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Model Reference Adaptive Management Theory(III)

—Focus on Japanese management in the Showa era after the defeat of Japan—

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Abstract

The main purpose of this paper is to clarify the adaptation policies on the introduction of management methods from advanced countries, focusing on the period after the defeat in the Pacific War.

The main adaptation policies are as follows :

- (1) After the defeat, Japanese economic policies changed to policies of democratization such the economic demilitarization, the promotion of democratic forces, the elimination of concentration and resuming peaceful economic activity.
- (2) Japanese economy recovered owing to full scale deflationary policy of the Dodge plan in 1949.
- (3) The financial clique dissolution policies exerted a great impact over the entire postwar economy, characterized by intense competition in all industries. The ousting of business leaders also hastened the succession of young managers to senior positions.
- (4) To increase the competitiveness of international trade, many industrial rationalization plans for all industries perfectly were completed by various industrial rationalization temporary measures acts.
- (5) According to the trade and capital liberalizations, large-scale installations for all industries were promoted. In addition production control, and the establishment of special and cooperational production systems were promoted.
- (6) The economic adjustment for coping with postwar oil crisis were adapted to short terms, through energy conservation, rationalization of industries and the actual devaluation of labor wages.
- (7) The industrial policy of the creative intelligent industries of 1980 s' was promoted.
- (8) To counter the rapid increase in the ordinary subsidy of trade between Japan to America and Europe, the Japanese government was promoting direct foreign investment, the technological transfer of developing countries, the import of agricultural goods and the cancellation of limitation of financial and communication markets to guard free trade and the GATT system.
- (9) The Japanese government established the foundation of promotion of modernization of Japanese companies based on the principles of career-long employment, the independence of enterprises and equal distribution of profit among labor, management and consumer.
- (10) The young high fliers of central government and private companies were dispatched to the business schools of America to learn modern management theory.
- (11) In Japanese practical management, many methods such as Quality Control and just in-time production etc were developed and given worldwide attention.
- (12) Modern management methods such as accounting systems, the interior control of enterprises, project branch systems and management control were introduced from America and Europe.
- (13) The educational system was reformed (for example the change from a multi-track to a single-track system) and educational opportunity provided for all people in keeping with their abilities by model reference to the American education system.
- (14) Special training schools were established to develop the abilities required for their working or daily

lives, or to raise their level of general education.

(15) New-type universities such as those having no academic departments, new-technology science and new educational training were established.

(16) The University of the Air was founded to give more people a university education by making effective use of television and radio programs.

Keywords ; Model reference adaptive management, Japanese management, Reform of industries, Financial clique dissolution, Industrial rationalization, QC circles, Just in-time production, Management control.

1. Introduction (Reform)

After the defeat, Japan was occupied by the American forces, Supreme Commander for the Allied Powers (SCAP) General Douglas Mac Arthur publicly announced the policies of democratization such as economic decentralization, the promotion of democratic forces, the elimination of concentration and resuming of peaceful economic activity. Three major reforms were the breakup of financial cliques, land reform and labor democratization.

The reason for dissolving the financial clique lay in the desire to destroy military power of Japan, to control the few great financial clique which had obstructed the creation of firms by independent entrepreneurs, and hindered the rise of a middle class in Japan.

The first step in the dissolution was to break up the holding companies, which were at the core of financial clique control, and to sell their stock to the public.

The financial clique leaders, including members of the founding families, were purged and were prohibited from further activity in the financial world.

A succession of democratization policies concerning industrial associations was adopted. The first was the Anti-Monopoly Law of April 1947(S22). This law became a basic principle of the postwar Japanese economy. In December of 1947(S22), the Elimination of Excessive Concentration of Economic Power Law was passed. On the basis of this legislation, 325 companies were designated for partitioning into smaller units in February 1948(S23).

The above policies exerted great influence over the entire postwar economy. It was an economy characterized by intense competition of all industries.

The second reform was the land reform. Right after the defeat, the Ministry of Agriculture and Forestry submitted a first draft of a land reform program which would have allowed landlords to retain 5 cho(1 cho=2.45 acres) of land and obligated them to transfer anything above that amount to the tenant farmers. Japanese officials instituted a thorough-going reform stipulating that all the land of absentee landlords, and all but one cho of the property of landlords resident in the rural villages, would be bought up by the government for redistribution to tenant farmers.

The proportion of total agricultural land area worked by tenant farmers was reduced from 50% to 10%.

This stringent reform had the effect of rapidly increasing the productive capacity of rice-growing land.

After the transfer of property rights, land improvements were carried out on a large scale and combined with the introduction of new rice-growing technology to raise the level of agricultural productivity. In terms of the economy as a whole, these technological advances and income increases in due course also caused an expansion of domestic markets.

The third reform was labor democratization. The proportion of workers organized into labor unions rose rapidly with the promulgation of the Trade Union Law, the Labor Standards Law and the Labor Relations Adjustment Law. Union movement of Japan was establishing firm roots and played an important role in improving working conditions of the laborer.

