



INSTITUTE OF SOUTHEAST ASIAN STUDIES

TECHNOLOGY AND SKILLS IN ASEAN

An Overview

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The ASEAN Secretariat
and
Japan Institute of International Affairs
in collaboration with
ASEAN Economic Research Unit
Institute of Southeast Asian Studies

EFFECTIVE MECHANISMS FOR THE ENHANCEMENT OF TECHNOLOGY AND SKILLS IN ASEAN An Overview

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Foreword

One of the central objectives of the Association of Southeast Asian Nations (ASEAN), as embodied in the Bangkok Declaration under which ASEAN was founded, is the promotion of Southeast Asian studies. In this context, ASEAN warmly welcomed the offer of Mr Zenko Suzuki, the Prime Minister of Japan, in early 1981 to support the launching of an ASEAN Regional Studies Promotion Programme.

After extensive consultations among ASEAN member countries and between ASEAN and Japan, it was agreed that the ASEAN Regional Studies Promotion Programme, initially to extend over a period of five years, should focus on policy-oriented socio-economic research. Given the overriding importance that ASEAN attaches to economic development and the vital role of ASEAN-Japan economic relations in this regard, ASEAN-Japan Industrial Co-operation was adopted as the first topic of research under the Programme. The second topic chosen was Effective Mechanisms for the Enhancement of Technology and Skills in ASEAN. An integrated ASEAN-Japan Overview, together with volumes on the individual ASEAN countries, are the fruits of this second phase of research.

The recent history of ASEAN-Japan relations has been marked by a degree of ambivalence. As the first Asian nation to industrialize successfully and to have risen as a phoenix from the ashes of war-time destruction to the leading heights of industrial and technological power, Japan has always been held with a degree of awe and admiration by its southern ASEAN neighbours. Such awe and admiration have, however, been tinged with a certain amount of suspicion derived from war-time memories, especially as the impact of Japan's post-war economic expansion becomes increasingly felt in the ASEAN region.

On the Japanese side, historical circumstances and the need for economic reconstruction in the early post-war years made it unavoidable that, initially, its external relations were largely oriented towards the West, especially the United States. However, as Japan rose to global economic prominence, and its economic presence in Southeast Asia grew, it increasingly came to attach greater importance to its relationship with the ASEAN countries.

ASEAN first approached Japan collectively in the early 1970s on the question of Japan's production of synthetic rubber and its adverse impact on the ASEAN economies. From such narrow beginnings, the dialogue has quickly expanded into the present broad-based consultative framework of the ASEAN-Japan Forum. Given the historical background, there is a general recognition that while economics must remain the central pillar of ASEAN-Japan relations, the socio-

political context under which such economic relations evolve is also of prime importance. Thus, a central objective of the ASEAN-Japan dialogue is the development of greater mutual awareness, understanding, friendship, and trust between the peoples of ASEAN and Japan, especially among the younger generation. In this regard, it is particularly heartening that the present Programme has begun to bring together many young researchers from both ASEAN and Japan in collaborative research on various important and pressing issues of mutual concern. The interactive thought process involved in such research, and the development of common perceptions on a wide range of issues, cannot but help improve the effectiveness of the dialogue and establish ASEAN-Japan relations on a firm basis. The ASEAN Secretariat and the Japan Institute of International Affairs, as the ASEAN and Japanese co-ordinating units for the Programme respectively, are happy and honoured to be playing a part in this process.

Phan Wannamethee
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Preface

Japan is an economic giant in every sense of the word. In accordance with the size of the Japanese economy and its growing importance in foreign trade and investment, its economic activities and policies have had and will have substantial impact on many national economies the world over — especially the ASEAN countries. Japan is not only ASEAN's most important trading partner but also its largest source of aid and investment.

Economic interaction between Japan and ASEAN is not limited to flows of commodities and finance. Technology has a vital role to play in the economic development of the ASEAN countries. It is often said that the possibility of borrowing technology gives latecomers to the development process an advantage that the pioneers of industrialization did not possess. Furthermore, it is widely recognized that the phenomenal achievements in the economic development of Japan have been made possible by its acquisition of technical knowledge and successful adaptation and utilization of this knowledge selectively borrowed from the West. Japan, therefore, has an accumulated stock of scientific, technical and managerial expertise as well as a stock of rich experiences in borrowing, adapting, diffusing and developing technology which are invaluable to ASEAN.

The ASEAN countries are aware of the importance of technology and related skills required for the processes of industrial development. However, little has been done so far to identify, let alone establish, proper mechanisms for the enhancement of technology and skills at the national level. If this situation is not quickly rectified, it will remain a serious impediment to industrial development.

