerned.

Secondly, some consideration about the public as well as political environment of the companies in the developing countries is necessary. Because a company exists as a participant of its state economy, it cannot ignore the interference from its environment, especially the public as well as political environment. Here, the public environment includes government policy and actual measures for training local experts about productivity technology. The political environment means the power relationship between the management of the company concerned and the interested parties who are either inside or outside the company. In some countries, interested parties outside the company can have stronger influence in the decision making of companies. Such a party who has

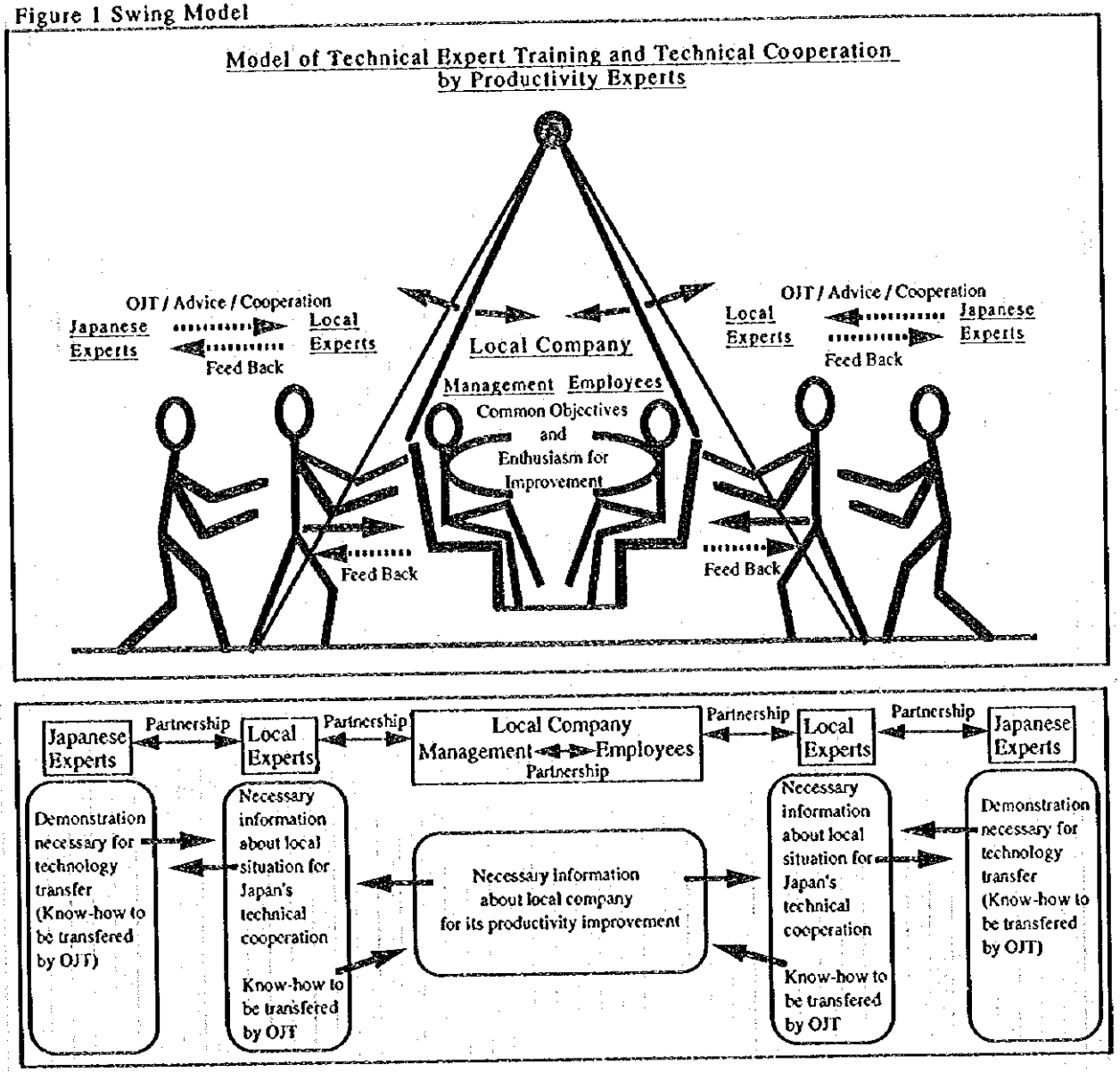
[1]Local experts are called Counterperts in JICA's technical transfer.

authority in corporate decision making is defined as a "real decision maker" in this study. Because the real manager's influence is considerably strong, recognizing who the real manager is and acquiring support from him are crucial for the experts in smooth technology transfer. Therefore, the method of finding out the real manager should be developed through the study. The study for 1996 is that of the public and political environment of the companies.

Thirdly, the effective and efficient technology transfer process for the companies of the developing countries should be considered. In order to share a common and clear understanding of the technology transfer for productivity improvement to developing countries, the Swing Model, which visualizes the framework of such technology transfer, has been developed. (See **Figure 1.**) The Swing Model explains the elements necessary to actualize productivity improvement in the company concerned. Such major elements are: (1) the importance of mutual understanding and inter cooperation between the management and the employees within the company; (2) the importance of a common recognition of the business situation of the company; (3) the fact not only that the internal accumulation of basic technologies within the company makes it possible to utilize advanced technologies, but also that no advanced technology is manageable by the company without such technology accumulation.

In addition to the analysis using the Swing Model, a preliminary proposal for the technology transfer process to be conducted by the local expert within the company, is proposed. The following are the 6 steps for the technology transfer process for productivity improvement.

Figure 1 Swing Model



Step 1: Clarification of Problems

- To identify areas of improvement in the company concerned

Step 2: Improvement of the Management-Employee Relationship

- To reach a consensus between management and employees of steps necessary for productivity improvement

Step 3: Situation Analysis of the Company

- To confirm the company's present situation, such as an analysis of SWOT (strong points, weak points, opportunities, and threats)

Step 4: Direction Setting for the Improvement

- To clarify the direction of the improvement process and the required steps

Step 5: Sharing of Management Information

- To share management information within the organization (between the managers and the employees and the departments or the sections) about the points to be improved and the ways to improve them

Step 6: Organization for Improvement

- To organize teams or workshops within the company to tackle the specific issues to be solved, and to make this a regular task

Seven requirements exist to make the productivity movement effective. Among the seven requirements below, four requirements are regarded as the "first step" (the four hurdles that must be cleared in the beginning) in introducing productivity movement. (See Section 3 of this overview.)

Requirements:

- **Clarification of the "Raison-D'être" of the Company**

  Clarify the firm's principles which managers and employees have to always have in mind, such as contribution to the society. Without having such corporate principles, the direction of the firm would be very vague. This would be an obstacle to making effective productivity improvements. (See Hurdle 1 and Hurdle 2.)

- **Confirmation of the Three Guiding Principles for Productivity Improvement**

  Confirm three guiding principles for productivity improvement:

  (1) Maintenance and expansion of employment;

  (2) Mutual cooperation and discussion between the employees and the management; and

  (3) Fair distribution of improved results among parties concerned (the management, the employees, and consumers). (See Hurdle 3.)

- **Commitment of the Management to the Three Guiding Principles Above**

  Commit firmly to the above mentioned 3 principles for productivity improvement. (See Hurdle 1 and Hurdle 3.)

- **Indication of Strategy**

  Establish and indicate the clear strategy for the direction of productivity improvement. (See Hurdle 4.)

- **Management of the DCAP Cycle**

  Establish the way to control and monitor the effort based on the concept of the DCAP(Do -> Check -> Act -> Plan) cycle.

- **Recognition of the Roles of Middle Managers**

  Clarify the roles of middle managers, such as drafting sustainable plans and educating their subordinates. Judge and do what is required at the right time.