The unions began to insist on improved working conditions in return for vows of loyalty to the company and compelled management to accept the career-long employment system and the age-graded management system. The improved working conditions achieved by the labor unions expanded the domestic contribution to the development of the economy.

In addition to the three major reforms, General Headquarters also imposed a variety of others on the Japanese economic system such as the purge of business leaders (which hastened the succession of young managers to senior positions), the technological transfer of scientific management and the Dodge plan.

The Dodge plan was a broad program of fiscal and monetary policies developed under the guidance of Detroit bank president Joseph Dodge, who came to Japan with the rank of minister in 1949(S24), as financial adviser to Supreme Commander for SCAP. He advanced three basic policies such as a balanced budget policy, new loans from the reconstruction bank and the reduction and abolition of subsidies. At the same time, a single exchange rate was set at 360 yen to the dollar in April of 1949(S24).

The Dodge plan thus was a full-scale deflationary policy ranking with the Matsukata deflation of the early 1880(Shinohara,1982).

2. The Development of Management in the Reconstruction Period

After the war, the purpose of industrial policy was to revive the production of companies to cope with the grave shortages. The policies of the time were official distribution of goods, the official price control, and reconstruction bank financing.

The high inflation of postwar Japan was decreased by the full-scale deflationary policy of the Dodge plan. Furthermore Japanese companies could participate in international trade owing to the setting of a single exchange rate of 360 yen to the dollar.

Industrial production rose rapidly with wartime procurements of Korean War in 1951(S26). To increase the competition of international trade, industrial rationalization plans such as the first rationalization plan for iron and coal mining and a five-year plan for the development of power resources were initiated.

The industrial rationalization plan was supported by industrial policies such as the special tax step, the treasury investment of the Japan Export-Import Bank and Japan Development Bank, the interest supply for shipping, and foreign currency allotment.

To help the national population enduring the priority production system for the expansion of production of steel and coal was adopted from 1946(S21) to 1948(S23).

In 1952(S27), the enterprise rationalization promotion law was established. The achievement of economic independence and the intensification of international competition of trade were obtained by the rationalization policy.

At the end of 1950's, to achieve full employment and to improve the standard of living, the industrial policy for the promotion of trade and heavy industrialization was adopted.

The Coal Industry Rationalization Temporary Measures Act and the Machinery Industry Promotion Temporary Measures Act were passed in 1955(S30) and in 1956(S31) respectively.

The infrastructures of location, water supply and transportation were filled out, and the new industries such as machines and petrochemicals were promoted by industrial policy.

The strengthening of industrial bases and the reform of old industries arising from the energy revolution, the expansion of demand for consumer durables, and the changes of location from inland to coastal areas and locations of consumption were promoted.

At the end of the 1950's, the Japanese economy entered into a rapid growth path, and the fluidity of energy, new material utilization and the mass production of consumer durables were promoted. New potential industries such as synthetic fiber, petrochemicals, machinery and electronics were promoted. In order to promote these industries, the following industrial policies ; such as the financing of the Japan Development Bank, reductions of equipment redemption and customs duties of machines imported, the introduction of foreign technology, and the cartel order for industrial rationalization were adopted, Typically the first machine was imported, but the second machinery was produced at home, depending on the development of advanced technologies of home production (Shinohara,1982 ; Maruo 1990).

3. The Development of Management of Rapid Growth Terms

During the five years of the end of 1960's, the two girder growth rate and full employment were achieved by the income-doubling plan and from 1968(S43) the scale of the Japanese economy was stepped up to second position in the free world. The total inflation annually was 5 percent, but the wholesale price was stable at 2.5 percent. The technological reformation level advanced in many industries, and supply abilities expanded smoothly.

As for the financial balance, the natural increased tax represented the additional increase produced by the rapid growth.

The higher structure of industries was expanded by increase in secondary and tertiary industries, the rapid growth of heavy industries, the increase in medium sized firms, and the rapid growth of supermarkets and so on.

The ordinary balance of trade changed to ordinary subsidies by the fixed exchange rates, and the increase rates of first half and latter half of 1960's were 17.9 percents and 15.1 percents respectively.

Broken down by industry, food processing, fiber and non-metal mining, and the chemi-

cal, Iron and Steel and Machinery increased rapidly. The industrial policies of this term were highly varied.

First, according to the trade liberalization and capital liberalization, the new industrial reform promoted large-scale installations, together with the ship reform and the installations of automobile industries. But, the installation automobile industries was not achieved.

Second, MITI controlled industry-wide plant and equipment capacity expansion agreements with the cooperation between government and company to forestall future fear of overproduction.

Third, production control and the establishment of special production system and the cooperational production systems were promoted.

The cooperation of businesses and guidance of the proper scale of the medium and small companies were promoted by the Modernization Promotion Law of medium and small sized companies passed in 1963(S38).

