

# **BIMSTEC-Japan Cooperation in Technology: Bangladesh Perspective**

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M. Nurul Islam\*

**Abstract:** The objective of this paper is to explore and identify the possible role of Japan in undertaking technology-based development programme for Bangladesh under BIMSTEC Cooperation Programme. This paper talks about how Bangladesh can be benefited on technological issues from the experiences of Japan by participating in the BIMSTEC cooperation programme. Given Japan's major intellectual contribution in developing methodologies for undertaking technology-based development, findings of this paper suggest Bangladesh should strengthen its human resources through higher education in order to train capable manpower to undertake technology-based development programme in the country. Collaborative arrangement may be sought with appropriate Japanese organization(s) to implement the programme. This paper recommends that in order to decide appropriate strategies for transfer of technology in future in BIMSTEC, there is a need to undertake a systematic study to assess the experiences of transfer of technology and technology innovations from Japan.

## 1.0. INTRODUCTION

BIMSTEC is a sub-regional group formed by some geographically contiguous South Asian Countries situated around the Bay of Bengal. The idea of setting up a sub-regional cooperation block in the Bay of Bengal basin was first mooted in Bangkok known as the "Bangkok

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Declaration” by Bangladesh, India, Sri Lanka and Thailand. On June 6, 1997, Bangladesh-India-Sri Lanka, Thailand Economic Cooperation (BIST-EC) came in force. The purpose of this regional grouping was to provide trade and technological cooperation among its members in the areas of trade and investment, tourism, transport and communication, technology, energy and fisheries. Later, at the special Ministerial meeting convened in Bangkok on December 22, 1997, Myanmar was admitted as a member of the group and BISTEC was renamed as BIMST-EC (Bangladesh-India-Myanmar-Sri Lanka-Thailand-Economic Cooperation). Bhutan and Nepal joined as new members in 2004. By signing the Framework Agreement to establish a Free Trade Area (FTA) in February 2004 and through the Summit Declaration on July 31, 2004 BIMSTEC received further momentum in launching the process of deeper integration in the region. The sub-regional group was renamed as “Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) (Datta and Dattam 2005).

All the member countries of BIMSTEC are developing countries. They possess low per capita income, low level of technology and good natural resources endowment. There is good prospect to achieve rapid economic development with technological and financial supports in BIMSTEC. On the other hand, Japan has vast experiences of successful transfer of technology from developed world. As a member of OECD, Japan has high technological capability. Japan is the largest ODA provider to Asian developing countries. In this context Japan may be considered as an appropriate development partner of the BIMSTEC Countries to provide technology and financial support for achieving rapid economic development for mutual benefit. Economic development of the BIMSTEC group will provide growing market opportunities to Japan.

The objective of the present paper is to explore and identify the possible role of Japan in undertaking technology-based development programme for Bangladesh under BIMSTEC Cooperation Programme. In other words, this paper attempts to find out how Bangladesh can be benefited on technological issues from the experiences of Japan by

**Table 1.1: Some Development Indicators of Japan-BIMSTEC Countries**

Country	Population 2004 (Million)	Population Density (Per Sq.Km)	Per Capita GNI (\$) 2004	GDP Per Capita Growth (%) 2003-04	CO2 Per Capita Metric Tons 2000
Japan	127.8	351	37,180	2.5	9.3
Bangladesh	140.5	1,079	440	3.7	0.2
Bhutan					
India	1,079.7	363	620	5.4	1.1
Myanmar					
Nepal	25.2	176	260	1.6	0.1
Sri Lanka	19.4	301	1,010	4.8	0.6
Thailand	62.4	122	2,540	5.4	3.3

**Source:** WB (2005).

Table 1.2: Economic Parameters of Japan and BIMSTEC Countries

Country	GDP (\$ Million 2004)	Av. Annual GDP Growth (%) 2000-04	Agri. Value Added Per Agri. Worker 2000 \$	Value Added (as % GDP)			Household Expenditure % of GDP 2004
				Agri 2004	Industry 2004	Services 2004	
Japan	4,623,398	1	25,339	1	30	68	57
Bangladesh	56,844	5	309	21	27	53	78
Bhutan							
India	691,876	6	397	22	26	52	67
Myanmar							
Nepal	6,707	3	208	40	23	37	76
Sri Lanka	20,055	4	737	17	25	58	76
Thailand	163,491	5	588	10	44	46	57

Source: WB (2005)