- **Recognition of the Roles of Employees**

  Clarify the roles of employees, such as being good to their subordinates, colleagues and bosses without sacrificing themselves.

These will be the minimum requirements for a smooth technology transfer and the productivity improvement in the developing countries.

Chapter 2 What is "Productivity"

Chapter 2 reviews the concept of "productivity" such as the definitions of "productivity" and "productivity improvement".

"Productivity" is an indicator that shows how much output has been obtained by a unit of input. This input can be an amount of time, resources, money, man-power invested and so on.

However, what kind of productivity indicator to be used should be discussed and determined within each company based on its own interest and goals. Such a discussion of determining suitable productivity indicators will help the company clarify its targets.

In addition to the definition of productivity, the logic behind the theory of productivity improvement should be understood. The productivity improvement activity must be distinguished from a mere rationalization activity. Rationalization may make victims of its activity, while it is the intention of productivity improvement activity to bring benefit to everyone. Analyses using productivity indicators are the means of the productivity improvement. The ultimate goal of the productivity movement is not merely productivity improvement itself but the improvement of the living standards of the people concerned.

Chapter 2 also briefly covers the evolution process of the concept of productivity and productivity improvement in the field of economics.

Chapter 3 Productivity Improvement Activities within the Framework of Management

The development process of management theories and also the history of productivity improvement activities and its theoretical development are reviewed in this chapter. The review begins with how management theory was formed, mainly in the United States. The description of each management theory is omitted from this overview. Instead of describing each management theory, the significance or role of such theories is mentioned in this overview. Understanding their role in the context of productivity improvement is more important than mere understanding of the theory concepts for the purpose of this study.

In world history, the remarkable improvement in productivity first began in England during the industrial revolution era. However, the mass production method began in the United States, and not in England. The model of mass production method is first observed as the appearance of "American production method" in the first half of the 19th century. After this period, productivity improvement continued along with the development of both the "American production system" and the "American factory system".

A large part of the method which has been expressed as the Japanese management style is the re-arrangement of the American management theory. Moreover, the management related studies that have been spreading as management theories today were established from the development of the "American production system" and the "American factory system" in order to achieve competitiveness and high productivity.

What is the "American production system" which has given such a major

influence on today's production system? It is characterized by: standardization of parts using gauge; securing interchangeability (or compatibility) of standardized parts; elimination of adjustment work in assembly operation; and, improvement in production efficiency using single purpose machine tools. The significance of the "American production system" is two fold: (1)accomplishment of economies of production by eliminating adjustment work in assembly operation; and (2)realization of economies of scale by mass production of standardized parts. However, the focus on these accomplishments was limited to production technology. On the production system side, the "American factory system" contributed in productivity improvement.

After the second half of the 18th century, the "American factory system" was developed along with the advancement of transportation and markets. The rapid development of the "American factory system" took place particularly after 1830 with the increased supply of coal. On the production systems development side, the "American factory system" contributed with regard to the organizational aspect of the production. The main contents of the innovation in the organizational aspects were: improvement in plant design; control of raw materials flow; improvement in management method/procedure of workers; improvement in production skills of workers as well as management skills of managers. Also, factories using the "American production system" were properly cleaned and kept in order. In order to effectively divide a work process and use sole purpose machines, a clean and well-organized work environment was necessary. Moreover, such work environments brought favorable influence on the labor-management relationships and resulted in few labor disputes. Out of such a work environment, the "blue collar elite" class with supervisory capability emerged. Such supervisory workers were different from the traditional,

skilled, handicraft workers.

In the "American factory system", in spite of the underdeveloped mechanization stage, there was an "internal contract system" that enhanced production efficiency, and contributed in lowering manufacturing cost. The "internal contract system" was a mechanism that kept the balance between the subdivided production process. The balance in the production line was maintained by the contractor. He took the responsibility regarding the contracted production process, which was difficult to mechanize, by signing a consignment contract with the company. Because the contract price was set at the beginning and not changed during the contracted period, results of cost reduction by increasing production efficiency became a profit to the contractor. However, the "internal contract system" which once worked well, started to fade with the passing of time. The reasons behind this decline were the further development of mechanization, dissension within the production process caused by the increased influence of internal contractors (so called the "foreman's empire") and the slowdown of the American economic environment (an intensification of competitiveness with the recession.

After the economic recession of 1873, the emphasis in the factory management field started to shift from machine technology to organizational management. The "efficiency movement" was newly started with the decline of the "internal contract system." The movement evolved in order to avoid waste which canie from workers' reliance on experience and memory. In this movement, mechanical engineers took an important role. The systems and methods for factory management were established mainly by the engineers. The management method introduced during this period was called "systematic management." Under this method, three systems were

developed to combine each production process into an overall production system. These systems were production control, cost accounting and the payroll. However, the limitation of the "systematic management" became clear with a flaw in the stimulative payroll system and weakness in dealing with labor relations.

In response to the limitation of the "systematic management," Taylor showed the new way of management. It was called, the "scientific management," and consisted of a differential rate system of piece work and the four management rules to simultaneously actualize a high wage and a low labor cost. The four management rules of scientific management were:

1. **A large daily task**
   - Clear indication of a prudently determined proper daily task, which is not so easy for a worker to complete
2. **Standard conditions**
   - Provision of satisfactionary conditions and tools which allow workers to complete the task without fail
3. **High pay for success**
   - Promise of high wages upon completion of the task
4. **Loss in case of failure**
   - Clarification of the responsibility of a worker upon failing the completion of his/her task

As with previously introduced systems, there were some flaws in "scientific management." These flaws were the deterioration of "unity of command," ambiguity of both authority and responsibility among divisions or processes and creation of a sense of crisis within labor unions. In order to offset the problems with "scientific management," concepts such as "line and staff organization" (Emerson) and "human labor analysis" (Gilbreth)

were developed. After the introduction of "scientific management," the theories for business administration were developed with the emergence of business schools. The main concepts of such theories can be summarized as: (1) the pursuit of rationality (production management theory, management science/system approach, etc.); (2) the pursuit of humanity (human relations, behavioral science, etc.); (3) the pursuit of organization (organization theory), and; (4) management strategy.

From the productivity improvement stand point, the pursuit of rationality which was originated by Taylor (such as production management theory and management science/system approach) is naturally important. However, the approach working on the human/psychological aspect (or the pursuit of humanity) is more important than the pursuit of rationality. This is because no work is completed without intervention of human beings. Moreover, demarcation of tasks and work rules become necessary when more than two people work together. In this sense, the organization theory is useful for demarcating tasks and establishing work rules in an efficient and effective manner.

As mentioned above, the understanding of management theories is necessary for realizing productivity improvement. However, it is too optimistic to consider that the understanding of each management theory promises productivity improvement. Because management theories simply explain the events or phenomena that companies would face in their productivity improvement activities, they are not the direct answers to individual problems. In order to solve problems, companies must adapt such theories to the situations they are in. The importance of understanding management theories in productivity improvement activities is for strengthening analytical skills and problem solving abilities in companies.

Section 2 Evolution and Present Status of Productivity Improvement in Japan and the United States

Chapter 4 Evolution and Present Status of Productivity Improvement in Japan

Chapter 5 Evolution and Present Status of Productivity Improvement in the United States

In Section 2, the history of development and present status of productivity improvement in Japan and the United States are respectively described first. Then, the productivity improvement activities both in Japan and the United States are compared. Based on this analysis, an effort to clarify the "first step" in introducing the productivity movement, which is applicable to any country, has been made. The "first step" is shown in Chapter 6 of Section 3.