Fourth, with regard to the comprehensive energy strategy, the Oil Industry Act in 1962(S37). the Electricity Industry Act in 1964(S39) and the Coal Industry Reform Temporary Measures Act in 1967(S42) were enacted.

Fifth, regarding the promotion of special industries, the Japan Computer Company with six joint capital enterprises for the purchase of home production computer was established in 1961(S36).

The industrial pollution problem became serious as result of those industrial policies pursuing of scale economy and the lack of control over this segment of the economy (Shinohara 1982 ; Maruo 1990).

4. The Development of Management in the Low Growth Period

When the Japanese economy entered the 1970's, the demand of the people called for fighting public hazards, environmental destruction, the dens and sparse problem of population and the lack of social capital.

In 1971(S46), the yen exchange rate changed from 360 yen to 308 yen to the dollar, from 1973(S48), the high inflation was aggravated by the transference of the floating exchange rate system. And Furthermore, the Japanese economy was shaken by high inflation, the decline of economic growth and the wide deficit of international payments by the restriction and prohibition of oil exports arising from the Fourth Middle East War.

During the three years from 1976(S51) to 1978(S53), the Japanese economy recovered to the same levels of economic growth rate and price rate as in the period immediately prior to the oil crisis.

The Japanese economy was again effected by high inflation and the wide deficit of international payments by the restriction and prohibition of oil exports arising from the Iran-Iraq War in 1979(S54). The Japanese economy had recovered to the same level as before the crisis in the two years from 1979(S54) to 1980(S55).

The economic adjustment to these crisis consisted of adaptation to the short term problem of the energy conservation, the rationalization of companies and the actual

devaluation of labor wages.

The demand of interior and overseas markets owing to products expanded industrial energy conservation produced by the energy, the quality control and improvements using robots and NC machines. But the heavy industries were in the long term depression brought about by the oil crisis. The industries suffering over structural depression were the electric furnace metal aluminum smelter, synthetic fiber, shipbuilding chemical fertilizer, plus pulp and paper industries.

The joint disposition of over capacity of equipment, the joint fund establishment for disposition, the unemployment counterplan establishment, and the regional counterplan establishment were achieved by the Declining Industry Stabilization Temporary Measures Act in 1978(S53), and the Declining Industry Structural Improvement Temporary Measures Act in 1983(S58).

These Acts were considered as part of positive adjustment policy by the OECD in 1978(S53).

The industrial policy of 1980's was the creative intelligent intensification of industrial structures. The creative intelligent industries represented large intelligent input of labor, small capital input and small energy input. Namely these industries were IC, Computers, Robots, Fine chemicals, New materials, NC machinery, Aircraft, Fashion and Information. The aircraft industry had been achieved as yet.

Response to the rapid increase of exports to American, the Japanese government controlled self respond an export such as textile goods, miscellaneous goods and automobiles. The Japanese government also added the policies of raising, the value of yen, abolishing customs obstacles, the promotion of imports and the decrease of import limit goods.

In spite of these efforts, the ordinary subsidy of trade between Japan to America and Europe increased. The closing of the Japanese market denoted an issue of industrial policy, agricultural policy, a technological promotion policy and distributive circulation.

These policies were very difficult to decide as g "anti-custom obstacles." The Japanese government is after all promoting foreign direct investment, technological transfer to developing countries, the import of agricultural goods and the abolition of limits to financial markets and the communication market, to guard free trade and the GATT system (Destler, I.M and Sato 1982 ; Hayashi 1989).

5. Introduction of European Management

In 1949, the broadcasting station of G.H.Q opened a lecture course on management control for the leaders of Japanese companies to support the reconstruction of communication machinery makers and to develop the unsophisticated management control of Japanese companies. This lecture course was divided into two courses ; a general course on policy planning, organization business and total control, and a senior course on quality control, cost control and budget control.

It is the first experience of learning systematic scientific management for the leaders of Japanese companies. These lectures had a great impact on the Japanese companies.

The Japanese companies tried to acquire American management control. According to the Model Reference Adaptive Theory, after the end of the war, Japanese companies started anew with new management, facilities and manpower.

The FOA of American government had obtained good results promoting productivity improvement in Europe, and tried to introduce the same promotion into Japan.

The FOA selected its counterpart in Japan as the “Japan Committee for Economic Development”.

But it was not enough to merely transfer technology and equipment. Consequently the FOA promoted to establish a Headquarters of production organized with labor, management, and neutral control, for the total modernization of management control of Japanese companies.

MITI established the Foundation of the Headquarters of Production with consultation of the FOA and Japan Committee for Economic Development.

The fundamental principles of the Foundation were the promotion of career-long employment, independence of enterprises and the equal distribution of profit among labor, management and the consumer.

The modernization promotion of the Foundation opened with a seminar by American businessman and dispatched inspection groups to Europe and America to bring back various management theories. One of the reports “Management control and cost control” in 1957(S32) had a direct impact on Japanese management.