Table 1.3: Trade, Aid and Finance of Japan and BIMSTEC Countries

Country	Export (\$ Million) 2004	Import (\$ Million) 2004	Manufac. Exports (% of total merchandise export) 2003	High Tech. Export (% of merchandise export) 2003	Current Account Balance (\$ Million) 2004	Net Private Capital Flows (\$ Millio) 2003	FDI (\$ Million) 2003	ODA (\$ Per Capita) 2003
Japan	565,490	454,530	93	24	172,059	-	6,238	-
Bangladesh	8,150	13,100	89	0	132	86	102	10
Bhutan								
India	72,530	95,156	77	5	6,853	10,650	4,269	1
Myanmar								
Nepal	756	1,877	-	-	171	14	15	19
Sri Lanka	5,800	7,950	74	1	-131	236	229	35
Thailand	97,701	95,384	75	30	7,281	1,155	1,949	-16

Source: WB (2005)

participating in the BIMSTEC cooperation programme. Subsequent presentation of the paper is organized in the following sequence. Some conceptual issues on technology for development are presented in Section 2. An overview on Japan's Policy on Technology promotion is presented in Section 3. Japan's contribution in technology-based development programmes of Bangladesh is captured in Section 4. Status of Government policy on foreign investment and transfer of foreign technology is presented in Section 5. Suggestions for future actions on technological cooperation between Bangladesh and Japan are outlined in Section 6.

## **2.0. SOME CONCEPTUAL ISSUES ON TECHNOLOGY FOR DEVELOPMENT**

During the last 25 years most pioneering research in the field of Technology and Development has been carried out by Prof. Nawaz Sharif. Until 1997, he worked as a Professor of the Asian Institute of Technology (AIT), Bangkok and the Director, Asian and Pacific Center for Transfer of Technology (APCTT), UNESCAP, located in New Delhi. From 1998 he has been working as a Professor and Director of Doctoral Programme of the University of Maryland University College, USA. Conceptual issues presented in this section were taken from various publications of Prof. Nawaz Sharif (2006).

### **2.1 Four Components of Technology**

Technology is commonly perceived to be the physical tool used for achieving any resources transformation. Very often the importance of the related knowhow for either producing or using the physical tool is not realized. Moreover, even in contemporary economic growth models, technology is only implicitly included or treated as an exogenous variable. As has been amply demonstrated during the last few decades, the massive expansion of economic output in the industrialized countries was made possible largely by introducing technological changes in the production activities.

With increased importance attached to the development and introduction of new technology for restructuring industry, improving productivity and ensuring economic growth through competitiveness, there is a need to reveal the contents of the "black-box" used to

represent technology in the production context. To facilitate such an analysis, technology may be considered as a combination of four basic components, all of which together accomplished any transformation operation. These components are:

- (i) **Product tools and facilities** – this may be referred to as object-embodied technology or **Technoware**. Technoware includes all physical facilities required for the transformation operation, such as, instruments, equipment, machinery, devices, structures, factories.
- (ii) **Production skills and experience** – this may be referred to as person-embodied technology or **Humanware**. Humanware includes all acquired abilities necessary for the transformation operation, such as, expertise, proficiencies, dexterity, creativity, perseverance, diligence, ingenuity.
- (iii) **Production facts and information** – this may be referred to as document-embodied technology or **Inforware**. Inforware includes all accumulated facts and figures required for the transformation operation, such as, designs, specifications, observations, relations, equations, charts, theories.
- (iv) **Production arrangements and linkages** – which may be referred to as institution-embodied technology or **Orgaware**. Orgaware includes all necessary arrangements required for the transformation operation, such as practices, groupings allocations, systematizations, organizations and networks.

Technoware enhances the muscle-power and brain-power of individual human beings. Humanware generates, operates and maintains all transformation facilities. Inforware stores accumulated knowledge for time compression by individuals in learning and doing. Orgaware helps plan, organize, activate, motivate and control transformation operations.

The effective usage of these four components at any transformation facility have to requires that certain minimum conditions be satisfied. Firstly, Technware needs operators with certain capabilities. Humanware has to gradually improve form operation to upgradation and eventually generation of Technoware. Inforware, as

accumulated knowledge, needs to be regularly updated, while Orgaware has to be continually (organizational reforms) evolved over time to meet the changing requirements within and outside the transformation activity.

All four components of technology are complementary to one another and are required simultaneously at any transformation operation. No transformation of natural resources to produced resources can take place in the complete absence of any of the four components. The four components also interact with one another in a complex fashion and it is important to understand the nature of these interactions for making proper choices of technology.