Chapter 4 Evolution and Present Status of Productivity Improvement in Japan

The factors that made high productivity growth possible in the Japanese companies are the well organized production systems and consideration for human aspects in production systems.(See **Figure 2.**) Some Japanese companies have developed management systems which focus on human resource development. Commonly used measures for human resource development in those companies are in-house training, job rotation, small group activities, long-term performance rating of workers on site, internal promotion system, and sharing of management information. Moreover,

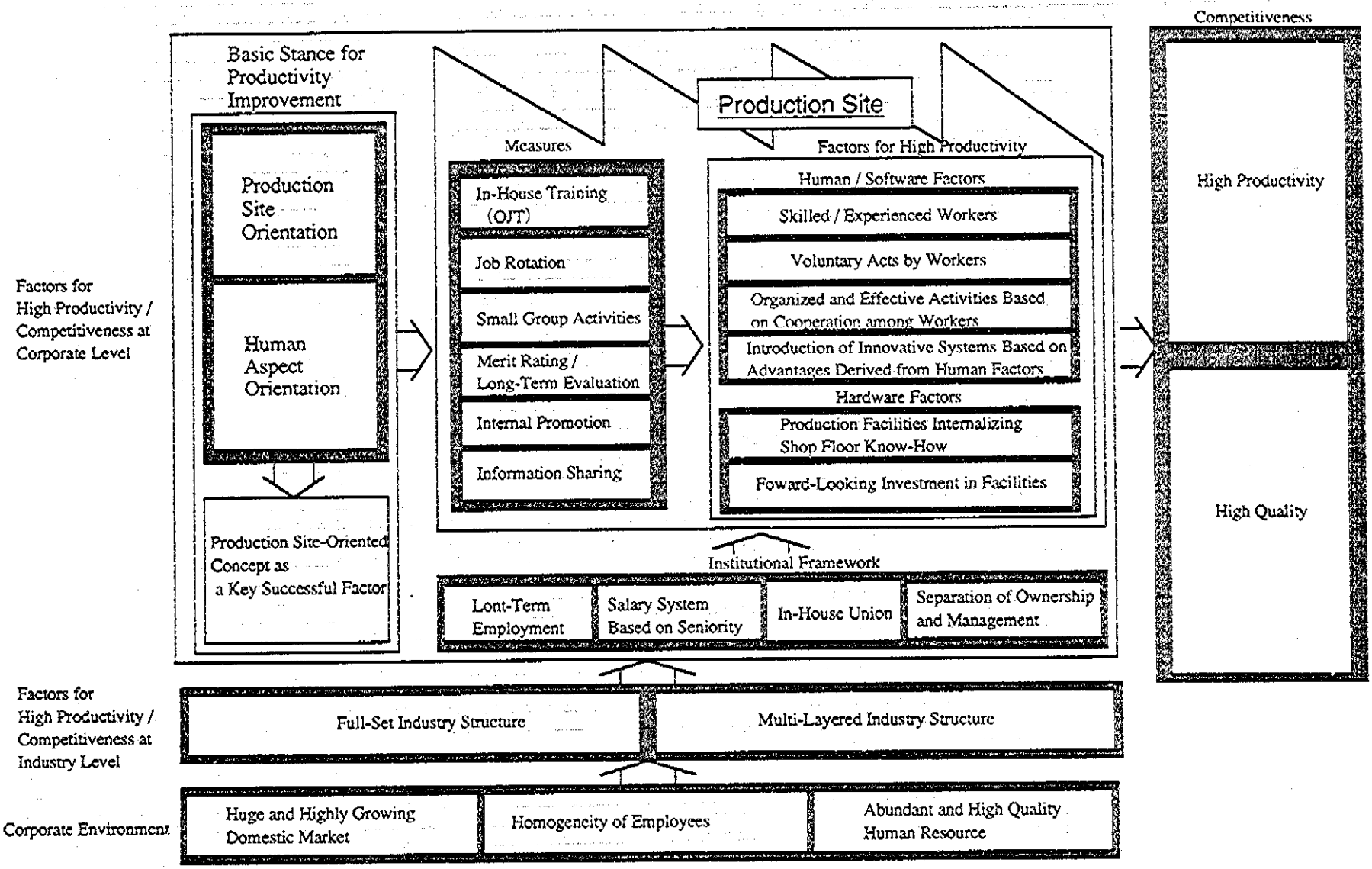


Figure2 Factors for High Productivity and High Quality Products of Production Firms in Japan

favorable conditions and customs, which made these policies more effective, also existed in those companies. These were: a long-term employment system, that is called the "life time employment system"; a seniority wage system; in-house union; separation of ownership and management. The conditions and customs have been supported by the favorable external environment of companies, including the huge domestic market, homogeneity of workers and abundance of young, highly-educated labor force. Furthermore, it is logical that the full-set and multi-layered industry structure has contributed to the Japanese companies' high growth of productivity. However, the corporate environment in Japan has changed recently and is still changing. Therefore, many Japanese companies are now attempting to review and renew their management policies so that they can maintain and enhance their competitiveness.

Chapter 5 Evolution and Present Status of Productivity Improvement in the United States

As a background to productivity improvement in the United States, it is necessary to know the trend of the American industries' competitiveness. After the World War II, the American companies enjoyed the golden age of the 60's. Then, they entered the period of loosing its competitiveness. Thereafter, since late 80's or early 90's, their competitiveness has been recovering.

The period during which American companies lost their strength is paralleled with the period that Japanese companies started to gain competitiveness by learning and applying various American production methods to their production processes. During this period, Japanese companies modified such American methods so that they fitted to the

production activities in Japan. The productivity improvement activities in the United States after World War II were represented by the process to overcome the decline of its competitiveness. Faced with the decline in its competitiveness, the American companies thought such weakness was caused by its low productivity growth in comparison with that of other countries, especially Japan. Based on such thought, they actively learned and mastered the production methods of Japanese companies. However, the study on the Japanese production methods by American companies was not intended to simply introduce the Japanese methods as they are used in Japan. Continuous efforts to adapt Japanese methods to the American management style have been made. The modified methods were designed to exclude the ambiguity (which, however, in Japan, enforced the effectiveness of the Japanese methods to the companies) embodied in the Japanese methods. Such modified methods may be called the US model.

The productivity improvement activities in the US-based Japanese companies have also been different from those done in Japan. The activities have been arranged so as to fit into the corporate environment in the United States. Among such arrangement are: (1) pursuing discussions and negotiations with powerful labor unions, to attain the consensus of both parties, the management and the labor union; (2) attempting to localize through hiring local workers and actively participating in the community; (3) technical training of local engineers in Japan; (4) relationship building with the local supplier through supplier training programs; and (5) actualization of equal employment opportunity.

Through the comparison of productivity improvement results between the Japanese companies and the American or the US-based Japanese companies from the financial perspective, it became clear that the differences of

productivity improvement activities between the two countries come from the dissimilarity in the social environment such as ethnicity, culture, history and language.

The above finding suggests that understanding of public and political environment as well as the adaptation of the technology transfer method to the given environment are important facts. Although the financial analysis is not directly useful in productivity improvement, it is one of the effective method for managers when they decide the corporate direction. As it will be mentioned at the end of this study, it is crucial that management set the direction and the objectives of the company concerned for introducing productivity movement. On such occasions, financial analysis can help the management make an important decision.

Section 3 Basic Stance of Technology Transfer for Productivity Improvement and the "First Step" for Introducing Productivity Movement

Chapter 6 The "First Step" in Introducing Productivity Movement (case study of Saudi Arabia Joint Venture and Conclusion of This Report)

In Section 1 and 2, the productivity improvement technology transfer, the concept and theories of "productivity" and the productivity improvement activities within Japan and the United States were studied. Section 3 first shows an example of a Japanese company that attempted to transfer productivity improvement technology to the developing countries. Then, the four common hurdles that must be cleared by every company at the

introduction of the productivity movement is explained. Such hurdles as a whole are named the "first step" in introducing productivity improvement.