During the decade 1950-1960, 660 groups with 6,600 members consisting of managers, academic management, shop floor labor and consumers were dispatched to America and Europe. And also the high flyers of central government were dispatched to the business schools of America to learn modern management theories.

From 1965(S40), the Foundation established the Management Academy, and many universities also established management faculties.

The foundation also established the participation system of management with the labor and management council, friendship between labor and management and sound and free communication between labor and management for preventing administrative interference.

In the 1980s', the Foundation accepted many inspection groups from foreign countries. In the history of Japanese management, most ideas of modern management science was based on the adaptation of European management as the model referent. However, in Japanese practical management, the two methods QC circle and just in time production were developed and given world-wide attention worldwide.

QC circle

Japan technological league opened the basic course of quality control for technical experts, managers and leaders by a bottom-up procedure. Furthermore, the league broadcasted a lecture course on quality control for workers by Japan short-wave broadcasts from 1956(S36). NHK broadcasted lectures of the new management and quality control from 1957(S37) to 1962(S37), the textbook selling 110,000 copies were very popular. In the factory, the study groups of quality control became accustomed to the style of QC circles in completing quality control. These QC circles were unified to the national circle,

and the branches of the national circle were established. Furthermore, 160 conferences of QC circles were held annually.

In 1966(S41), 10,000 QC circles were established and diffused widely within Japanese industries. Total quality control developed with full support of companies and the branches established in each company.

At the same time, the Zero Defect promotion to cut the job time was introduced to QC circles and spread rapidly. It is necessary for the manager to promote positively because the workers know the daily business perfectly and can find points for improvement more easily.

In 1968(S43), Japan efficiency association held its first national conference. The positive benefits of QC were received attention from prof. R. Lickert. In his book of "New Patterns of Management" in 1961(S36), it is clear that the supportive actions for cooperation of workers and each class of companies was needed. Japan learned QC theory from America and obtained great success by the enforcement of QC circle.

In Management Review in 1981(S56), Prof J.M.Juran advised Japanese QC that (in addition to Dr. Deming) one QC circle is made up of about ten workers and 10 million workers learned and solved 15 million problems. And also he pointed out that QC circle promoted sound finance and peacefulness among workers arising from cooperation between worker and manager, and the sound teamwork to achieve QC. Prof Juran taught QC to many countries, but, only one of them in the world, Japan prove successful at using his ideas,

The self learning of QC carried out smoothly based on the career-long employment system.

Material Requirement Program (MRP)

MRP was famous worldwide for its Toyota automobile company method and also was named as Just-in-time production and stockless production.

This method supplies the materials and parts at nonexcess and nondeficiency by the levels of day, week and year according to the manufactural goods plan and production plan.

Kiichiro Toyota, president of the Toyota automobile company adapted all factory facilities to this "stockless" use of materials and parts for automatic production.

In 1962(S38), the "*kanban*" (sign board) method that designated the type and volume of materials and parts for use in the next stage by the flow of paper chits was widely applied at each level of the production process thus completing the stockless of materials and parts.

To implement this method, it was necessary to exert effort to standardize all job times by QC circles. According to demand and retailing trends, this system was controlled by computerization.

A study of the worker efficiency was primarily based on worker morale and attitude to problems that was produced at Harvard.

The details of the study were published in the following three books "The Human Problem of an Industrial Civilization" by Elton Mayo in 1933(T8), "Management and the Worker" by Roethlisferger and Dickson in 1939(S14), and "Management and Moral" by Roethlisferger in 1941(S16).

These studies were first introduced into Japan by Kuniko Otaka and Nobuo Noda in

1953(S28). Methods-Time measurement (MTM) and work Factor (WF) were based on the Pre-Determined Motion Time System from which the total standard time based on the summation of the pre-determined standard time of each job divided by the small factor motion was obtained.

In 1950(S25), Takahiko Ueda established the Japan section of WF conducted his first lecture at the Meidensha company. WF spread widely to many factories.

Cybernetics developed by Norbert Wiener and OR was introduced into Japanese management, and high scientific management such as Linear programming, Game theory, Information theory and so on were also spread widely by computer use.

In 1960's, Manufacturing Automation Protocol(MAP) developed by GM, was applied to the manufacture of aircraft and IC. In Japan, this method spread widely as "CAD/CAM".

From 1964(S39), Program Evaluation and Review Technique (PERT) and Critical Pass Method (CPM) spread widely.

Accounting System

In postwar time, G.H.Q issued orders that the improvement of accounting reports of Japanese company was completed and thus the results were unified. MITI, Economic Planning Agency and the Ministry of Finance promoted the establishment of these laws and rules governing financial accounts and cost accounting.

The most important rule of financial accounts is the establishment of an auditing system.

In 1948(S23), the external auditing was made mandatory by the Certified Public Accountant Act. In 1949(S24), the accounting principle of enterprises and rules of financial accounting were promulgated, and these rules showed a great impact upon the modernization of Japanese accounting.