## **2.2. Development of Technology**

Technology is developed through systematic research. Research may be carried out in production enterprises (e.g. industries, factories, agricultural fields, etc.), research organization, and universities. Some of these enterprises are state owned (public sector) and some of them are privately owned. Considerable investments are necessary to carry out systematic research. Technology developed through research is a costly item and has prospects for commercial applications. There is provision to protect the property right (ownership right) of newly invented technology through legal system; provided the inventor(s) follow the prescribed legal procedures (e.g. patent registration). The process of giving ownership right by state (government) to the inventor to use a technology is called Patent. Patent is allowed for a specific time period varying from 16-20 years. It is considered that inventor(s) would be able to recover the R&D cost and make reasonable profit during the specific period. Patent life-time of a technology may be termed as legal life cycle of a technology. During legal life cycle of a technology it is illegal to use a technology by others without getting license from the owner (inventor). Whereas it can be used legally without owner's permission after the expiry of patented life time. When the outcome of research is not patented it may be published in scientific journals. Once the results of scientific and technological research are published they cannot be patented. These scientific knowledge may be accessed free of cost.

In developing countries, majority of research works are carried out by the researchers working in Universities and R&D Organizations. Very little research is carried out in production enterprises (e.g. industries, factories). On overall basis very small number of research outputs are patented (as new technology) and applied for commercial use. In developed countries, major research activities are carried out by private sector organizations and their outputs are generally patented. From economic point of view a research work is successful when the invented technology is applied (diffused/disseminated) for commercial purposes.

Considering rapid industrial development of developed countries through technology-based development, it is generally perceived that economic development is only possible through industrialization and technology can play an important role mainly in industrial development. Developing countries should also follow similar path for economic development. Critical observations of economic development of developed countries indicate that the technologies have played an important role in each and every sector of their economy. Contribution of different sectors in economic development depends on availability of resources and the strategies followed by them. Therefore, developing country like Bangladesh should pay attention to undertaking technology based development for each and every sector for rapid economic development. In Bangladesh, since independence substantial investments have been made for R&D activities in agriculture sector. As a consequence, it has been possible to make notable contribution in increasing agricultural production. Food grain production increased from 10 million tons in 1973 to 21.8 million tons in 1990. HYV seeds and other technological inputs (e.g. fertilizer, irrigation, mechanizations) also made positive contributions in this respect.

### **2.3 R&D Investment in Developed and Developing Countries**

It is well known that in order to harness the benefits of Science and Technology it is necessary to make substantial investments in research

Table 2.1: R&amp;D Investments in Developed and Developing Countries

Particulars	R&D Expenditure (US\$ billion)		Share in (%) World Expenditure		Share in GNP (%)	
	1980	1990	1980	1990	1980	1990
Developed Countries	195.8	434.3	94	96	2.22	2.92
Developing Countries	12.6	18.3	6	4	0.52	0.64
Total	208.4	452.6	100	100	1.85	2.55

*Source:* Mehta and Sarma (2001)

programme. In 1990, the shares of global R&D expenditure between development and developing countries were 96% and 4%, respectively (see Table 2.1). In 1990, developed and developing countries invested 2.92% and 0.64% of their respective GNP in R&D. This is why developing countries are to depend on developed countries for imported technologies to meet their needs. Developing countries very often import obsolete and old technologies (second hand cars, machines) from developed countries.

## 2.4 R&D Spending and GDP Per Capita

It may be seen from Table 2.2 that high income economies (developed countries), Asian NIEs, middle-income economies and low-income economies (developing countries, China) spent about US\$ 218, US\$ 108, US\$ 6 and US\$ 1 per million of their respective population. In developed countries generally the major share of R&D expenditure is made by the Trans National Corporations (TNCs).

**Table 2.2: R&D Spending and GDP Per Capita (1991)**

Particulars	R&D spending in US\$ per million of population	Average per capita GDP (\$)
High-income economies	218	16,048
Asian NIEs	108	6,369
Middle-income economies	6	1,563
Low-income economies (exclu, China)	1	328

Sources: World Bank (1999).

## 2.5. Transfer of Technology

Technology transfer issues are very important for technology based development. On the other hand, this is not a well understood area to the policy makers. In developing countries, discussions on technology transfer issues are generally focused towards transfer of industrial technologies from developed to developing countries. It may be stressed that technology transfer issues are important for all sectors of

economic development including industrial sector. In addition to international technology transfer; technology transfer issues are also important within the country. Technology transfer transaction is not free. Recipient of technology must be prepared to pay a price for the transferred technology.

