

JAPANESE EXPERIENCE

No. 1 September, 1978

UN UNIVERSITY PROJECT TEAM
INSTITUTE OF DEVELOPING ECONOMIES

42 ICHIGAYA-HOMMURA-CHO SHINJUKU-KU TOKYO-162 JAPAN
TEL : (03) 353-7501 & 4231 CABLE : AJIKEN TOKYO

TECHNOLOGY TRANSFER, TRANSFORMATION AND DEVELOPMENT: THE JAPANESE EXPERIENCE PROGRESS REPORT, February 1 – May, 31, 1978

by

Takeshi Hayashi, Co-ordinator

I. OBJECTIVES

1. The major objectives or rationale of the project is summarized as follows.
2. The study of development is now in a state of "disarray", as the United Nations University's Expert Group on Human and Social Development at its meeting 10 to 14 November 1975 pointed out, in terms of approaches, conceptual frameworks, methodologies, and more importantly, setting up development goals. There is an urgent need, therefore, to re-examine development problems and issues from fresh and diversified angles on a global scale.
3. With this in mind, the Project on Technology Transfer, Transformation and Development—the Japanese Experience (J.E.) will attempt to make a comprehensive study of various aspects of technology transfer (positive as well as negative) using the case of Japan as both a recipient and a transmitter of technology.
4. To date, there have been numerous studies in Japan which have focused on the problem of the relationship between technology transfer and the attempt at increasing economic self-reliance. These studies, however, differ from those which the United Nations University envisaged for two reasons: first, a consideration of developing countries, particularly in terms of development based on self-help and self-reliance, is absent; second, technology is narrowly defined, compared with that of the United Nations University/Human and Social Development Programme (UNU/HSDP). The task of the J.E. Project, therefore, will be to review the history of modern Japan by taking into full account the problems related to development which the developing countries currently face.
5. Japan shares many things with non-Western cultures and at the same time it shares much with Western industrial societies. This dualistic character of Japanese society enables us to understand the transcultural characteristics of technology and to transcend the conventional notion of the non-transferability of technology. However, care must be taken with respect to the role and function of international relations

as well as domestic conditions (i.e., socio-economic and political structures) corresponding to each stage of technology transfer.

6. Japanese experience provides evidence that the growth-oriented strategy has been pushing aside problems concerning human rights, life-styles, the quality of life, and cultural and national identity (linkages with the Projects on Human Rights in the Context of Development, and Socio-Cultural Comparative Evaluation of Development Alternatives in a Changing World). The lagging development in pollution control technology is also attributable to this strategy. Therefore, the necessity of studying the impacts of technology transfer, particularly its cultural and social costs and its relationship with environmental problems, has to be emphasized.

7. On the other hand, it should be emphasized that technology—broadly defined—is useful and, moreover, is inevitable for human and social development. In this connection, it is meaningful to re-evaluate the significant role of endogenous technology (linkage with the Project on the Sharing of Traditional Technology). In any case, what is needed is to conduct careful studies on the objectives and methods of technology transfer, together with the agents and/or channels of such transfer (i.e., the individual as well as groups or organizations).

II. APPROACH AND CONCEPTUAL FRAMEWORK

8. The major aspects which characterize our basic approach are summarized as follows.

9. The conventional development theory is based on the assumption that capital is scarce in developing countries but that these countries abound with natural resources and labor. The experience of many developing countries shows that the rate of capital dependence on outside sources increases, and the exploration and utilization of natural resources tend to follow a direction inconsistent with the self-reliant efforts of the developing countries.

10. It is not unusual to witness the fact that employment-absorptive capacity fails to increase during the course of growth-oriented capital-intensive industrialization. Moreover, it is often the case that the products produced by the domestic industries are neither competitive in the international market nor effective in attempts to substitute imports.

11. The lack of recognition of the rural society, its structural poverty and the pattern of employment among planners and scholars add other difficulties for

development efforts. Urban unemployment resulting from unorganized massive migration from rural areas is precisely the outcome of inadequate understanding of rural problems. On the other hand, the developing countries are suffering from a drain of skilled laborers and professionals to other countries.

12. Faced with these realities, it seems necessary both to expand and diversify the concept of "development" and to differentiate clearly between "development" and the concept of "growth". This relates to the setting of development objectives and indicators (linkage with the Project on Goals, Processes and Indicators of Development). However, it should be noted that these are subject to change over time and in various stages of development. As the Japanese experience shows, pursuit of a uniform objective and indicator does not prove to be successful.

13. One of the important issues in development is "poverty". The study of the structural relationship between the rural poor and the marginal urbanites, and its implication for technology and

employment, will be an important cornerstone of our project. Unfortunately, studies of the Japanese case up to now do not provide any systematic framework of this matter.

14. The Human and Social Development Programme has a pragmatic and problem-solving nature. Each society, each region within a society, and each minority group in a society, have their own problems. However, we have to start with the search for a technology which is effective in promoting the cultural identity, local security, and social welfare of a nation-state with the parallel aim of eliminating various social tensions and hardships which afflict every individual and minority group. At the same time, it is equally important to investigate technological measures which are helpful in intensifying mutual understanding among local, ethnic, minority groups and promoting collective self-reliance for the purpose of the building up of nations.