In 1951(S26), a compulsory auditing system was initiated by the proclamation of the rule of inspection of proof of financial documents based on the Security Stock Committee.

Interior Control of Enterprises

An American company has a controller, but the Japanese company has no controller. The president and director of Japanese companies took charge of the controller. In proportion to the expansion of business, it is necessary to control the total evaluation of budget and results from the point view of company as a whole.

MITI promulgated the procedural rules for interior control of enterprises in 1953(S28), and ordered the establishment of the permanent managing director committee.

With the development of these computer, management system was integrated by data processing, and many reforms in management science were effected. One of these management control cycle was outlined in the book "Top-management Organization and Control" by Holden, Fish and Smith in 1949(S24). This book impacted on Japanese management and was published in Japanese in 1951(S26). This book represented clearly the control cycle with objectives, procedure and evaluation, where the Top decided the object, the manager of the organization the standard of good results and the evaluation of actual results. Japanese companies introduced the new principle that the Top controls total management and trusts each branch charged.

Nobuo Noda completed the cybernetic feedback system of management control cycle

by using computers.

Project Branch System

Konosuke Matsushita of the president of Matsushita electronic company established the project branch system in 1933(S8). But the most of the project branch system was derived from American management theory.

This system is a decentralize system with perfect independence of project system for goods or region, the head office only controlling affairs.

From 1955's, this system spread widely throughout Japanese companies. To adopt this system, it is necessary to establish a unit to be the standard to evaluate personal ability and to choose competent people transferred to top management by the proofing of responsibility. In recent years, to develop the new values among various branches, the project team was composed of members selected from each project branch.

Management Control

Management Control signifies that the manager can decide the top management of a company without controls of legal, stock holding with few stockholders, majority stock holding, and all stock holding.

According to the management control theory, the manager can manager with self-perpetuating.

The stockholder is mostly interested in dividend and stock prices without interfering with the management. The creditor of loan trusts cannot sell freely the holding rights of stock by bank control. The legal ownership is the fiduciary ownership.

In Japan, the mutual stock holdings of the old financial clique group, the employee stock holdings and insurance company stock holdings represent a high value. At a general meeting of stockholders, the attitude is indifference to one's appearance according to all directors coming from employees.

From a social point of view, the Japanese company is without self-consciousness of independent responsibilities and volunteer activities.

The Japanese company is making desperate efforts to stand side by side the share competition against the same trades.

With the response to the internationalization, the Japanese company must awake to the sense of independent responsibility according to Model Reference Adaptive Theory based on the reference to the excellent European practices of management control. (Yuzawa and Udagawa,1990 ; Yamamura 1989b, 1990a,1990b)

6. Educational System for Japanese Management

After World war II, the organization of the various Japanese public institutions and systems shifted to a democratic basis. The educational system was also reformed (the change from a multi-track system a single-track system) and educational opportunities provided for all people in keeping with their abilities.

Imperial ordinances formerly established basic principles and prescribed the forms and procedures of education in Japan. Since the end of the war, education has been governed by constitutional and statutory laws as implemented by Cabinet orders.

The Consitution sets forth the basic national educational policy, as follows ; "All

people shall have the right to receive an equal education correspondent to their ability, as provided by law. The people shall be obligated to have all boys and girls under their protection receive ordinary education as provided for by law. Such compulsory education shall be free" (Article 26).

The Fundamental Law of Education, presented in Chart II, sets forth in more detail the aims and principles of education in accordance with the spirit of the Constitution. In it are established specific national principles of education; equal opportunity, compulsory education, co-education, public education, social education, prohibition of partisan political education or sectarian religious education in public schools and prohibition of the improper control of education. The enactment in 1947(S22) of the Fundamental Law of Education was followed by a series of educational statutes. The first of these was School Education Law, which further elaborated the aims, methods and principles of the new system.

The structural organization of the present system of public education indicates the normal age of admission or promotion to each grade of the educational system.

In upper secondary schools, there are two types of courses. The curricula of part-time and correspondence upper secondary courses generally require four years or more to complete, graduates of these courses qualify for university entrance examination on an equal basis with graduates of full-time upper secondary schools. Technical colleges started in 1962(S37) are institutions aimed at training technicians and Junior colleges offer two or three-year courses. The evening course programs in universities take four or more years to complete. The curricula in departments of dentistry and medicine take six year or more to complete.

Special education schools are those for the blind, the deaf, and otherwise handicapped children. There are also a number of special training schools and miscellaneous schools other than the regular schools mentioned above. Special training schools are aimed at developing students abilities for their working or daily life, or at raising their level of general education. Among such schools, the schools offering upper secondary courses are called upper secondary special training schools (ie, Koto-senshu-gakko) and those offering advanced or college courses called special training colleges (senmon-gakko).