### ***2.5.1. Contracting Parties***

Technology transfer takes place between individuals and firms. It is a commercial deal between a buyer and seller. Technology transfer deal does not generally take place between two governments (e.g. donors and recipients). Governments can play important roles in technology transfer as promoter, facilitator and regulator.

### ***2.5.2. Elements of Technology Transfer Deal***

Technology transfer deals may consist of the following four elements. (i) Price of Technoware or the physical unit(s). (ii) Technical know-how fee for the owner of technology (for the owner of Patent). (iii) Consultancy fee for know-how and know-where expertise (intellectual and physical help to do the job). In a simple case, the price of technology may be limited only to the price of technology (technoware) itself. There is general understanding among the common people that technology transfer deal ends with the purchase of technoware(s). When purchased technology is transferred to the site sometimes it is assumed that technology has been transferred. When the purchased technoware(s) fails to deliver desired outputs the recipient start to look for the cause of failure. This is why in developing countries, imported technologies are procured on turnkey basis (operational output is guaranteed under the contract). On the other hand, in a very complex situation where it is required to identify, select, design, fabricate, install, test and operate a large number of technologies (e.g. a fertilizer industry), it may be necessary to add a fourth component which may be termed as (iv) Management Contractors Fee.

In order to ensure effective use of technology, necessary arrangements (e.g. costs) should be made to transfer all the four components of technology (e.g. technoware, humanware, inforware, orgaware). In Bangladesh, except the technoware, the other three components get neglected. As a result, many industries become sick-industries soon after their initial startup operation.

### ***2.5.3. Price of Technology***

There is no standard price or catalogue price for different components of technology. It depends upon the bargaining capacity of the buyer(s) and the seller(s). For a particular technology price may vary widely in different situation. Least cost technology procured through competitive bidding process (tender) may not always facilitate to buy the best technologies.

### ***2.5.4. Technology Transfer Process***

Depending upon the source of technologies, technology transfer process may be classified into the following two groups. (i) In-country Technology Transfer and (ii) International Technology Transfer. In line with the objective of the paper subsequent discussions on transfer of technology are made on International Technology Transfer.

### ***2.5.5. International Technology Transfer***

Because of weak technological capabilities developing countries depend heavily on international technology transfer, which means importation of technology on mutually agreed price and conditions. It has been discussed earlier that development of technology depends on systematic Research and Development. Some people think that since developing countries depend on imported technologies, they need not to have indigenous research facilities (activities). This view is not correct. Developing countries should have indigenous R&D to support assimilation of imported technologies and gradually attain the capabilities to develop advanced technologies locally. Developing countries should try to achieve technological self-reliance in making autonomous decisions on technology-based development. They should know which technologies should be transferred from local sources and which technologies are to be transferred from foreign countries (make some and buy some policy). International technology transfer is an integral part of international trade (technical assistance, technology cooperation, economic cooperation etc.). Therefore, developing countries need to follow World Trade Organizations (WTO) rules on specific issues.

### ***2.5.6. International Technology Transfer on Individual Basis***

Different firms of developing countries can import (transfer) different technologies on individual basis. In that case importer needs to know contents of technology transfer deals, sources, the country of origin and their prices. In case the firm lacks in house capacity, they can engage local or/and foreign consultants to do the job.

### ***2.5.7. International Technology Transfer through Trans-national Corporations (TNCs)***

#### ***(a) Technological Capabilities of TNCs***

Within industrialized countries, a large share of global R&D is undertaken by Trans-national Corporations (TNCs), in 1990 the combined R&D expenditure of the 10 largest US multinational corporations exceeded the expenditures of France and the United Kingdom. Multinational firms have strong incentives to conduct R&D, since the complementary assets (such as production plants) needed to exploit innovations are already at their disposal in multiple markets (Hoekman, Mattoo and English, 2002).

Trans-national Corporations (TNCs) are global leaders in innovation and have worldwide productive activities. They can be an important source of new technology for developing countries. TNCs decision to open up business in a developing country through foreign direct investment depends on trade and investment policies, infrastructural facilities (e.g. energy supply, communication, transport, port, etc.) and law and order situation (e.g. *Hartal*) of the host country.