15. One serious bias which exists concerning technology transfer is the assumption that the technology of the developing countries is inferior and inefficient. This belief totally ignores the cultural aspects of technology. Moreover, it should be noted that any study of transferred foreign technology which lacks a proper understanding and assessment of endogenous technology in terms of its level of efficiency, its system of dissemination, its social characteristics (open vs. closed; location specific vs. universal validity), etc., would inevitably produce biased results.

16. The interrelationship between endogenous and foreign technology envisaged in our approach is as follows:

Case where:

- (a) imported modern technology replaced traditional or endogenous technology (e.g., iron, steel, railway transport, etc.);
- (b) imported modern technology

failed to replace traditional or endogenous technology (e.g., tractor farming);

- (c) imported modern technology coexisted with traditional or endogenous technology (e.g., mining industry);
- (d) imported modern technology was integrated with traditional or endogenous technology (e.g., irrigation).

17. We would select certain key industries relevant in each case and examine the interacting process with the specification of time and space, because it is conceivable that the second type of relationship between traditional and modern imported technology, observed at one time in some places, for example, might shift to the third or fourth type of relationship after a time lag and in other ecological conditions.

18. Any technology, whether it is endogenous or foreign, has two characteristics, hardness and softness. These characteristics are not related to the nature of technology itself but rather to the social uses of the technology. A certain technology does not demand changes in the existing social system in a direct manner. The impact of this kind of technology is felt indirectly after a certain time lag and is often utilized by the prevailing power elites to preserve or even strengthen their political and social positions. We call this "hard technology". On the contrary, "soft technology" demands certain changes in the social and institutional framework before and after transfer and transformation can occur. Life-styles and patterns in the use of natural resources will change accordingly. Difficulties arising from technology transfer occur mostly in these cases. The Japanese experience suggests that the channels and agents of transfer of such "soft technology" had a decisive influence in eliminating the difficulties involved with the mitigation of conflicts caused

by the transfer. However, there is much to be done before these experiences are incorporated into a theory of technology transfer.

19. The J.E. Project will search for an effective and meaningful technology (broadly defined) which will contribute to "human and social development". One of the important aspects of our approach is that the emphasis is placed on the linkage between technology and labor; the structure and dynamism of the working population; distribution of employment opportunities; acquisition of techniques and their dissemination; organization of labor and discipline; working conditions (i.e., safety and health); problems relating to the employment of the aged and female labour, etc.

20. The development of technology to date has been regulated by the extent of availability of resources and the amount of capital invested. Omitting labor, technology tends to concentrate in places where the optimal use of resources and capital are expected. But this tendency often results in the formation and expansion of the primate city in developing countries. The growing disparity in terms of the availability of, and accessibility to, information, education, public services, etc., that can be observed between urban and rural areas, is not a healthy sign of development.

21. Excessive concentration of technology in an urban centre is an outcome of a particular structure of agricultural

production (e.g., monoculture) and also corresponds to the inadequate development of diversified economic activities at the local and regional level. Development of local cities cannot be expected without the development of rural areas, which should be planned to develop in such a way as to mobilize the unemployed and underemployed population to form social overhead capital (e.g., public works) and rural (e.g., cottage) industries. In this respect, Japan has sought solutions in land reform and co-operative movements, but the problems of temporary migration (i.e., the role of rural migrant laborers in off-seasons and the the problem of their families which were left behind), rural exodus, and excessive expansion of metropolitan areas exist today.

22. To be brief, the basic approach toward the J.E. project can be summarized as follows. First, to broaden the definition of development and technology, and to place major emphasis on the inquiry into the infrastructure of technology and on the impact of technology transfer on human and social development. Second, to review the Japanese experience in the context of self-reliant efforts toward development of the developing countries. Third, to analyze the problems of technology transfer, transformation and development centering around labor and organization of labor (shifting emphasis from capital and natural resources to labor and organization of labor).

III. RESEARCH AGENDA (1978 - 1982)

23. In view of the necessity of re-evaluating the problems of technology transfer associated with development explained above, the actual work of the J.E. Project will be carried out through two methods—the formation of a consortium, and then the actual research of the subject-matter.

24. The success of the J.E. Project depends on the extent of mobilization and co-operation of experts in various disciplines. The tasks assigned to the consortium formation are as follows:

- (a) review and reappraisal of existing studies;
- (b) collection of information con-

cerning on-going researches, researchers involved, and hypotheses and theories developed therein;

- (c) collection of information on experiences of other countries.

25. Major areas of inquiry of case studies to be conducted will be listed as follows:

A. *Technology and Urban Society*

- (a) Urban expansion and ecological changes in life-style resulting from the development of transportation, and waterworks and sewage systems.
- (b) Conflict and coexistence between the old and new urbanism (especially, the adjustment of marginal urbanites to a new setting and new occupational patterns).
- (c) Urban planning and its financing (especially the improvement of the urban environment and the capacity to bear its cost).
- (d) A solution for reducing the disparity between urban centres and local areas caused by the excessive concentration of industry and information in the urban areas.