The former require admission the completion of lower secondary schooling and the latter the completion of upper secondary schooling. In addition, there are many general course in the schools open to all regardless of their educational qualifications. Miscellaneous schools mainly provide young people with vocational and practical courses in dress-making, cooking, book keeping, typing, driving and repairing, computer techniques, etc. Most courses in such schools require for admission the completion of lower secondary schooling, while some courses require the completion of an upper secondary school course.

In the field of higher education, recently, the following new-type universities have been created. The University of Tsukuba, established in 1973,(S48), has no academic departments of the conventional types. The University treats research and instruction as separate but functionally related endeavours. All of the so-called faculty members at Tsukuba are primarily researchers and they are placed in its various Research Institutes. Graduate and undergraduate degree programs are planned and administered by the various Colleges.

These Colleges form six superordinate organizational units called Clusters or Schools for instruction so that students may benefit from broad inter college course offerings.

The Universities of Technology and Science in Nagaoka and Toyohashi, both inaugurated in 1976(S51), provide four years of professional education, linking the last two years of an undergraduate course and the graduate courses mainly for graduates of technical colleges.

The Universities of Education in Hyogo and Joetsu, both founded in 1978(S53), are new types of universities for teacher training which provide both an undergraduate course for training of elementary school teachers and the 2-year graduate course for offering opportunities of in-service training as well as advanced studies for teachers.

After World War II, when the Japanese economy entered the stage in which heavy and chemical industries were developing, tertiary industry expanded and the national increased, upper secondary and higher education took rapid strides under the new educational system.

From 1956(S31) to 1977(S52), the advancement rates to upper secondary education schools and institutions of higher education increased from 71% to 93% and 17% to 38%, respectively, and enrollment in universities and junior colleges exceeded 2.0 million in 1975.

The establishment of a university and junior college irrespective of its establishing body requires the approval of the Minister of Education, Science and Culture. The school presents each application for approval to the University Chartering Council and the council decision is based on the recommendation of the Council.

The standards for the establishment of a university or junior college are prescribed in the Standards for the Establishment of Universities or in the Standards for the Establishment of Junior College. On the basis of these standards, the University Chartering Council makes inquires and deliberate an applications for the establishment of new institutions. The Council is also concerned with policy for awarding doctorates and other academic degrees.

The members of the Council are appointed by the Minister, on the recommendation of organizations concerned such as Japanese University Accreditation Association, National University Association, Local Public University Association, Association of Private Universities of Japan, etc, and from among personnel of universities and junior colleges throughout Japan, and knowledgeable and experience in the spheres of politics, education, etc. All universities and junior colleges come under the jurisdiction of the Minister of Education, Science and Culture but each university or junior college is governed by its own governing agency.

Regarding important matters related to private universities or junior colleges, the Private University Council may make recommendations to the Minister. The Council is composed of presidents and other educational personnel of private universities, junior colleges, directors of private school bodies and knowledgeable and experience.

The establishment of technical colleges-national, local and private-is approved by the Minister of Education, Science and Culture on the recommendation of the Technical College Council. The members of the Council are appointed by the Minister from among principals or teachers of technical colleges, directors of private school bodies who are leaders of such colleges and people of learning and experience.

Educational expenditures for operating national and local public institutions of higher education are mainly supplied from the funds of national and local governments, respectively. Revenue from entrance examination fees, entrance fees, tuition fees, etc, in national and local public institutions are generally credited to the governments concerned, and not to individual institutions. In private institutions, students fees and private funds available to the school are the main financial resources,

There are many private universities and junior colleges facing financial difficulties because of their low financial resources. To ameliorate this situation, national grants-in-aid of current expenditures for education and research (including teachers' salaries) are distributed to private institutions through the Japan Private School Promotion Foundation, which is mainly funded by the national government. Other functions of the Foundation include the extension of loans to leading school persons as well as various types of assistance for the promotion of education in private institutions. In addition, specific subsidies are being granted directly by the national government to individual institutions for new facilities for science education and research equipment.

For the school education of working youth who have completed compulsory schooling and upper secondary schooling, part-time or correspondence courses of the upper secondary level and evening or correspondence courses at the higher education level are provided respectively.

The upper secondary part-time and correspondence courses are regular ones and have the same status standing as those in full-time school. Though the duration of study in part-time and correspondence courses, there are no differences among them in educational content, credit requirement for graduation and certificates awarded. The part-time courses are usually provided in the evening to facilitate the attendance of young people who work during the day.

In the correspondence course, instruction by correspondence materials, schooling and others are employed as teaching methods and completion of the prescribed number of the instructions and schooling for each subject yields a certain number of credits. Broadcasting programs by radio or television may be substituted for partial schooling.

In 1962(S37), to lighten the burden of study of working students, the Ministry of Education, Science and Culture introduced a system which promoted cooperation between established schools and the training institutions of enterprises. The training given to part-time or correspondence students of an upper secondary school in those enterprise-based institutions for technical education approved by the Minister is regarded as part of the course work of the curriculum in upper secondary education.

In the case of evening and correspondence courses in junior colleges and universities, the duration of study and other requirements for graduation are in principle equal to those of full-time and resident students.