There is no guarantee to transfer technologies to local industries by the MNCs. However, some technology spillovers that may occur from multinational firms to local firms are presented below:

- ◆ Local firms may adopt technologies introduced by multinational firms through reverse engineering (adaptive R&D).
- ◆ Workers trained by or previously employed by multinational firms

may transfer important information to local firms by switching employers or may contribute to technology diffusion by starting their own firms.

- ◆ When considered profitable TNCs may engage local firms either to supply them with intermediate goods or to buy their products. As for example some TNCs purchase standard quality products manufactured by local firms and market the product under their trade mark.

### *(b) Modes of Technology Transfer*

There are primarily three modes through which technology is transferred across the borders.

- ◆ International Trade in goods.
- ◆ Licensing of Technologies and Trade-marks to Unaffiliated Firms, Subsidiaries, Joint-ventures.
- ◆ Foreign Direct Investment (FDI).

Imports of capital good and technical inputs directly reduce production costs and raise productivity in the firms that employ them. International trade in high-technology capital goods depends positively on the strength of patent regimes in the receiving countries. Technology exporters may not feel confident in exporting high technologies to a developing country with weak patent rights and enforcement system.

For fear of misuse of Intellectual Property Rights (IPRs) foreign enterprises are reluctant to license advanced technologies to unfamiliar enterprises in developing countries. Generally they prefer to transfer technologies these are old and may be obsolete within a few years. Licensing under Joint-venture programme may help both technology exporter and importer in undertaking business with mutual confidence.

The strength of IPRs and the ability to enforce contracts have important effects on decision by MNCs on where to invest and whether to transfer advanced technologies through FDI. FDI often embodies efficiency advantages through superior technologies, management skills and marketing. Intellectual Property Rights (e.g. patents, trade marks) can enhance the diffusion of technology and experiences by

ensuring greater contract certainty between local enterprises and foreign suppliers.

Licensing and joint-venture method provide better opportunity to learning. On the other hand, FDI provides better opportunity to import newer technologies. Methods followed by specific country depend on indigenous technological capabilities and experiences of previous business dealings of the importers.

### ***2.5.8. Strategies to Manage International Technology Transfer***

It is important to consider technology transfer by giving attention to all the four components of technology. The following points regarding the four components may be worth noting:

#### *(i) Technoware*

Technoware, other than the state-of-the-art, can normally be bought internationally for a price determined by the relative bargaining position of buyers and sellers. However, there are restrictions on the transfer of nuclear technologies. Less sophisticated imported Technoware may very often require quite sophisticated Humanware to operate and maintain it.

#### *(ii) Humanware*

Humanware can be imported temporarily, and success in acquiring this ability depends primarily on local learning capability. In Bangladesh foreign experts are found to work in many local industries (e.g. private hospitals, tannery industries, leather industries, ready made garments industries, engineering industries etc.). When Humanware is well developed in any particular area of technology, importing Technoware can be a very effective option for reducing the technology gap.

#### *(iii) Inforware*

Inforware, beyond the level of simple operating instructions, is usually not given to the ordinary Technoware importer. Since Technoware production costs money and involves risks, critical information

(particularly comprehending, generalizing and assessing facts) is closely guarded for cost recovery and profit making through repair & maintenance services. Thus, importing Inforeware may be more expensive than the cost of Technoware import.

*(iv) Orgaware*

Orgaware from abroad cannot be easily transplanted in the local environment and needs considerable adaptation to suit local working considerations. Many public sector enterprise in developing countries are established through external financing and managed by transnational corporations (TNCs). As the TNCs use very sophisticated Orgaware, the host organization in the developing countries (which did not have the opportunity to gradually evolve its Orgaware through various degrees of sophistication), becomes dependent on foreign experts and the linkages of the external organizations such as TNCs.

Different sectoral reforms (e.g. telecommunication sector reform, gas sector reform, power sector reform) have been undertaken by the government to improve operational efficiency of the technologies in these sectors.

### ***2.5.9. Some Observations on Technology Transfer***

The aforementioned aspects may explain why mere importation of machinery and plants will not automatically lead to technology transfer. Effective utilization of imported Technoware requires considerable investment in the development of the other three components of technology. This implies that local research and development expenditures are needed for the development of suitable Humanware, protected Inforeware and compatible Orgaware. Unfortunately, at times, commercial interest and political leverage act as constraints against harnessing the fullest benefits from technology transfer.

It has been highlighted in previous discussions that to ensure successful application of technology for development (successful technology transfer) it is necessary to consider all the four components of technology (technoware, humanware, inforeware, orgaware) during all technology transfer process.