On the other hand, Japan is naturally concerned that successful industrialization in the ASEAN countries may result in the Japanese market being flooded with cheap imported manufactures. It may also shrink Japanese exports in third markets. Thus, any co-operative effort on the part of Japan in the ASEAN countries may be considered in the short run to be contrary to its own self-interest. This concern is misplaced. At the current stage of the debate, there is an increasing recognition that with careful industrial restructuring in ASEAN and Japan, the expansion of Japanese marketing opportunities is highly probable. The growth of new activities in the ASEAN countries may foster an expansion in markets for a variety of capital goods, materials and services which Japan can supply. An added bonus of co-operative effort is that it bridges the information gap for Japan on the policies and objectives of the ASEAN countries' plans and priorities for sustained industrialization.

Although technology transfer and skills enhancement in the private sector are

likely to be mutually beneficial, the reliance on market forces alone to achieve these may not be sufficient. Co-operative action in the dissemination of information, exchange of views and ideas and the analysis of potential opportunities are essential to smoothening and quickening the process. It is for this reason that research and academic exchange and co-operation have an important role to play.

"Effective Mechanisms for the Enhancement of Technology and Skills in ASEAN" represents ongoing collaborative research efforts of ASEAN and Japanese scholars. It started in 1984 as an outgrowth of the first phase of the ARSPP. Building upon the results of an earlier study, "ASEAN-Japan Industrial Co-operation: An Overview", this volume is the logical progression to the next phase where we examine "Industrial Restructuring and Adjustment for Japan-ASEAN Investment and Trade Expansion".

Country research teams were required to identify and examine problems in their respective countries in technology transfer and skills enhancement. Conclusions were drawn from the findings of sample surveys taken on selected industries located in the ASEAN countries. Based on this, five country papers were produced by the respective ASEAN-country research teams. These papers provided the raw material from which the ASEAN Overview was developed. Likewise, the Japanese team developed a Japanese Overview and an account on Japanese experiences in technology transfer. These were then put together to form this volume.

This study indicates that basic difficulties relating to technology transfer and skills enhancement are nearly identical in most of the ASEAN countries, although the magnitude and effects vary. There are also noticeable differences in emphasis, assumptions and approaches — especially with regard to the Singapore paper. While the findings of the investigations in these countries cannot be said with certainty to be fully representative of the problems and difficulties faced by all the ASEAN countries, they indicate some of the directions in which efforts of ASEAN-Japan co-operation will have to be aimed.

The main focus of this volume is on these general directions. It is divided into two parts. Part One consists of the ASEAN Overview. It reviews industrial trends and policies in ASEAN, with special emphasis on economic relations between ASEAN and Japan and presents the concerns of the ASEAN countries in technology transfer, adaptation and diffusion. Science and technology development efforts in ASEAN are highlighted, with elaboration on major policies and incentives that ASEAN governments provide. It also analyses the experiences of the ASEAN countries in technology and skills development, particularly in the machinery and electronics industries, which are drawn from the primary research conducted by the five ASEAN-country teams. Finally, the conclusions and recommendations of the five ASEAN-country papers are presented.

Part Two contains two sections. The first discusses the changing patterns of foreign manufacturing investment, technology transfer and skills enhancement in the process of industrialization in the ASEAN countries except Brunei, as well as deals with some major issues confronting them in technology transfer, adaptation, diffusion and development, and skills enhancement. It focuses, among other things, on the issues of: 1) the appropriateness of the various technologies being transferred from overseas; 2) the adaptation and diffusion of those technologies;

3) the research and development capabilities in the ASEAN countries; 4) the improvement of operating and management skills; and 5) the regional and international arrangements for technology transfer involving the ASEAN countries.

As in the ASEAN Overview, the Japanese Overview analyses some key issues of technology transfer and development as revealed in the machinery and electronics industries in the ASEAN countries. Identified and analysed as the major constraints on the choice of technologies are the presence of low-wage labour, the small size of the domestic markets, the incompatibility of some modern technologies with traditional ones, and the underdevelopment of supporting industries in these countries. Equally important are the constraints on technology absorption capability in the ASEAN countries. Most conspicuous are the inadequate vocational training programmes and facilities, the inflexibility of mind and attitudes among workers, the high incidence of job-hopping resulting partly from the lack of financial and other incentives for transferring the skills and technologies acquired, and the underdevelopment of institutional mechanisms for technology transfer. At the end of the critical examination of private-sector practices and public policies on technology transfer and development, the Overview offers some policy recommendations at the corporate, host-country and home-country levels.