B. *Technology and Rural Society*

- (a) Assessment of the endogenous technology and the level of irrigation infrastructure prior to the introduction of foreign technology.
- (b) Improvement and dissemination of agricultural implements and machines.
- (c) Agents of the dissemination of high level technology (e.g., mechanical and biological) and the feed-back mechanism among government experiment stations, farmers' organizations, and individual farmers.
- (d) Role of co-operatives, farmers' associations, and irrigation associations in the development of

technology.

- (e) Consolidation of village organization and the production base, particularly in connection with capital formation outside the market economy.
- (f) Changes in the division of labor by sex and age.
- (g) Changes in consumption patterns and labor migration.
- (h) The function of the rural poor and rural *zatsugyo-so* (those engaged in unspecified jobs) in the labor market and labor organization.

C. *Technology Transfer and the Nature of Industries*

- (a) Leading industries undergo changes in status in the course of socio-economic development. Textile and small-scale industries (e.g., knitting, matches, etc.) were once the leading export industries in Japan. The former depended on female workers for a major portion of its labor force, while the latter relied on marginal urbanites. Both industries sought markets for their products in neighbouring countries and contributed greatly to the development of technology and to the earning of foreign currency.
- (b) Another important area of inquiry that the J.E. Project will take up is the role of basic industries such as iron and steel, coal mining, and railway transportation in connection with labor organization, recruitment of labor, on-the-job training systems, etc. Major machine and heavy industries prospered on the foundation created by these key industries. The chemical industry will also be dealt with in this context.

D. *Combination of Resources and Technology and Changes in the Ecology (Eco-System)*

Resources are not equitably distributed among different countries and regions within any given country. Consequently, the pattern and direction of the resources/technology mix are basically regulated by the available resources and by economic factors inherent in each ecological setting. Three types of regions have been decided upon as case studies for this project (Hokkaido, Northern Kyushu, and Niigata), with the possibility of adding other regions as the research progresses.

E. *The Role of Education and Technology*

The role of education as a dissemination medium of technology is well-known. In this project, four types of education will be taken up; formal, informal, vocational, and on-the-job training.

F. *Fiscal and Monetary Institutions and Technology Transfer*

The significance of fiscal and monetary institutions in the process of technology transfer is well known. This project will take up monetary institutions including informal financing, and fiscal measures of various kinds, together with the changing aspects of these institutions, including subsidy.

G. *Development of Legal System in Response to Modern Technology*

Technology transfer, transformation and development in many cases have been greatly facilitated by the transfer of legal and judicial systems from abroad. Substitution of Western medicine for traditional one in early Meiji is a notable example. In this project, the process of and background for the transfer of various legal and judicial systems will be examined.

Work Schedule for the J. E. Project (1978-1982)

	1st year	2nd year	3rd year	4th year	5th year
Research Activities	Technology and Urban Society (I) Technology and Rural Society (I) Iron & Steel Industry, and Transportation Textile Industry Small-scale Industries Mining Industries Area Studies	Technology and Urban Society (II) Technology and Rural Society (II) Light Machinery Industry	Area Studies of Seto, Niigata, etc. Development of Education Fiscal and Monetary Problems of Technology Transfer Development of Legal System in Response to Modern Technology Transfer of Technology from Japan to Other Countries		Appraisal and Coordination of Research Results Research in the Remaining Fields Drafting of Final Report
Consortium Formation Activities	Data Filing about Research Institutions and Researchers	Compilation of Directories of Research Institutions and Researchers			
Publication Activities		Documentation and Compilation of Bibliographies	Individual Research Papers	Directories of Research Institutions and Researchers Bibliographies	

H. *The Export of Technology and Technical Training*

An appropriate system of technical training, necessary for the successful transformation of the technology transferred, is sought. It may be useful to analyze the technology which Japan has developed and is currently exporting to other countries, by comparing it with the differences in the socio-economic and cultural environment prior to technology transfer.

26. So far we have explained the general framework of the project covering for the period of five years starting from 1978. Five years may not be sufficient for the project to cover all the relevant areas of technology transfer. Yet, the general framework has to be put into operational form with due priority based

on the urgency of the problems.

27. Five year period is planned to be divided into three phases; 1st phase (1978-79), 2nd phase (1980-81), and 3rd phase (1982).

28. In the first phase, the major focus is on the so-called "hard technology", and the areas considered to be "soft technology" such as education, public health, legal and administration system, banking and other related institutions etc. will be taken up in the second phase. However, it is scheduled that the sub-projects on "Technology and Society (urban and rural)" will be continued in the second phase because of its importance. The last phase is reserved for drafting the final report and the supplementary research activities which are expected to strengthen the final report.

IV. WORK SCHEDULE FOR THE YEAR 1978

29. Activities for the year 1978 are divided into two areas; consortium formation and research. The major task of the former is to establish the network of information with respect to the scholars who are concerned with the subject of technology transfer (broadly defined), the institutions interested in this subject and the research activities (past as well as on-going).

In the case of the latter, seven research sub-projects are divided into three problem areas: technology and society (urban and rural); group of industries; and regional studies.