In Bangladesh, very often Technical Assistances (assistance of expert consultant) are sought with much eagerness to transfer-technology. Technical assistance package generally contains a report prepared by expert consultants (humanware) by gathering information on related issues (inforeware) and making observations on institutional aspects (orgaware). Due to lack of knowledge, sometimes country considers the technology transfer in a package on turnkey basis (in order to avoid risk), which involves identification, selection, procurement, installation, operation of technology package (at rated capacity). Turnkey package includes of the four components of technology (technoware, humanware, inforeware, orgaware).

When the capability of the recipients of technology is limited to operation of technology, then the nature of technology transfer is termed as Static Technology Transfer (STT). On the other hand, when the recipient of technology attain the capacity to design, fabricate, install, operate the technologies, technology transfer is termed as Dynamic Technology Transfer (DTT). In Bangladesh, in most cases technology transfer processes have been Static Technology Transfer (STT). Planned efforts are needed to achieve the capability of Dynamic Technology Transfer (DTT).

## **2.6. Observation on Technology-based Development**

Due to conceptual problems, there is lack of understanding among the policy planners to understand the important roles of technology for development of different sectors of economy. There is a need to undertake appropriate human resource development programmes (e.g. seminars, workshops, short courses etc.) to develop capabilities in undertaking technology-based development programmes for different sectors.

## **3.0. JAPAN'S POLICY ON TECHNOLOGY PROMOTION**

Japan has made tremendous progress by successful application of technology and has been an active promoter of technology based development for other developing countries.

### 3.1. Japan's Science and Technology Policy

The General Guidelines for Science and Technology Policy was adopted by the cabinet in March 1986. In this guideline, strengthening international cooperation and increasing contribution through dissemination the R&D results are referred to as the most important principles. In pursuing the concept underlying the guideline, the government of Japan has taken several initiatives. One of these initiatives was the introduction of the Act for Facilitating Government Research Exchange on May 1986, by which foreign researchers can be employed as research officials. As a follow up of the Policy, Science and Technology Agency (STA) of Japan has been offering increasing number of fellowships to foreign researchers to work in National Research Laboratories and Research Public Corporations (Yoshimura 1988).

In Japan separate Budget Allocation for Science and Technology are made for the following Ministries and Agencies (Yoshimura, 1988).

- ◆ Diet
- ◆ Science Council of Japan
- ◆ National Police Agency
- ◆ Hokkaido Development Agency
- ◆ Defence Agency
- ◆ Economic Planning Agency
- ◆ Science and Technology Agency
- ◆ Environment Agency
- ◆ National Land Agency
- ◆ Ministry of Justice
- ◆ Ministry of Foreign Affairs
- ◆ Ministry of Finance
- ◆ Ministry of Education
- ◆ Ministry of Health and Welfare
- ◆ Ministry of Agriculture, Forestry and Fisheries
- ◆ Ministry of International Trade and Industry
- ◆ Ministry of Transport
- ◆ Ministry of Post & Telecommunication
- ◆ Ministry of Labor
- ◆ Ministry of Construction
- ◆ Ministry of Home Affairs

### **3.2. Tokyo Programme on Technology for Development in Asia and Pacific**

In addition to developing and strengthening her own technological capabilities, Japan has made consistent efforts for the promotion of technology for development for the countries in Asia-Pacific region. The fortieth annual session of the United Nations for Asia and the Pacific held in 1984 adopted the “Tokyo Programme on Technology for Development in Asia and the Pacific”. The main feature of this programme was a plan of Action which points out that correct identification of a country’s technological needs and capabilities is a prerequisite for effective technology planning. Under the above mentioned project, the Government of Japan provided funding for the Technology Atlas Project and Asian and Pacific Center for Transfer of Technology (APCTT) was assigned to implement the project. The output of the project was published in a set of six volumes, which provided a Framework for Technology-based Development. This study has provided conceptual issues on various aspects of technology based development such as Technology Content, technology climate, technology status, technology capability, technology needs etc (UN-ESCAP, 1989). Technology Atlas Project was implemented by APCTT under the leadership of Prof. Nawaz Sharif as mentioned in Section 2.

### **3.3. Observations on Japan’s Policy on Technology Promotion**

It may be noted that the importance of technology for development of different sectors of economy has been duly recognized in Japan by making separate budget allocations for Science and Technology for different Ministries and Agencies.