Chapter 6 The "First Step" in Introducing Productivity Movement (case study of Saudi Arabia Joint Venture and Conclusion of This Report)

In order to transfer the experiences of the productivity improvement activities in Japan and the United States to the developing countries, it is necessary to adjust such experiences to each recipient. Such adjustment should be done based on the consideration of various elements in the recipient countries including situations of the companies concerned, nature of labor unions, characteristics of workers, customs, tradition and culture. One example of such adaptation is the case of the iron works joint venture in Saudi Arabia described in this chapter. Summary of the points extrapolated from the case are as follows:

1. **Do not force stereotyped productivity improvement activities that are well suited for the conditions of industrialized countries.** Productivity improvement experts should not stick to the image based on the view of industrialized countries. Technology transfer should be carried out with mutual understanding and respect for the counterpart's value.

2. **Do what brings out the best in the recipient companies by having the concept of "partnership."** Both experts from Japan and the recipient country should learn what to do to bring out the potential of the companies. In order to find out the best measure for the recipient companies as well as for the recipient countries, the concepts

of the "partnership" and cooperation with each other are necessary.

3. **Be modest to learn what is important for the productivity improvement in the recipient countries as well as in the recipient companies.** It is also important for the experts to have a modest stance in order to learn what is important for productivity.

4. **Show objective and rational reasons for introducing the productivity movement.** In order to convince the counterparts, the rationale of introducing productivity improvement activities should be clearly explained. Showing incentives to conduct productivity movement is also important.

Furthermore, from the result of the study in the fiscal year 1995, it is confirmed that the company intending to improve its productivity has to clear the common four hurdles as the "first step" in introducing the productivity movement. The four common hurdles are:

Hurdle 1. Management must show its strong conviction and make an emotional commitment to the introduction of productivity improvement movement.

Hurdle 2. Management must establish the corporate philosophy and promote the discussion about their philosophy within the company (among management and employee).

Hurdle 3. Management must establish and confirm the three guiding principles of productivity improvement:
(1) Maintenance and expansion of employment;

(2) Mutual cooperation and discussion between the employees and the management; and

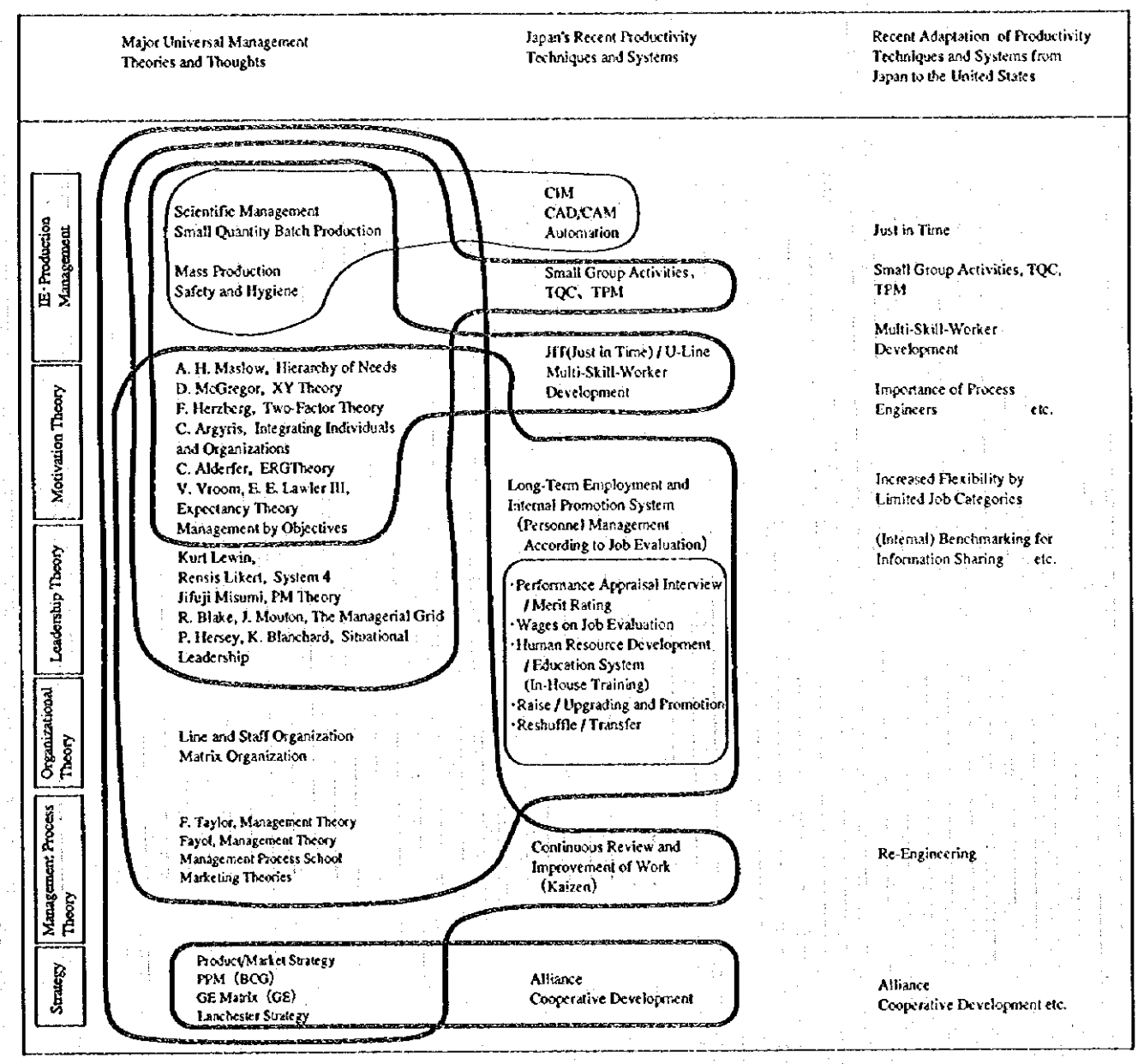
(3) Fair distribution of improved results among parties concerned (the management, the employees, and consumers).

Hurdle 4. Management must clearly indicate its management strategy which includes productivity improvement.

After overcoming these four hurdles, the productivity movement will start to work with the efforts of all parties concerned (experts from Japan, experts in the recipient country concerned, managers, workers, etc.). No matter how much productivity improvement technology transfer takes place, if above mentioned hurdles are not cleared, the transfer results cannot be obtained satisfactorily.

This is the summary of the conclusion of this report. Since this part is just an overview, a more detailed description for the introductory process of the productivity movement is also available in a separate document titled as Conclusions. If you are interested in the details of the introduction process of the productivity movement, please read the Conclusions part.

APPENDIX 1 Relationship between Japanese Management Techniques / Systems and Management Theories