The brief explanation of each sub-project will be given as follows:

30. *Technology and Urban Society*

Tokyo, the transformed capital from Edo, is itself a reflection of the transitional phases of modern Japan. Tokyo has been functioning not only as a centre of education, administration (bureaucracy), and culture, but also a centre of ever growing Westernization (=mod-

ernization) and industrialization.

The major objective of this sub-project for the year is to assess the characteristics and function of the primate city, Tokyo in the context of transitional nation state. Under this general objective, causes of various urban problems and their changing phases will be examined from the view point of local government and its urban plans as well as of urban communities, in the framework of socio-economic history. The adaptation problems of migrants to the new urban life and also the changing aspects of life style will be analyzed through the study of marginal urbanites. Also an attempt will be made to describe the changing phases of urban society in a local city viewed from the life history of an artisan.

Outline:

1. City Plannings of Tokyo—Soft Technology Transferred and its Implementation
2. Urban Problems in Retrospect—

From Edo to Tokyo

3. Marginal Urbanites—A Case of an Artisan
4. Urban Communities in Transition

31. *Technology and Rural Society*

In order to analyze the characteristics of rural society in relation to the development of technology, this sub-project will examine above all the relationship between irrigation and rural society.

The structure of a village community differs substantially depending upon the mode of irrigation in Japan. At least four types of irrigation system have to be identified and examined in order to explain the diversity of the rural society in Japan. These types are canal irrigation, reservoir irrigation, creek irrigation and irrigation in a deltaic region, notably lift irrigation.

This sub-project will examine this year the changes in canal irrigation system and its impact on the rural society taking Azusa River in Nagano Prefecture as a case.

Outline:

1. Irrigation Technology and its Impacts on Village Communities
2. Capital Formation in Agriculture and Peasant Economy
3. Development of Irrigation and Structural Changes in Farm Management
4. Role of Local Leadership in Technological Development
5. Development of Irrigation and Changes in Labor Absorptive Capacity in Agriculture
6. Irrigation Technology and Changes in Value System & Life Style

32. *Iron & Steel Industry and Transportation*

Iron & Steel industry and transportation are usually studied separately. However, they will be studied concurrently in this sub-project so that the interaction between the two can be examined as well.

In the case of iron & steel industry,

emphasis will be placed on the role and function of pioneering engineers in introducing foreign technology in order to meet the increasing national demand including the demand from army. A few cases of technology transfer to the developing countries (e.g. Malaysia) will also be examined in this sub-project.

In the field of transportation in Japan, the endogenous system and the newly introduced railway system co-existed side by side in the early Meiji period. This study analyzes the transitional phases of the transportation system focusing on the establishment of the major network of national railways, and the changing role of the endogenous (road and river) system. Development of locomotive and rolling stock manufacturing industries will be examined in connection with the development of iron & steel industry.

Outline:

STUDY GROUP I

Development of Modern Iron & Steel Manufacturing Industry in Japan

1. Endogenous Technology as a Base for Modern Technological Development.
2. From Endogenous Technology to Modern Technology.
3. Self-Reliant Innovations of Modern Iron & Steel Industry.
4. Technology Transfer to the Developing Countries—A Case of Malaysia

STUDY GROUP II

Development of Transportation System

1. Road and River in Transportation System
 - i. Changes in Transportation Policy and Institutions.
 - ii. Construction of Road and its maintenance.
 - iii. Development of Railways and Reorganization of Road Transportation System.
2. Introduction and Dissemination of Railway Transportation System
 - i. Struggles among Foreign Agents over the Acquisition of

Concessions.

- ii. Formation of Construction Policy toward Railway Transportation System.
- iii. Self-Reliance in Construction and Operation.
- iv. Nationalization of Railways Transportation System.

33. *Small-scale Industries*

Small-scale industries in Japan played an important role in foreign trades in the process of self-reliant development in Japan. It is the small-scale industries that the marginal urbanites usually find employment opportunities. There are so many controversial issues of small-scale industries such as financing, labor recruitment, efficiency in production, international competitiveness, relationship with large-scale industries etc. To start with, this sub-project will examine these issues taking two industries as case studies; button industry as a case of rural-based industry, and lens industry as a case of urban-based industry.

Outline:

Small-Scale Industries—A Comparison between Rural- and Urban-based Industries

1. Characteristics of Small-scale Industries
2. Labor and its Social Background
3. Characteristics of Financing and Marketing—A Case Study of Wholesalers' Function
4. Structure of Market
5. Dualistic Structure of Technology and Labor—Mechanism of Sub-contract System
6. Regionalization of Small-scale Industries and their Role in Regional Economy

34. *Textile Industry*

It does not need much explanation with respect to the classical role of textile industry in the process of modern industrial development in Japan. The work schedule of this sub-project for this year will be two-folded: to review the

development of textile industry in terms of the industrial life-cycle; and to make a comparative analysis with respect to the different pattern of development observable in Japan and China.