Technology Atlas Project has made a major intellectual contribution in developing methodologies for undertaking technology based development. The outcome of the project could be made more useful if the knowledge gathered by study could be disseminated within the participating countries among the policy planners and decision makers through capacity building programmes (post graduate courses and training workshops, on the job training).

## **4.0 JAPAN'S CONTRIBUTIONS IN TECHNOLOGY BASED DEVELOPMENT PROGRAMMES OF BANGLADESH**

### **4.1. Japan's Investment in Technology Based Development Programmes**

Japan has been a leading development partner of Bangladesh for the last forty years. Japanese technologies, expert services and investment funds have been used in almost every sector of economic development. Some of the important sectors are Road and Highways (Bridges), Power Sector (Hydro & Thermal Power Plants), Fertilizer Industries and Steel Industries. Both state owned enterprises (SOEs) and private enterprises have been benefited from Japan's Cooperation. However, there is no systematic study on the role of Japan in technology based development of Bangladesh.

Since independence Japan Government has been providing increasing number of scholarships to Bangladeshi scholars to carryout post graduate studies in Japan. Since 1992, Bangladesh University of Engineering and Technology (BUET) has signed collaborative research and academic programme with the following organizations of Japan: Kyoto University, Saga University, Nagoya University. Khulna University of Engineering and Technology (KUET) have signed collaborative agreements with Saga University for post graduate studies and research. Dhaka University has established a Japan study center to provide post graduate education to Bangladeshi students on Japan's politics, economy, society and culture.

### **4.2. Promotion of Japan's Business Interests in Bangladesh**

Japan Bangladesh Chambers of Commerce and Industry (JBCCI) and Japanese Commerce and Industry Association (Shoo-Koo-Kai) in Dhaka have played important role in promoting Japan's business interest in Bangladesh. They organized Japan Business Forum 2005 on 8 September, 2005 at Sheraton Hotel, Dhaka with the following objectives.

- ◆ To share the experience of successful exporters of Bangladesh who penetrated into Japanese Market (Readymade Garments and Leather Products)

- ◆ To learn from the success story of Japanese Investors
- ◆ To submit proposal to government and business leaders to improve the business climate of Bangladesh from the companies point of view. The representative of SHOO-KOO-KAI and JETRO made presentation on the conditions of business environment in Bangladesh

Summary of information presented in Japan Business Forum 2005 are presented below.

#### ***4.2.1. Experiences of Bangladeshi Entrepreneurs Exporting to Japan***

Mr. S.M. Khan, Managing Director, Shirt Makers Ltd. and Mr. Ziaur Rahman, Executive Director, Bay Tanneries Ltd. presented their experiences of exporting Readymade Garments and Leather Products respectively to Japan in the forum. They highlighted about quality consciousness of Japanese entrepreneurs and the method of developing inter-personal business relations.

#### ***4.2.2. Experiences of Japanese Investors in Bangladesh***

Mr. Yasufumi Matsuo, Executive Director OP-SEED CO LTD. presented his experience of establishing and operating a LED Industry in Chittagong EPZ. The author highlighted the precision skills of women workers and their aptitude for learning. The author also pointed out about shortage of water and unreliable power supply. On working environment the author highlighted the following disadvantages: high logistic cost, logistic led time, restriction of women workers working at night, miss conduct and miss use of power by trade union members.

#### ***4.2.3. Experiences of SHOO-KOO-KAI***

Various impediments identified by SHOO-KOO-KAI in July 2003 for doing business in Bangladesh are presented as follows (SHOO-KOO-KAI 2005):

- ◆ Lack of consistency and continuity of policies
- ◆ Lack of care for the existing foreign investors

- ◆ Lack of industrial development policy
- ◆ Poor coordination among the concerned agencies
- ◆ Pressure from the politicians
- ◆ Absence of the mechanism for solving commercial disputes
- ◆ Corruption
- ◆ Slow processing of official matters
- ◆ Delay in issuing work permits (! improved in 2005)
- ◆ Delay in issuing multiple entry visa (! improved in 2005)
- ◆ Delay in customs clearance
- ◆ Delay in immigration procedure at the Air Port (! improved in 2005)
- ◆ Delay in the settlement of L/C payment
- ◆ For any government purchase, frequent incidents of Re-tender and slow processing.
- ◆ Insufficient electricity
- ◆ Not enough gas supply and pressure
- ◆ Not enough water supply, specially in Chittagong EPZ
- ◆ Poor telecommunication
- ◆ Chittagong port is not efficient
- ◆ Roads are not good enough
- ◆ Holidays do not match with the world
- ◆ Labor too politically involved
- ◆ Hartal is detrimental to all economic activities
- ◆ Non availability of statistics
- ◆ Law and order situation (security) not good