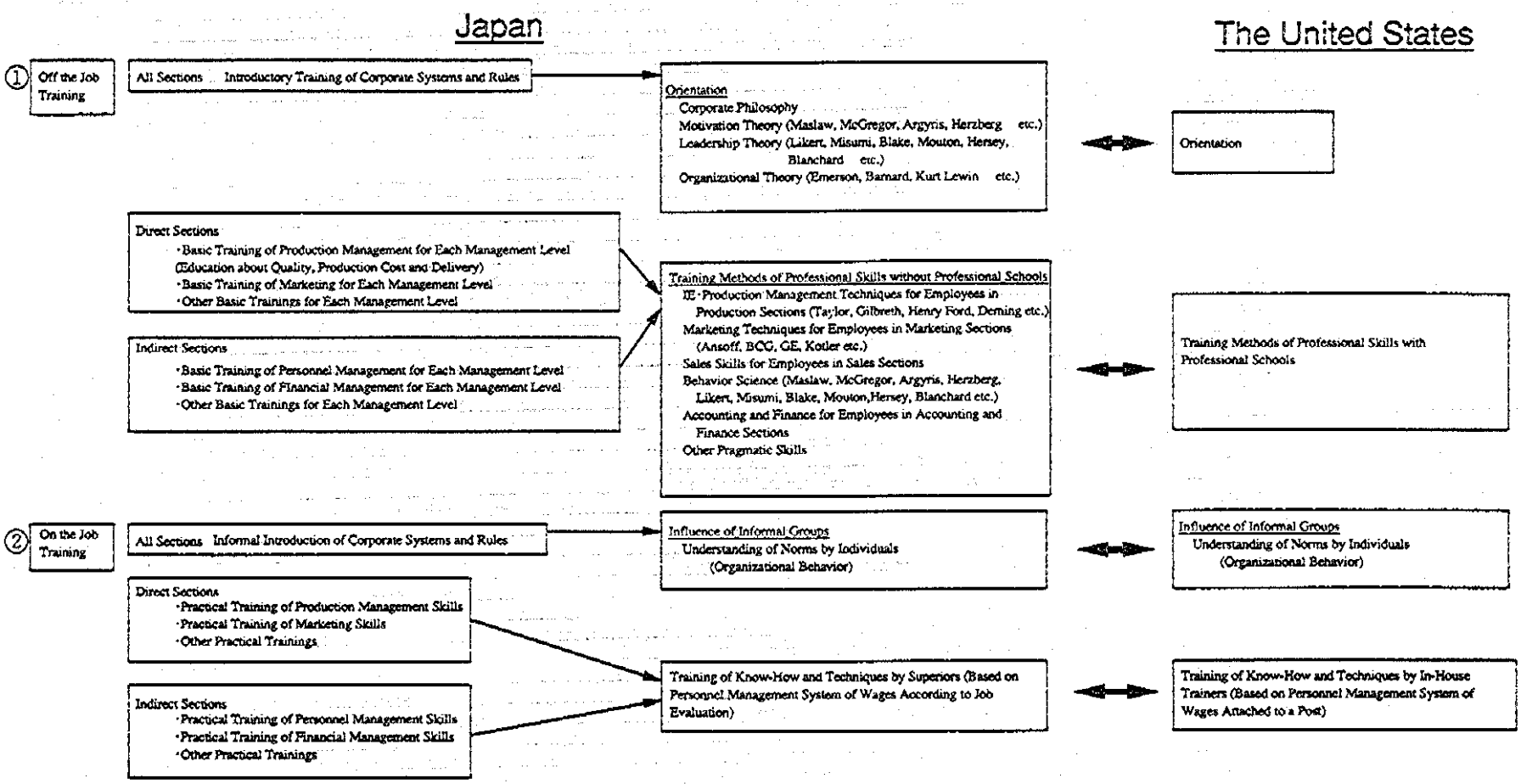


Notes:

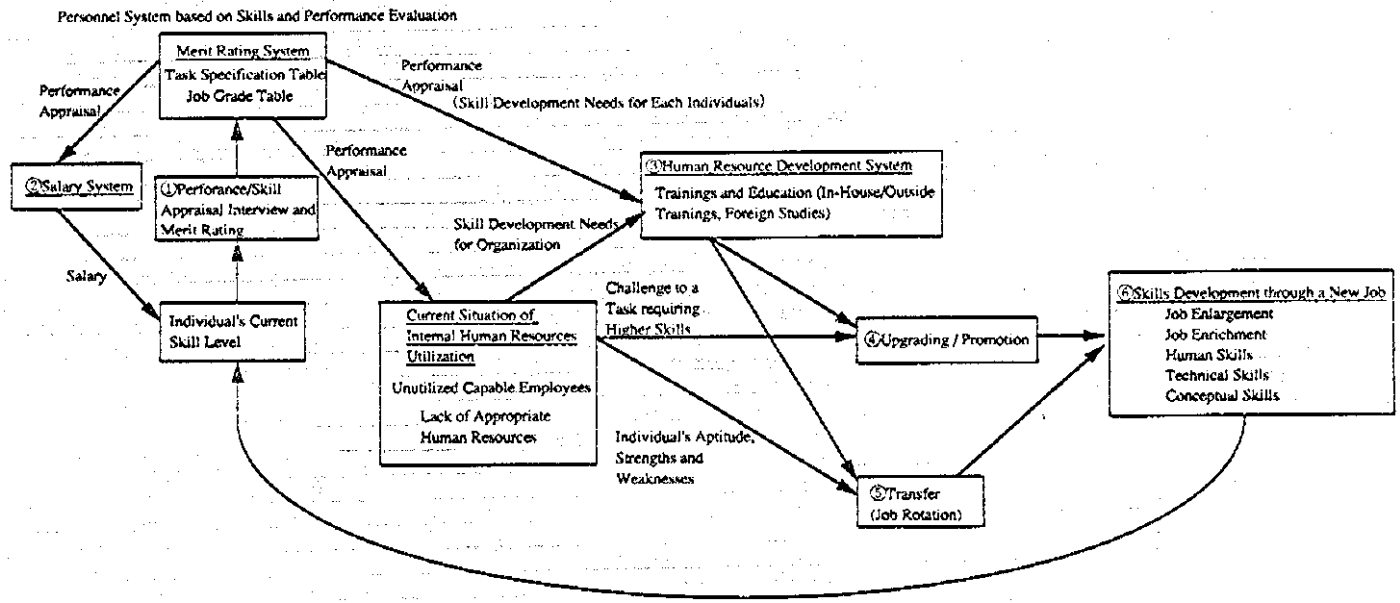
"Major Universal Management Theories and Thoughts" have been developed based mainly on the American Management Theories.

"Japan's Recent Productivity Techniques and Systems" above are not always used by Japanese companies. Appendix 1 shows an image about the relationship between Japanese productivity measures and universal management theories. There are non-Japanese companies which use similar productivity measures without any technology transfers from Japan.

APPENDIX 2 In-House Training



APPENDIX 3 Long-Term Employment and Internal Promotion System



①Perforance/Skill Appraisal Interview and Merit Rating
Basics of Ment Rating / Training for Merit Rating
- Taylor, Scientific Management
- Mayo, Rethlisberger, Human Relations
- Maslow, Hierarchy of Needs
- McGregor, XY Theory
- Argyris, Integrating Individuals and Organization
- Herzberg, Two-Factor Theory
- Alderfer, ERG Theory
- Vroom, Lawler, Expectancy Theory
- Likert, System 4
- Misumi, PM Theory
- Blake, Mouton, The Managerial Grid
- Hersey, Blabchard, Situational Leadership
- Drucker, Management by Objectives etc.

②Salary System
Basics for Setting a Salary Table / Understanding Employees
- Taylor, Scientific Management
- Maslow, Hierarchy of Needs
- McGregor, XY Theory
- Argyris, Integrating Individuals and Organization
- Herzberg, Two-Factor Theory
- Alderfer, ERG Theory
- Vroom, Lawler, Expectancy Theory
- Bernard, Organizational Theory
- Marketing Theories etc.

③Human Resource Development System
Understanding Employees
- Mayo, Rethlisberger, Human Relations
- Maslow, Hierarchy of Needs
- McGregor, XY Theory
- Argyris, Integrating Individuals and Organization
- Herzberg, Two-Factor Theory
- Alderfer, ERG Theory
- Vroom, Lawler, Expectancy Theory
- Bernard, Organizational Theory etc.

Managers' Attitude
- Likert, System 4
- Misumi, PM Theory
- Blake, Mouton, The Managerial Grid
- Hersey, Blabchard, Situational Leadership etc.

Technologies (Production Management, Marketing, Strategy etc.)
- Taylor, Gilbreth, IE・Production Management Techniques
- Process Control, OR, QC, JIT
- Pareto, Pareto Analysis
- Ansoff, Product-Market Strategy
- Lanchester Strategy
- Kotler, Concept of 4 P
- BCG PPM
- GE GE Matrix
- Other Strategy Theories etc.