Outline:

STUDY GROUP I

1. Scale and Organizational Structure of Management of Japanese Cotton Manufacturing Industry—A Consideration on the Factors behind the Successful Technology Transfer
2. Improvement and Dissemination of Technology in Silk Yarn Production—Comparative Analysis of Japan and China
3. Technology Transfer of Cotton Textile Industry—Analysis and Perspective

STUDY GROUP II

1. Characteristics of Endogenous Technology in Cotton Textile Industry
2. Development of Modern Textile Industry—A Case of Osaka Textile Co.
3. Significance of Import of Raw Cotton—Impacts on the Peasantry and Development in Cotton Industries
4. Efforts Toward Technological Innovation
5. Labor Recruitment System and On-the-Job Training
6. Japanese ways of Rationalizing Management and International Competitiveness

35. *Mining Industries*

This sub-project deals with coal mining and metal mining. In both cases, the analysis will be made on the impacts of foreign technology on the endogenous one and the supporting structure such as market, management structure and organization of labor together with the problems of calamities. Particular attention will be paid to the channels and agents of technology transfer in relation to the specific form of labor recruitment and of organizing labor. The role of

mining industries in the process of industrial revolution in Japan, and their changing aspects in terms of finance, transport, marketing etc. will be the another subject of inquiry.

Outline:

STUDY GROUP I

Development of Metal Mining Technology in Japan

1. Formation of Endogenous Mining Technology
2. Development and Dissemination of Endogenous Technology
3. Agents and Channels of Foreign Technology
4. Process of Technological Innovations in Metal Mining Industry
5. New Technology and Calamities

STUDY GROUP II

Changes in Employment Structure under the Technological Development in Coal Mining Industry in Japan

1. Development of Endogenous Coal Mining Technology
2. Industrial Revolution in Coal Mining Industry
 - i. Introduction of Foreign Technology
 - ii. Transformation Process of Foreign Technology
3. Changes in Employment under the Industrial Revolution
 - i. Changes in Labor Market
 - ii. Changes in Management and Organization of Labor
 - iii. Labor and Capital Relation—An International Comparison
36. *Technology Transfer and Development in Hokkaido*
Hokkaido, as being the last frontier of

Japan, has been the major concern of the regional development policy of the central government for the last hundred years.

Abundant natural resources and virgin land gave impetus for the government to develop Hokkaido. Although Hokkaido has been relatively free from precedent social and institutional problems apart from the indigenous minority, there were a great many problems to be solved in the development process (e.g. unfavourable climatic condition, shortage of labor, etc.). In order to overcome these difficulties, foreign technologies were positively introduced and a large number of foreign engineers and technicians were also employed.

The major tasks of this year are: first, to review the process of development of this region; and second, to establish the network of information, research and scholars who are concerned with various aspects of development of Hokkaido.

Outline:

1. Development of Rice Cultivation in Colder Region
2. Introduction of Flood Control Technology—A Case Study of Ishikari River
3. Changes in Housing and Building Materials
4. Indigenous Medical Grass and the Development of Pharmaceutical Technology
5. Foreign Technology and its Impacts on Culture and Socio-Economy of Hokkaido
6. Technology Transfer and Regional Socio-Economic Structure—A Methodological Appraisal

SUMMARY OF ACTIVITIES: February 1 – May 31, 1978

Feb. 1–March 31

Seminars held at the Institute

1. Non-Institutional Finance in Economic Development in Japan by Prof. R. Shibuya (Komazawa Univ.)

2. Technical Manpower Problems in the Early Meiji Period by Prof. R. Iwauchi (Meiji Univ.)
3. Role of Small and Medium-Scale Industries in Japan by Prof. T. Kiyonari (Hosei Univ.)

4. Quality of Labor and Labor Management in the Cotton Textile Industry of Japan by Prof. Y. Kiyokawa (Hitotsubashi Univ.)
- March 20
Exchange of Research Contract on Technology Transfer, Transformation and Development—The Japanese Experience.
- March 20–March 31
Selection of Advisory Committee members, collaborate scholars and Project Leaders.
- April 1–April 18
Preliminary Meetings of each sub-project.
- April 19
Planning Meeting on the Project consisting of Project Leaders at UNU Headquarter.
- April 26
First Advisory Meeting on the Project at IDE.

- May 12
Project Meeting on the Project Proposal and Work Schedule for the year 1978 at IDE.
- May 20–May 23
Preliminary field survey in Nagano Prefecture by “Technology and Rural Society” sub-project members.
- May 27–May 30
Planning Meeting on “Hokkaido Area Studies” at Hokkaido University.
- May 29–May 31
Planning Meeting on “Small-Scale Industries” sub-project members in Osaka.
- Feb. 1–May 31
Consortium formation activities: questionnaire formulation; collection of publications on the subject; and net work formation of scholars who are concerned with technology and development.

COMMENTS MADE ON THE J.E. PROJECT

at the Advisory Committee (April 26, 1978) and Project Meeting (May 12, 1978) held in Tokyo

Comments on the general framework of the project proposal and the work schedule for the year 1978 on the J.E. Project made at the Advisory Committee for the project held on April 26, 1978 and the Project Meeting held on May 12, 1978 can be summarized as follows:

Some of these comments are implicit in our original project proposal and some are scheduled to be taken up in the later stages of activities. However, for the rest, we are ready to incorporate them whatever relevant to our project subject to the constraint of time and budget.