The evening and correspondence courses of universities lead to bachelor degree, and may lead to the teaching certificate as well.

In 1978, the number of institutions-upper secondary school, Junior college and University-offering the part-time or Evening Courses is 1,390, 124 and 64 respectively. The enrollment at these schools is 171, 963, 32, 014, and 131, 498 respectively.

The number of institutions of those schools is 87, 9 and 12 respectively. And the enrollment of those schools are 132,793, 20,175 and 102,479 respectively.

Salary scales and the kinds and the amounts of allowances for national school personnel are fixed by the Law Regarding Compensation of Employees in Regular Governmental Service.

The salaries for teachers in different school bodies are determined by the same standards as at national schools and are quite similar.

There are four salary scales for national school teachers, for university and junior college, for technical college, for upper secondary, and for lower secondary, elementary and kindergarten. Salary levels are determined principally on the basis of level of preparation and length of service, without regard to the class of the teacher certificate. As a result, the salary levels among the four salary scales are quite similar.

The public expenditure on education was 6.4% (100, 294 million dollars) of the national income and 18.8% of the total public expenditures in 1986. The national public expenditure was 9.6% (30, 856 million dollars) of national public expenditures and 26.4% (86, 663 million dollars) of local public expenditures.

The percentage distribution of public expenditure on education by school level was 31.7% (Elementary schools), 19.5% (Lower secondary schools), 15.6% (Upper secondary schools), 11.7% (Junior colleges and university), 10.0% (Educational administration), 7.6% (Social education), 2.7% (Special education school) and 1.2% (kindergartens) in 1986(S61).

Recently there is a strong tendency toward lifelong learning not only in the field of education but also in every other field of our society. The site for lifelong learning crosses various fields of formal education, social education and home education. Methods for lifelong learning have been diversifying due to the development of various modern media.

The University of the Air was founded in 1983 to give more people a university education by making effective use of television and radio programs. The aims of the university are to serve as an institution of lifelong education, and to offer a new system of higher education to upper secondary school graduates in the future and university education for the new era using the latest resources in educational research and technology.

The university academic program consists of classes broadcast on television and radio, original programs produced in their own studio and broadcast through their own channels, the use of printed course materials, correspondence courses schooling and examinations for credits at study centers. Broadcast classes are provided from 6.00 to 24.00 every day, and programs are arranged in order that each student can listen and watch them in accordance with his or her own life style. The Faculty offers three courses such as science in everyday life, industrial and social studies, and humanities and national science.

It is characteristic of special training schools and other miscellaneous schools to provide practical vocational education, technical education and liberal art education to cope with various learning needs which are affected by the changes in society. In order to make the best use of these schools, standards for the teacher's certificate and facilities has been made flexible. Special training schools in particular have been widely developing since they were institutionalized in 1978. There were 3,191 schools and about 700,000 students in 1988. There are three categories of courses ; a general course which has no

limitation in admission requirements, an upper secondary course admitting upper secondary school graduates or those who completed at least 3 years upper secondary courses. Since 1985, permission to apply to universities has been granted to those who finished more than 3 years of coursework at upper secondary level and who fulfil the necessary conditions. Thus special training schools are promoted institutionally.

With the expansion of political, economic and cultural exchanges with foreign countries, the number of Japanese residents abroad has shown a remarkable increase. Japanese children at the compulsory education age residing abroad totalled 44,123. The regional distribution of Japanese children at the compulsory education was 42.6% in North America, 22.7% in Asia and 23.8% in Europe. With a view to improving the education for Japanese children residing abroad, the Japanese Ministry of Education, Science and Culture is undertaking such programs as dispatching teachers to full-time schools for Japanese, compiling and distributing guidance materials, distributing free textbooks, and affording other educational materials.

The Ministry of Education, Science and Culture is also undertaking many programs in order to facilitate their adoption which include giving grants towards the establishment of specifically designed upper secondary schools, opening reception classes at national schools and supporting a variety of programs for developing new teaching approaches.

The number of foreign students studying in Japan has been increasing year after year in recent years. Japan has been taking various measures for foreign students including the Japanese Government Scholarship Program, financial support for private fee paying students and the improvement of university facilities for foreign students.

The Japanese government Scholarship Program can be divided into the following six types ; the undergraduate scholarships ; Research scholarships ; Japanese studies scholarships ; scholarships for in-service teacher trainees ; for students at colleges of technology and for students at special training schools.

The number of foreign students studying in Japan was 25, 643 in 1988 and the Japanese government plans promote an increase in students to 100,000 by 2000 for Model reference adaptation for international technological transfer. In addition approximately fifty-seven thousand Japanese went abroad to study or to receive undertake training in 1987 for Model reference adaptation for international technological transfer. (Yamamura, 1989a, 1990.)

7. Conclusion

In postwar Japan the Japanese economic policies commenced to democratize-the financial clique dissolution, land reform and labor democratization. Furthermore, the purge of business leaders hastened the succession of young managers to senior position, technological transfer of scientific management and thus the Dodge plan was achieved.