④Upgrading / Promotion
Understanding New Position / Role
- Taylor, Fayol, Management Principles (Unity of Command、Span of Control、Specialization, Delegation of Authority)

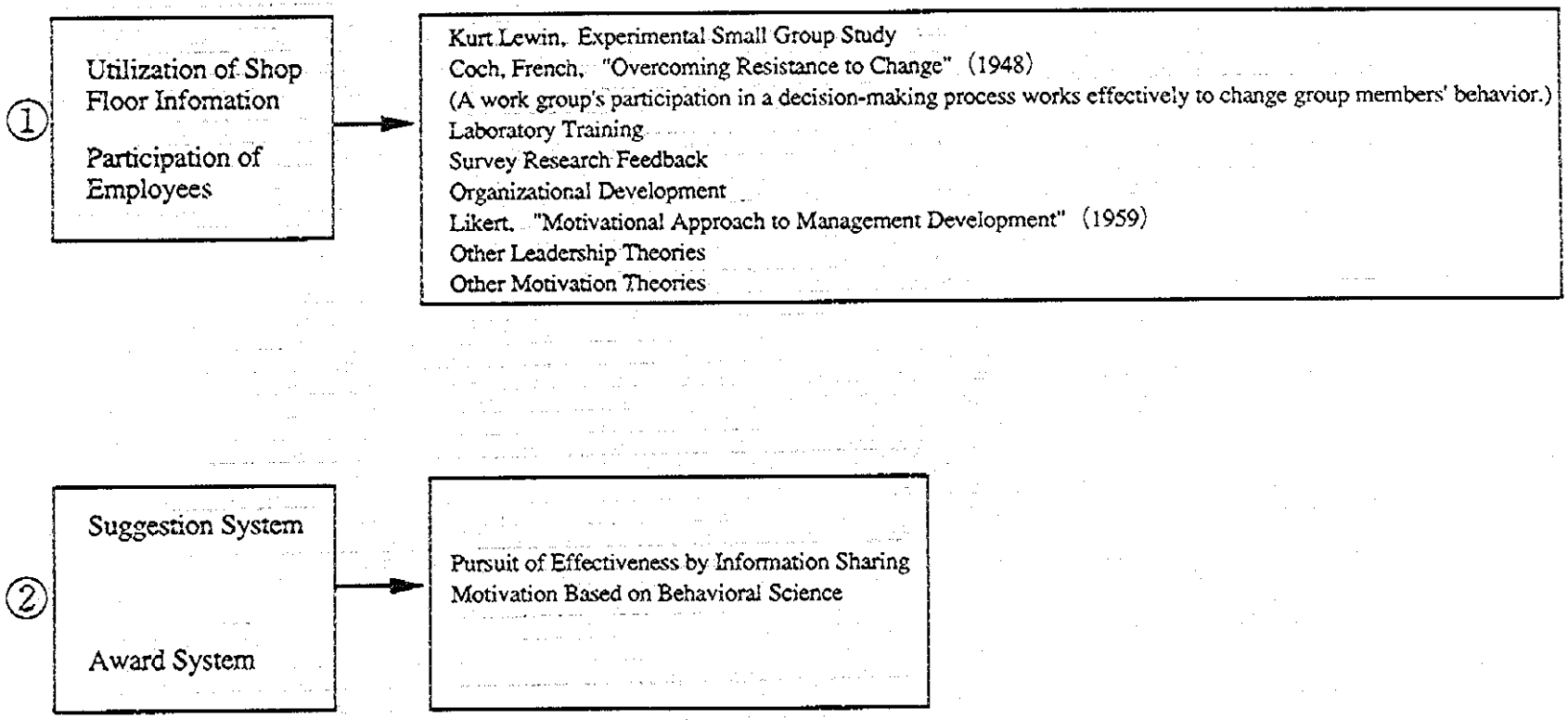
Understanding Employees
- Mayo, Rethlisberger, Human Relations
- Maslow, Hierarchy of Needs
- McGregor, XY Theory
- Argyris, Integrating Individuals and Organization
- Herzberg, Two-Factor Theory
- Alderfer, ERG Theory
- Vroom, Lawler, Expectancy Theory
- Bernard, Organizational Theory etc.

⑤Transfer (Job Rotation)
Understanding EntireCompany through Job Rotation
- Understanding One's Own Tasks from Others' View
- Utilization of Production Management Techniques by Experienced Employees
- Pursuit of Effectiveness by Information Sharing

Understanding Colleagues
- Mayo, Rethlisberger, Human Relations
- Maslow, Hierarchy of Needs
- McGregor, XY Theory
- Argyris, Integrating Individuals and Organization
- Herzberg, Two-Factor Theory
- Alderfer, ERG Theory
- Vroom, Lawler, Expectancy Theory etc.

⑥Skills Development through a New Job
Understanding EntireCompany through Job Rotation
- Understanding One's Own Tasks from Others' View
- Utilization of Production Management Techniques by Experienced Employees
- Pursuit of Effectiveness by Information Sharing
- Development of New Ideas by Accumulation of Experience
- Drucker, Management by Objectives etc.

APPENDIX 4 Small Group Activities



Follow-Up Review of Development Studies in Mining and Industry (Kaizen)

(Conclusion)

March 1996

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Conclusions
(The "First Step" in Introducing Productivity Movement)

In this section, the four common hurdles that have to be cleared first in introducing the productivity (improvement) movement by a company are summarized as the "first step." In addition, appropriate reference cases for clearing these hurdles are also mentioned.

C-1 Hurdle 1. Strong Commitment by the Management

First of all, it is necessary for management to have strong conviction and commitment to the introduction of the productivity (improvement) movement. Unless the management indicates their clear stance, the employees would not be convinced to follow. According to the "Swing Model" by which the framework of the productivity movement is explained in chapter 1, the "swing" (as the organization of a company in the "Swing Model") starts to make a big move with the interaction of the management and the employees. However, it is important that management take a strong initiative in starting the first swing. Naturally, the management has to think of the direction and the strength of the start before beginning the move. In this instance, analyses of the corporate performance such as the comparison among the industry (e.g., benchmarking, etc.), and time series analysis of the company concerned will provide the clue to decide the corporate direction in terms of the productivity improvement. As a part of external environment analysis, positioning of the company in the marketplace is important. Based on its current position in the market and from the market trend, the direction setting should be carried out. When possible, not only financial analyses but also other quantitative and qualitative analyses about the corporate performance should be carried out.

With regard to the Hurdle 1, the important task for the management is to clearly show the corporate vision which the employees consider as a basis of their business activities. This is because actual activities for the productivity improvement are the tasks of the employees. In concurrence with the presentation of the corporate vision to the employees, the management has to show them how serious it is in accomplishing the goals.

At the Hurdle 1, the corporate vision should be set toward a balanced benefit of the three parties; the management, the employees and the customers(market). In some cases, the management may have objectives that lean towards the management side. If such one-sided objectives are set, the company's long-term prosperity will not be expected. There are three levels in establishing objectives of the organization. The lowest level of the organizational objectives focus on the financial aspect, the company's profitability. The middle level ones include the educational aspect, the education of employees. The highest level ones consider the social aspect such as the environmental conservation and the contribution to poverty alleviation. Although it is not always possible for a company to set up objectives which heavily focus on the social aspect, it can shift its corporate objectives from the lower level to the higher one along with the growth of the company. By having the upper two level objectives, in addition to the finanical objective, the company will be able to expect a long-term stability. In this sense, the upper level objectives are also rational and ethically acceptable to all parties concerned.

C-2 Hurdle 2. Setting Up Corporate Philosophy

Secondly, it is crucial that the management take a central role in setting up the corporate philosophy, and that it is accepted by all the employees .