1. The theme, “Technology and Society” has been widely discussed at various occasions. This theme requires a broader framework of analysis which can effectively be formulated by the joint work not only with the scholars of the develop-

ing countries, but also with those of the developed countries.

2. If one of the major theme of this project is to review the Japanese experience in match with the “needs” of the developing countries, it is necessary to identify first the “needs” of the developing countries, and second the image or understandings of those countries toward Japanese experience. It is equally important to examine the characteristics of beneficiaries of technology transfer at various stages of development in Japan.

3. In order to carry out the study on the issues mentioned above, it is again essential to work with the scholars of the developing countries together with the scholars of the developed countries who are concerned with development issues.

4. Any foreign technology faces conflicts with indigenous culture or social structure. This project should contain chapters identifying various kinds of conflicts arose in the process of technology transfer and the adaptive innovations overcoming such conflicts.
5. In connection with the issues on conflicts, it is worth examining the relationship between technology transfer and cultural integrity. If the Japanese case is a unique example in which cultural integrity has not been affected seriously with the influx of foreign technology, the factors behind this phenomenon should be examined.
6. Technological conditions and the international relations in the 19th century when Japan started introducing foreign technology were substantially different from the situation that most of the developing countries are confronting with. This difference should carefully be taken into consideration in interpreting the Japanese experience.
7. The study on a person or a group of individuals who took initiative in introducing foreign technology or the study on the channels through which new technology was brought in is an important part of this study. However, in addition to this, the study on the so-called infrastructure of technology transfer, namely the social system, mechanism of decision making at the macro-level, the institutionalized feedback mechanism in the process of transformation and adaptation of foreign technology, banking institutions, organizational structure of companies etc. seems necessary for the comprehensive approach toward technology transfer.
8. In the case of Japan, it is equally important to pay attention to the initiative and dynamism in technology transfer at grass root level.
9. Stock of research on the role of small and medium scale industries is not large. Since the process and mechanism of transforming foreign technology are basically different from those in large-scale industries, the study on these aspects seems to be useful, particularly on the role of local entrepreneurs and the organizational innovation facilitating the transformation of technology.
10. It is noted that the study on the role and function of rural-based industries in Japan has been neglected. The inclusion of this aspect would greatly contribute to the understanding of the current issues on development strategy.
11. One of the dilemma that the developing countries face in the process of transformation is how to meet the demand for development and to preserve ecological balance. This project should look into this aspect. This point is deeply related to the problems of national cultures in the process of development on the other hand.
12. There are two relevant areas of inquiry which are not explicit in the proposal. One is the study on the technology transfer in the tertiary sector. The other is the study on the technology transfer, transformation and development induced by the changes in consumption pattern.
13. Last comment is related to the final form of presentation of the research results. It is argued that the mechanical compilation of the outcomes of each sub-project may fail to communicate with the prospective readers, notably the intellectual communities of the developing countries. It is therefore necessary for the coordinating body to take initiative in reorganizing the results in such a way as to meet the demands of the non-Japanese readers.

THE UNITED NATIONS UNIVERSITY PROJECT
ADVISORY COMMITTEE

List of Members

Isao AMAGI
Director, The Japan Society for Promotion of Sciences
Tadashi FUKUTAKE
Professor emeritus, The University of Tokyo
Eiichi ISOMURA
Rector, Toyo University
Masami ITO
Professor, The University of Tokyo
Jiro KAWAKITA
Professor, Tsukuba University
Kenji KAWANO
Director, Institute for Humanistic Studies
Kyoto University
Shigeto KAWANO
Professor emeritus, The University of Tokyo
Tadashi KAWATA
Professor, Sophia University
Hajime KITAMURA
Director, Institute for the Study of Languages and Cultures of Asia and Africa,
Tokyo University of Foreign Studies
Shunji KOBAYASHI

Deputy Director-General, United Nations
Bureau, Ministry of Foreign Affairs,
The Government of Japan
Michio NAGAI
Ex-Minister of Education, Science and
Culture, The Government of Japan
Chie NAKANE
Professor, The University of Tokyo
Sogo OKAMURA
Professor, The University of Tokyo
Keiichi ONAGA
Director-General, Economic Cooperation
Department, Trade Policy Bureau, Ministry
of International Trade and Industry,
The Government of Japan
Toshio SHISHIDO
Director, The Nikko Research Centre
Akira TEZUKA
Deputy Director-General, Science and
International Affairs Bureau, Ministry of
Education, Science and Culture, The Government
of Japan
Hideo YAMADA
Professor, Hitotsubashi University

LIST OF COLLABORATE SCHOLARS

Sub-Project 1: *Technology and Urban Society*
Sub-Project Leader:
Prof. Shogo KOYANO
Faculty of Social Sciences and Humanities,
Tokyo Metropolitan University
Members:
Mr. Ikuo HAYASHI
Manager, Office of Policy Formation
Tokyo Metropolitan Government
Prof. Hiromichi ISHIKAWA
Faculty of Social Sciences and Humanities,
Tokyo Metropolitan University
Prof. Hachiro NAKAMURA
Department of Humanities, Seikei
University
Sub-Project 2: *Technology and Rural Society*