The second section focuses on the patterns and issues of technology transfer and development in post-war Japan. Particularly emphasized here are the extensive search for better technologies overseas, the constant process of adaptation and diffusion of the imported technologies, the growing importance of indigenous technologies and some major factors responsible for it, including the rapid rise in research and development efforts at the corporate and public-sector levels and the national policies conducive to such expanded R&D efforts in post-1970 Japan. The major weaknesses and constraints in Japanese technology development efforts at the corporate and national levels are also identified. It is hoped that the paper will contribute to better understanding of the strength and weaknesses of technology transfer, diffusion and development in post-war Japan, which in turn will help the ASEAN countries in their efforts to upgrade and diversify the technologies, whether indigenous or imported.

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and
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PART ONE

ASEAN OVERVIEW

Introduction

The research studies focused on the problem of identifying effective mechanisms for raising the levels of technology transfer and skills development in the ASEAN countries. This concern stemmed from the recognition that technology is a key factor in national development efforts, both in the West and in the East, and that sustained technological advancement is urgently needed in order for national economies to industrialize, and more broadly, to modernize.

Except for Singapore, all the other ASEAN nations are basically agricultural countries, relying in the main on the export of primary commodities for the earning of foreign exchange. However, given the fluctuating international demand for primary commodities, these countries have all embarked upon industrialization programmes with a view to reduce dependence on primary exports, and to increase income and employment opportunities of their expanding labour force.

Beginning from the early 1970s, the industrialization process in the whole of ASEAN was given a major boost when many multinational electronics firms decided to locate their offshore assembly operations in this region. Among the factors that led to this relocation were the stable political climate, generous investment incentives, relatively good infrastructure, low wages, a docile labour force, and subdued trade union activity.

During the decade of the 1970s and right through to the early eighties, the electronics industry attained impressive growth rates. As a result, its output as a percentage of total manufacturing output increased substantially and a significant proportion of manufacturing exports from ASEAN consisted of electronic products. The labour-intensiveness of the industry also led it to become one of the largest, if not the largest, single absorber of labour in the manufacturing sector in this region.

While the contribution of the electronics industry to growth and employment generation was impressive, its effectiveness in the transfer of technology and the upgrading of skills was more doubtful. Concerned that the manufacturing sector should continuously upgrade its technical skills, the ASEAN governments exhorted multinational corporations (MNCs) from technologically advanced countries such as Japan and the United States to devote attention to the development of the technological capacities in their host country staff.

To promote greater transfer of technology, the ASEAN governments encouraged local branches of MNCs to enter into technical licensing agreements with their parent companies and suppliers while generous incentives were granted to firms willing to undertake local research and development.

Despite these, many policy-makers and researchers became concerned that the much desired transfer of technology and its adaptation to local conditions were slow in coming. Such concerns had to be verified, however, and it was with a view to finding out the exact state of affairs that these research studies were undertaken.

To obtain a more precise picture of the ongoing process of technology acquisition and development in the ASEAN countries, the researchers undertook a detailed scrutiny of specific industrial branches, namely, the electronics and machinery industries. These industrial branches were selected by the ASEAN and Japanese researchers after taking into consideration the fact that these industries, besides being among the most recent to develop, require more sophisticated technology than the earlier import-substitution activities in the ASEAN countries. Case studies on firms within these industries were written and analysed with special attention paid to the problems of technology transfer particularly from Japan to the respective ASEAN countries.

On the basis of their findings, the country research teams have made recommendations on how the ASEAN countries can achieve an optimum level of technology transfer and, thus, raise their respective levels of technology and skills development. These recommendations also outline the role that Japan can play in these efforts as well as the mechanisms required by the transfer process in both the public and the private sectors.

Organization of the Overview

The Overview is divided into five chapters. The first chapter reviews the experiences and thrusts of industrialization in ASEAN. In this chapter, the broad policy framework in each of the countries is described and special emphasis is given to the economic ties between Japan and the ASEAN nations.

Chapter 2 presents the major issues surrounding technology transfer, adaptation and diffusion in ASEAN, and highlights the respective concerns of the individual member countries.

Chapter 3 focuses on the specific approaches to the development of science and technology in ASEAN, and elaborates on the existing mechanisms and schemes that have been instituted in order to accomplish stated objectives.

Chapter 4 draws upon primary research on the electronics and machinery industries in ASEAN. The comparative analysis of the five country studies helps to illustrate the issues of concern in technology and skills development and to reveal the opportunities for intervention, assistance, and co-operation. The analysis is based on the information generated from survey research and case studies of ASEAN firms, many of which are either subsidiaries, joint-venture partners or licensees of multinational corporations.

The final chapter presents the conclusions and recommendations reached by the various country research teams. The chapter begins with a summary of the constraints encountered by the individual countries in their attempts to upgrade local technology and skills. Recommendations are then presented. These are addressed

to three types of institutions that have key roles to play in the technology development process: agencies of government as well as public enterprises; private firms, both the users and suppliers of technology; and regional and international bodies that promote technology transfer and development.