In establishing the corporate philosophy, Honda's philosophy can be used as a reference. Honda's philosophy is structured in three layers. The core is called the "Company Principle." The Principle is aimed at enjoying three kinds of happiness: (1) happiness (for the customers) to buy, (2) happiness (for the dealers) to sell, and (3) happiness (for the employees) to produce. In this Principle, satisfaction to the customers (customer satisfaction) is the first, and satisfaction to the dealers and the employees is also well considered. This coincides with one of the basic thoughts at Hurdle I which includes the distribution of prosperity to all the people under the influence of the corporate activity.

Surrounding the "Company Principle" is the "Management Policies" which set forth guidelines for the conduct of all the employees. There are three points in the "Management Policies": (1) to keep mental youth, (2) to act cheerfully, and (3) to be punctual. If the management and the employees follow the "Management Policies," it is possible that they can come close to accomplishing the core, the three kinds of happiness.

Surrounding the "Management Policies" is called the "Honda Way." The target in the Honda Way changes every year with the discussion held. The following are examples of the recent annual targets:

1994: Safety, Quality, Productivity;

1995: Quality, Reliable Product, Better Communication; and

1996: One Team.

In addition to the aspect of actualizing the "Management Policies" with specific behavioral targets, the "Honda Way" also has the aspect of doing business through the interaction with the market which surrounds the company.

Table C-1 shows the objectives of setting up the corporate philosophy from the viewpoints of both the management and the employees, and the measures for achieving their objectives.

Table C-1 Objectives of Setting Up Corporate Philosophy; Measures for Achieving Them

Objectives for the Mgt.	Objectives for the E'yees	Specific Measures
To obtain long-term profit (pursuit of financial aspect)	To improve quality of life (stable employment, wage increase, welfare program)	To maintain consistency in the corporate philosophy in the long term
To contribute to the local community and the country (pursuit of social aspect)	To be satisfied with the appreciation by the local community and the country; To recognize worthiness of work; To have pride to work	To conserve the environment; To provide customer satisfaction
To reward workers	To contribute to the company	To have a tangible annual target, which derived from the corporate philosophy, as a performance measure
To train and utilize employees' (human resources) (pursuit of educational aspect)	To recognize the direction of learning/improvement	To pursuit self-education; To introduce OJT/OffJT

Because each company puts its stress on different points for the preparation of its corporate philosophy (or corporate objectives), each and every company has to come up with its own objectives that can be agreed upon by all of its employees. Nevertheless, considering the consumers' and country's concern for environmental aspects, it is necessary to take into

account the conservation of the natural and social environment for the long-term prosperity of the company.

A case that represents this point can be seen in the slogan of Toyota Motors' Kentucky factory. With regard to the consideration of regional and working environments, important management guidelines taken are "introduction of pollution preventive facilities and consideration for the production line's height and elbowroom." Furthermore, this Kentucky factory's corporate philosophy, as listed below, coincides with the objectives of setting up corporate philosophy, mentioned in **Table C-1**.

1. To produce the highest quality cars in the US, based on the philosophy of "Customer First;"
2. To contribute to: the quality of life of its employees as well as that of the local community; and economic development of the local community and the US;
3. To secure employment and employees' welfare through a steady and continuous growth of the company; and
4. To establish the "Toyota Production Method," which is well fitted to the local community, by harmonizing the best in both the Japanese and American concepts.

What matters in the process of setting up the corporate philosophy is, the transition from the exsisting philosophy to the newly formulated one. This can be seen in the case of GM's Rosetown factory. Traditionally, car production in this factory had been performed by single-capacity workers, and each worker had been specializing in a single function among the factory's various functional categories. However, with the change in its corporate philosophy, GM's management and UAW created a new production system together. The five points stressed in changing the corporate philosophy is as follows.

1. Systematization(System-orientation)
2. Customer-orientation

3. Coverage of a wide range of quality elements in the definition of "quality"
4. Continuous improvement focused on process control
5. Participation of employees with leadership and teamwork

At the outset, UAW did not accept the change proposed by the management and were skeptical, because UAW believed that the change could lead to employment cut. Even for the Rosetown factory, the Quality Network started only from June 1994. It took time for the union to realize the market situation and change its stance. However, UAW finally recognized that "even though the worker-centered stance was kept, there would be a problem in stable employment when the company lost its competitiveness."

What led the union to change from company-centered operation style to customer-centered style was (1) the union's gradual recognition of the change in the environment that surrounds the company and (2) the management's enthusiasm and its persevering effort of persuasion. The persuasion was done mainly by the middle management, who had seen the reality of management improvement in NUMMI by the Toyota production system.

In any company, the strong drive by the management in setting up its corporate philosophy is vital. In response to such initiatives by the management, employees (including middle managers) can be involved. Then, by the interaction between the management and the employees, the company's own characteristics are formed. During this process, many discussions are held vertically and horizontally within the organization. Such discussion becomes an effective measure for the company to clear the next hurdle of establishing the three guiding principles for productivity improvement.

C-3 Hurdle 3. Establishment of the Three Guiding Principles for Productivity Improvement

The three guiding principles for productivity improvement are: (1) maintenance and expansion of employment; (2) cooperation and discussion between the employees and the management; and (3) fair distribution of improved results among management, employees and consumers. Without a strong commitment to these three principles by the management and employees, the productivity movement will neither work effectively nor last long after the introduction. Moreover, the commitment of the management has to be not only a declaration of its decision on the productivity improvement but also a course of action based on such a declaration. No action means no commitment. Employees' commitment to the productivity movement is also necessary for the success of such a movement. In order to get employees' commitment to the productivity movement, the concept of the three principles for productivity improvement is crucial. As mentioned in 6-1, the factors for the success of the Saudi joint venture are: (1) the management's clear indication that the Saudi joint venture should win first place in terms of price competitiveness in the manufacturing of iron works in Saudi; (2) a strong commitment to the actualization of a high operation rate and a high labor productivity based on the corporate direction; and (3) frequent wage raises (up to four times a year) which resulted in the cooperation from the employees.

Table C-2 shows the details of the three guiding principles from management and workers' perspective.

Table C-2 Three Guiding Principles of Productivity Improvement from Management and Workers' Perspective

Principle	Management's commitment	Employees' commitment	Measures
Maintenance and expansion of employment	• Commitment on corporate expansion in a broad sense • Investment on human resource development	• Acceptance of reshuffle ment • Commitment on self-education	• Development of the policy for human resource development • Introduction of the career development program
Employee-management cooperation	• Recognition of employees as a reliable information source	• Participation in the corporate management • Participation as a party concerned	• Development of communication channels such as a regular liaison conference between the management and the employee 'reps'.
Fair distribution of improved results	• Endeavor to fairly distribute improved management results of the productivity movement	• Recognition that no productivity improvement is actualized without employees' contribution	• Disclosure of management results for the transparency of management

However, in order for the management and employees to build mutual understanding and trust, persevering discussion between both parties is necessary.

The problem at the stage of setting up the three guiding principles is that both parties have the tendency of putting oneself first. The key to solving this problem is an objective situation analysis performed mainly by the management and the work out of corporate philosophy (Hurdle 1 and 2). Once a sound corporate philosophy is built, the atmosphere towards employee-management cooperation will be created gradually through the discussion based on such philosophy. Thus, the first and second hurdles should be cleared before starting the discussion for the third hurdle.

Another point to be noted is the importance of clearly indicating expansionary measures in a broad sense. As in GM's case, one can easily imagine that employees' active participation in the productivity movement may lead to an excess of manpower due to the improved productivity. Thus, the fear for losing one's job is instinctively raised in each employee's mind. Without wiping away such fear among the employees, the productivity movement will not be successful. Therefore, the management has to promise employees that the excess labor as a result of productivity improvement is to be absorbed either by increasing production up to full capacity, producing new products or reassigning excess manpower to other understaffed sections of the company. At this point, the employees have to accept the transfer and self educaiton, and take part in the improvement activities.