Sub-Project Leader:
Prof. Akira TAMAKI
Faculty of Commerce and Economics
Senshu University
Members:
Prof. Isao HATATE
Department of Law and Economics
Aichi University
Prof. Naraomi IMAMURA
Department of Agriculture The University
of Tokyo
Prof. Yoshio ITO
Faculty of Arts, Shinshu University
Prof. Takashi TOMOSUGI
Faculty of Arts, Rikkyo University
Sub-Project 3: *Iron and Steel Industry,
and Transportation*
Sub-Project Co-ordinator:
Mr. Hirokazu TADA

- Group 1: *Iron and Steel Industry*
 Sub-Project Leader:
 Prof. Ken'ichi IIDA
 International College of Commerce
- Group 2: *Traffic and Transportation*
 Sub-Project Leader:
 Prof. Hirofumi YAMAMOTO
 Faculty of Economics, Hosei University
- Members:
 Prof. Eiichi AOKI
 Tokyo Gakugei University
 Prof. Katsumasa HARADA
 Wako University
 Prof. Ichiro ISHII
 Faculty of Technology, Toyo University
 Prof. Hiromi MASUDA
 Bunkyo Women's College
- Sub-Project 4: *Textile Industry*
 Sub-Project Co-ordinator:
 Dr. Shigemochi HIRASHIMA
- Group 1:
 Sub-Project Leader:
 Prof. Yukihiko KIYOKAWA
 Institute of Economic Research, Hitotsubashi University
- Member:
 Prof. Shin'ichi YONEKAWA
 Faculty of Commerce, Hitotsubashi University
- Group 2:
 Sub-Project Leader:
 Prof. Kozaburo KATO
 Faculty of Commerce and Economics, Senshu University
- Member:
 Prof. Takeo IZUMI
 Faculty of Commerce and Economics, Senshu University
- Sub-Project 5: *Small-Scale Industries*
 Sub-Project Leader:
 Prof. Shigeo KIKUURA
 Faculty of Economics, Toyo University
- Members:
 Prof. Kyozo TAKECHI
 Hanazono University
 Prof. Tsuneyoshi TAKEUCHI
 Faculty of Political Science and Economics, Hiroshima University
 Prof. Tatsuzo UEDA
 Faculty of Sociology, Kansai University
- Sub-Project 6: *Mining Industries*
 Sub-Project Co-ordinator:
 Mr. Hirokazu TADA
- Group 1: *Metal Mining Industries*
 Sub-Project Leader:
 Prof. Jun'nosuke SASAKI
 Faculty of Sociology, Hitotsubashi University
- Member:
 Mr. Fumio YOSHIKI
 Sendai Dai'ichi High School, Miyagi Prefecture
- Group 2: *Coal Mining Industry*
 Sub-Project Leader:
 Prof. Nisaburo MURAKUSHI
 Faculty of Economics, Hosei University
- Sub-Project 7: *Hokkaido Area Studies*
 Sub-Contractor:
 Dean & Prof. Kiyohide SEKI
 Graduate School of Environmental Science, Hokkaido University
- Members:
 Prof. Hiroaki KIKUCHI
 Hokkaido College of Engineering
 Prof. Takeshi MIKI
 Sapporo Medical College
 Dean & Prof. Man'emom TAKAHASHI
 Faculty of Agriculture, Hokkaido University
 Prof. Toru TANIUCHI
 Faculty of Literature, Hokkaido University
 Mr. Takashi YAMAGISHI
 Hokkaido Institute of Hygienic Sciences
 Prof. Etsuo YAMAMURA
 Graduate School of Environmental Science, Hokkaido University

UNITED NATIONS UNIVERSITY PROJECT
 TECHNOLOGY TRANSFER, TRANSFORMATION AND DEVELOPMENT:
 THE JAPANESE EXPERIENCE
 PROJECT MEETING

May 12, 1978 The International Conference Hall Institute of Developing Economies

Chairman

Dean & Prof. Yoichi ITAGAKI (Asia University)

Opening Address

Mr. Noboru KANOKOGI (President, IDE)

The United Nations University Project Research Plan for 1978

Dr. Takeshi HAYASHI (Project Co-ordinator)

Comments

Prof. Tadao KIYONARI (Hosei University)

Prof. Takeshi ISHIDA (The University of Tokyo)

Prof. Iwao KOBORI (The University of Tokyo)

Prof. Shigeru NAKAYAMA (The University of Tokyo)

Open Discussion

Greetings

Dr. James M. HESTER (Rector, UNU)

Closing Address

Mr. Ei ARAKAWA (Director, IDE)