The high inflation caused by the defeat was combatted by a full-scale deflation policy of the Dodge plan. Japanese companies were consequently allowed to participate in the international trade by the setting of a single exchange rate of 360 yen.

The achievement of economic independence and the intensification of international competition of trade was brought about by the rationalization policy for all industries.

At the end of 1950's, the Japanese economy entered into a rapid growth and the fluidity

of energy, new material utilization and mass production of consumer's durables were achieved.

New potential industries such as synthetic fibers, petrochemicals, machinery and electronics were promoted.

According to the trade and capital liberalizations, large-scale installations for all industries were attained, and the establishment of special and cooperational production systems and production control were promoted.

The industrial pollution problem became serious as a result of industrial policies pursuing scale economy and the lack of control of diseconomy.

At the beginning of 1970s', the Japanese economy was shaken by high inflation, the decline of economic growth and the wide deficit of international payments caused by the restriction or prohibition of oil export arising from the oil crisis. The economic adjustment for oil crisis was adapted to the short terms, based on the energy conservation, the rationalization of industries and the actual devaluation of labor wages.

As for the industrial policy of 1980s', the creative industries such as IC, Computers, Robotics, Fine chemicals, new materials, NC machinery, aircraft, Fashion and Information were promoted.

To counter the rapid increase of the ordinary subsidies of trade between Japan and America and Europe, the Japanese government promoted direct foreign investment, technological transfer to developing countries, the import of agricultural machinery and technology, and the abolishment of limits in financial and communication markets to guard free trade and the GATT system,

After the defeat, modern management methods such as accounting systems, quality control, interior control of enterprises, project branch systems and management control were introduced from America and Europe,

Japanese government established the foundation to promote the modernization of Japanese companies based on the principles of career-long employment, independence of enterprises and equal distribution of profit among labor, management and the consumer.

The young high fliers of central government and private companies were dispatched to the business schools in America to learn modern management theory.

During the 1960s', 660 groups with 6600 members consisting of managers, labor, academics and consumers were dispatched to America and Europe.

After the defeat, the educational system was reformed by the multi-track system and was changed to a single-track system and educational opportunities provided for all people in keeping with their abilities by model reference to the American educational system.

From 1965(S40), to 1977(S52), advancements rates to upper secondary education schools and institutions stood at 93% and 17% to 38% respectively. Enrollement in universities and junior colleges exceeded 2.0 million in 1975(S50).

Special training schools were established to develop the students abilities required for their working or daily lives or for raising their level of general education.

Furthermore, the new-type universities ie, those having no academic departments, new technology science educational training were established. The University of the Air was also founded to give more people a university education by making effective use of

television and radio programming.

Recently, some Japanese managers and officials have adopted the haughty attitude that Japanese management did not need to learn foreign management theory for the top level technology of high intelligent industries.

As for management control, from a social point of view, the Japanese company is without self-consciousness of independent responsibility and volunteer activities, and also is making desperate efforts to stand side by side to share competition against the same trades with corresponding internationalization. Japanese companies must awake to independent responsibility according to Model Reference Adaptive Theory based on reference to best European management practice.

Furthermore, it is already clear that the environment today is not being managed sustainably due to drastic and widespread human impact on the global environment. The developed countries are becoming steadily disadvantageous economically because of poisonous wastes accumulating in the air, water and on the land. Such poisonous waste products begin to harm crops forests, fisheries, livestock and also human beings, particularly the newborn. In developing countries, poverty is widespread and steady degradation of the productive capacity of woodlands, rangelands and agricultural soils, caused by inappropriate deforestation, overstocking of pastures, overharvesting of cropland and woodland as well as overexploitation of fragile and others marginal lands. The struggle to obtain enough water, food wood fuel and shelter for daily survival from a dwindling resource base can result in public unrest and even civil conflict, the migration of environmental refugees and in extreme cases, it can bring about disintegration of that country. In addition to these national and regional problems, we face global climate changes such as acidification, ozone depletion and the greenhouse effect caused by the high waste output of developed countries. The global environmental problems are likely to have quite serious impacts which may be to the disadvantage of all companies worldwide in the coming decades.

It is possible to define several reasonable definitions for a sustainable world in the technological sense, if not yet necessarily in an institutional or policy sense. What we intend to seek are sustainable world futures where an adequate supply is guaranteed for centuries, and where economic and environmental concerns do not put an unacceptable burden on society. It is necessary to investigate a number of paths which converge on the reference model (sustainable world) and the adaptation process of the system and its stability by using Model Reference Adaptive Management. This management is able to clarify how the actual management would converge on the sustainable management. (Yamamura, 1983-1988, 1985, 1991a). This research work was made possible by the support of the Special Grant-in-Aid for Promotion of Education and Science in Hokkaido University Provided by the Ministry of Education, Science and Culture.

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