Regarding the third principle of productivity improvement, there is an exemplary story of the Ford Corporation. Even in the age when cars were only for high class people, Henry Ford advocated that a "good car" had to satisfy four elements: (1) low price, (2) small size, (3) solid and strong body, and (4) simple structure. Among the four elements, many people paid attention to Ford's achievement of "low price.". Henry Ford's intention was to manufacture a car which everyone, including his employees, could afford.

There were two connotations of the requirement of "low price:"
(1)recognizing one's own employees as prospective consumers and
(2)expanding the car market by producing affordable cars.

C-4 Hurdle 4. Indication of Strategy

After clarifying Hurdle 3, it is necessary to indicate corporate strategy.

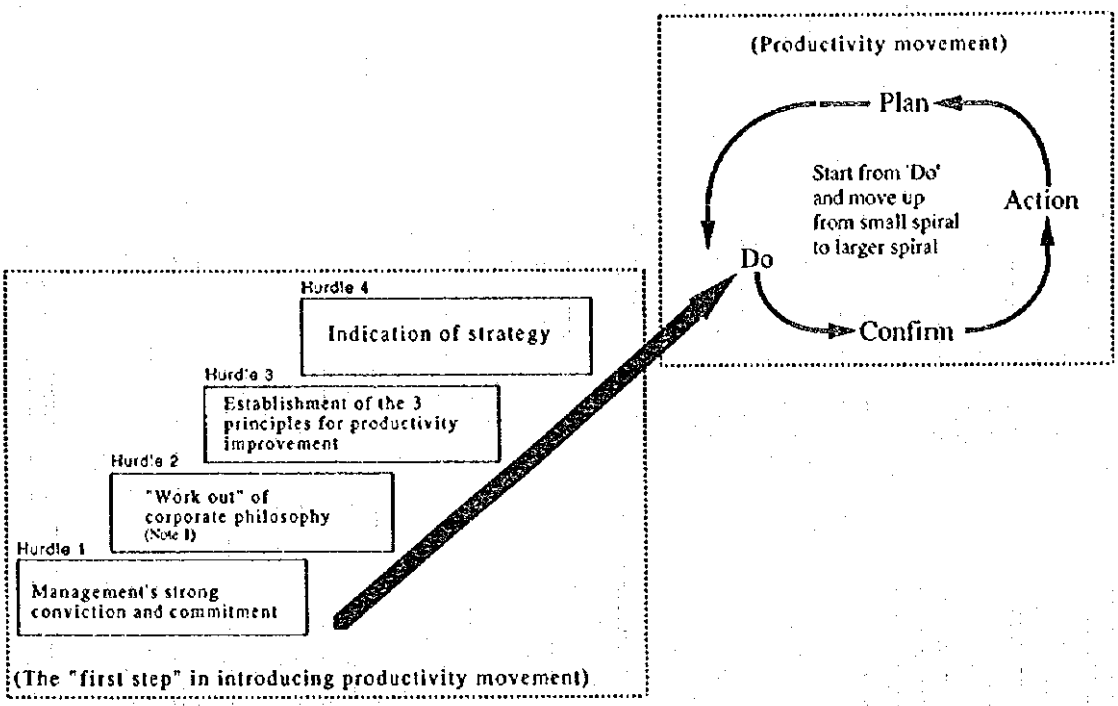
Corporate strategy shows the direction of the company. All the corporate plans are to be prepared along with the corporate strategy. By documenting the corporate strategy and the long-term corporate plan, the management can review and refer to them whenever required. Such written documents have stronger binding power for both the management and the employees than mere oral declarations. For the management, documented strategy means reconfirmation of its own direction and specific measures to be taken. Moreover, it creates the management's long-term commitment. On the other hand, the employees can check their activities by referring to such documents. The employees' long-term commitment to the strategy will also be enforced by the written reference.

Here, the point to be stressed again is that, the future of a company is held by the consumers (the market). Regardless of the country's characteristics, the idea of market-orientation is commonly important. A market-oriented system which is sensitive to the market opinion should be built. One example is Japan's "production site-oriented" concept, which is a result of the market-oriented operation. Traditionally, in some countries such as the US, highly educated engineers have the tendency to be unwilling to go down to the shop floor (production site). On the contrary, Japanese engineers have the tendency to consider that all the problems and solutions lie in the work site.

Because engineers' ultimate responsibility is solving problems of their products for their customers, it is natural to go to the place where they can find the problems.

Up to this point, the four common hurdles, which should be cleared for the introduction of productivity movement, have been explained. The first step for productivity improvement is to clear these four hurdles in order. Once the spiral of the productivity movement (Do -> Check -> Action -> Plan) begins, a steady expansion of the movement takes place. By both management and employees recognizing their duties, exchanging and sharing management information, the productivity movement becomes successful. **(Figure C-1** illustrates this point.)

In this study, clarification of the four common hurdles to be cleared at the introduction of the productivity movement was carried out. Recently, the introduction of international standard such as ISO9000 series is on the way. However, one of the common hurdles, such as management philosophy, that was acquired from this study is not given any concern in judgment points of such international standards. By lacking consideration for the hurdles presented in this report, there is the possibility of falling into the situation of, "plowing the field, and forgetting the seed." There is a need for recognizing what the international quality standard is for. **(Table C-3** lists the above mentioned points.)



Note1: "Work out" of corporate philosophy means, an effort to combine productivity improvement philosophy to common corporate philosophy of the management and workers.

Figure C-1 The "First Step" in Introducing Productivity Movement and Productivity Movement

Table C-3 The "First Step" in Introducing Productivity Movement

4 Hurdles

No.	Items	Requirements and Objectives for Management	Requirements and Objectives for Workers	Measures	Problems in Introducing Measures		Japan-US Differences and Cases
					Management	Working Environment	
1	Management's strong conviction and commitment	Firm's long-term prosperity and profit Human resource development through training Protection of environment Customer satisfaction (Focus on social, educational, and financial aspect)	Establishment of close rapport with management	Benchmarking -->Comparison within industry, site visits, and so on (qualitative, quantitative analysis) Own company's time series analysis	Tendency of one-sided policy making	Lack of such customs as long-term employment	Long-term employment of key persons is usual even in the United States. Prevailing restructuring in Japan -->Realize again the basis of long-term employment is training and education as well as long-term prosperity.
2	"Work out" of corporate philosophy	Firm's long-term prosperity Contribution to local community, country, and share holders	Improvement of living standard-->wage, welfare program, stable employment, training, etc. Worthiness of working, pride	Long lasting philosophy Annual slogan Clear connection between long-term plan and short-term plan	Demand crash	Difficulty of long-term commitment	To setup a channel for discussion is common to Japan and the United States.
3	Establishment of 3 principles for productivity improvement						
	Maintenance and expansion of employment	Utilization of human resources Commitment to education	Acceptance of reassignment or reshufflement Self education	Setting up rational objectives Meeting for target setting by employee reps and management	Demand Crash	(Agreed items in the second step become a reference.)	To setup a channel for discussion is common.
	Employee-management cooperation	Utilization of information from employees (The source of information is employees.)	Joy for management participation	Short-term objective set up with subdivision of long-term plan			
	Fair distribution of improved results	Fairness	No fruit to be shared without one's own effort				
4	Indication of strategy	Clarification and reconfirmation of long-term commitment by written documents	Confirmation of direction Long-term commitment of effort Confirmation of fair distribution of results	Customer-->use of market-pull concept	Implementation of 3 principles	(Discussion results up to the third step become a reference.)	

Implementation of Productivity Movement

5	Implementation-->Do, Confirm, Action and Plan Start of productivity movement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