List of Participants

1. Eiichi AOKI
Professor, Tokyo Gakugei University
2. Ken'ichi IIDA
Professor, International College of Commerce
3. Hiromichi ISHIZUKA
Professor, Tokyo Metropolitan University
4. Takeshi ISHIDA
Professor, The University of Tokyo
5. Takeo IZUMI
Associate Professor, Senshu University
6. Yoichi ITAGAKI
Professor, Asia University
7. Yoshio ITO
Professor, Shinshu University
8. Ryoichi IWAUCHI
Professor, Meiji University
9. Hideo UCHIYAMA
Professor, Keio University
10. Shinzaburo OISHI
Professor, Gakushuin University
11. Koshiro OKAKURA
Vice-President, Science Council of Japan
12. Hidehiro OKADA
Professor, Tokyo University of Foreign Studies
13. Sogo OKAMURA
Professor, The University of Tokyo
14. Kozaburo KATO
Professor, Senshu University
15. Tadashi KAWATA
Professor, Sophia University
16. Shigeto KAWANO
Professor emeritus, The University of Tokyo
17. Shigeo KIKUURA
Professor, Toyo University
18. Yukihiro KIYOKAWA
Associate Professor, Hitotsubashi University
19. Tadao KIYONARI
Professor, Hosei University
20. Shunji KOBAYASHI
Deputy Director-General, United Nations Bureau, Ministry of Foreign Affairs, The Government of Japan
21. Tetsuya KOBAYASHI
Professor, Kyoto University
22. Iwao KOBORI
Associate Professor, The University of Tokyo
23. Shogo KOYANO
Professor, Tokyo Metropolitan University
24. Takashi SAITO
Professor, Gakushuin University
25. Yoshikazu SAKAMOTO
Professor, The University of Tokyo
26. Jun'nosuke SASAKI
Professor, Hitotsubashi University
27. Motohiro SHICHIDA
Chief, Planning and Coordination Division, UNESCO and International Affairs Department, Ministry of Education, Science and Culture, The Government of Japan
28. Ryuichi SHIBUYA
Professor, Komazawa University
29. Kiyohide SEKI
Professor, Hokkaido University
30. Akira TAMAKI
Professor, Senshu University
31. Yoshiyuki TSURUMI
The International House of Japan
32. Hachiro NAKAMURA
Professor, Seikei University
33. Shigeru NAKAYAMA
Lecturer, The University of Tokyo
34. Michio NAGAI
Ex-Minister for Education, Science and

- Culture, The Government of Japan
35. Ikuo HAYASHI
Manager, Office of Policy Formation,
Tokyo Metropolitan Government
 36. Motoko HARA
Researcher, Gakushuin University
 37. Hiromi MASUDA
Deputy Chief Librarian, Bunkyo Women's College
 38. Iwao MUNAKATA
Professor, Sophia University
 39. Shunsuke YAMAGISHI
The Asahi Shimbun Co., Ltd.
 40. Hirofumi YAMAMOTO
Professor, Hosei University
 41. Fumio YOSHIKI
Teacher, Sendai Daiichi High School,
Miyagi Prefecture
(in Japanese alphabetical order)

*The United Nations University
Headquarters*

1. James M. HESTER
Rector
2. Alexander A. KWAPONG
Vice-Rector for Planning and Development
3. Kinhide MUSHAKOJI
Vice-Rector for Programme (Human and Social Development)
4. Pedro HENRIQUEZ
Programme Officer (Human and Social Development)
5. Shigeo MINOWA
Chief, Academic Services
6. Toshihiro YAMAKAWA
Finance Officer

Institute of Developing Economies

1. Yoshizane IWASA Chairman
2. Noboru KANOKOGI President
3. Ei ARAKAWA Executive Director
4. Masaru KAJITA Executive Director
5. Nobuyoshi HAGIWARA
Executive Director
6. Tadatoshi FUKUSHIMA Auditor
7. Takahiko HASEYAMA
Chief, Economic Growth Department
8. Tetsusaburo KIMURA
Deputy Chief, Current Affairs Department

9. Shigekazu MATSUMOTO
Chief, Research Planning Department
10. Toshiaki HAYASHI
Deputy Chief, Regional Development
Research Unit
11. Shigeru TAKABAYASHI
Chief Librarian, Library
12. Shigeru YAMAZAKI
Chief, Statistics Department
13. Tomijiro NEGISHI
Chief, Administrative Department
14. Hiromitsu NAKAMURA
Deputy Chief Librarian, Library
15. Hisashi NAKAMURA
Area Studies Department
16. Keiko IMAI
Area Studies Department
17. Hirokatsu KANO
Area Studies Department
18. Akira SUEHIRO
Area Studies Department
19. Toru YANAGIHARA
Economic Growth Department

THE UNITED NATIONS UNIVERSITY
PROJECT TEAM
INSTITUTE OF
DEVELOPING ECONOMIES

List of Staff Members

Project Co-ordinator:

Dr. Takeshi HAYASHI

Associate Co-ordinator:

Mr. Hirokazu TADA

Dr. Shigemochi HIRASHIMA

Co-ordinating Staff:

Miss Mitsuko TAKAHASHI

Mr. Hiroshi SAKURAI

Mr. Hiroyoshi KANO

No. 1

The NEWSLETTER is published by
THE UNU PROJECT TEAM
INSTITUTE OF DEVELOPING ECONOMIES
42 ICHIGAYA-HOMMURA-CHO
SHINJUKU-KU TOKYO-162 JAPAN