Similar observations have also been reported by Ebashi (2006)

#### ***4.2.4. Experiences of Japan External Trade Organization***

Every year Japan External Trade Organization (JETRO) conducts a survey in the major cities of Asia to provide relevant information to the potential Japanese Investors on investment related costs. On the basis of the 15<sup>th</sup> round of survey conducted in 21 major cities of Asia on Investment Related Cost Comparison in March 2005 the observations on investment environment in Bangladesh have been reported as follows (Nishikawa 2005):

- ◆ Comparing to other Asian countries the advantages the Bangladesh have become clear. The favorable points includes the wage of workers, office rent, rental of industrial states, water & electricity charges, monthly basic cost for fixed telephones, rate of personnel income tax etc. All of these points are within the fourth position among the Asian Countries.
- ◆ Apart from the investment cost two favorable aspects in the procedural matters (Work Permit for Foreigners & Issuance of Visa on Arrival) have improved.
- ◆ The following suggestions have been presented for further improvement of business environment.
  - (i) The corporate tax in Bangladesh is being 37.5% for general enterprises (not listed in the Stock Exchange), is one of the highest in Asia.
  - (ii) Improvement of infrastructure facilities (e.g. establishment of Deep Sea Port, Improvement of Chittagong Port Facilities). Water & Electricity are cheaper but their supply is to be guaranteed. Many companies have its own captive power supply.
  - (iii) The “speed, sincerity and transparency” in issuing different permission by the government departments/agencies of Bangladesh are to be ensured. Abolishing the “unforeseen expenses” required at each step of the procedure are to be eliminated. The procedure should be simplified, computerized and as far as possible, free from individual preference of the officer in charge.
  - (iv) It is never desirable that ongoing project is cancelled suddenly or the policy is changed unreasonably.

### **4.3. Observations on Transfer of Technology from Japan**

It generally assumed that Foreign Direct Investments (FDIs) from developed countries automatically provide benefits to recipient developing countries in terms of Transfer of Technology and Economic gains. It may be noted that due to lack of negotiating skills sometimes FDI may also fail to give desired benefits. There is a need to undertake a systematic research study to assess the experiences of transfer of

technology from Japan during last 40 years to adopt appropriate strategies in future for transfer of technology.

Government of Bangladesh need to pay serious attention to remove various impediments identified by SHOO-KOO-KAI and Japan External Trade Organization (JETRO) studies to encourage FDI from Japan and other developed countries.

## **5.0 GOVERNMENT OF BANGLADESH (GOB) POLICY ON FOREIGN INVESTMENT AND TRANSFER OF FOREIGN TECHNOLOGY**

### **5.1. GOB Policy on Foreign Investment**

The following facilities are available for the Foreign investors:

- ◆ Investment is protected by Foreign Investment (Promotion and Protection) Act 1980;
- ◆ Non-discriminatory treatment between foreign and local investment;
- ◆ Protection from expropriation by the state
- ◆ Ensured repatriation of proceeds and sale of shares, profit;
- ◆ No limitation to equity participation (100%)
- ◆ Equal treatment as regards tax holiday, payment of royalty, technical know how fees etc.
- ◆ Foreign technicians are exempted to pay income tax for three years;
- ◆ Full repatriation of capital invested from foreign sources;
- ◆ Enjoy S&D treatment on WTO obligation;

### **5.2. Government Policy on Transfer of Foreign Technology**

In Bangladesh there is no approved policy for transfer of foreign technologies. Government's incentives given to foreigners generally considered as a policy measure in this respect. Total tax exemption on royalties, know-how fees and the facilities for their repatriation are given to foreign nationals/ companies. Royalties and know-how fees paid by the local industries to the foreigners are deductible under expenses account (SRO 227-L/82 dated 20.6.82). The procedure for the payment of technical know-how, technical assistance fee to

foreigners (circular No. BOI/FID/24/89/459 dated 24.6.92) are presented as follows. No prior permission from the Board of Investment (BOI) will be required for entering into technology transfer agreement whose fees are within the following guidelines.

- (a) For new projects such fees and other expenses should not exceed on aggregate limit of 6% of the cost of imported machinery.
- (b) Recurrent annual fees for royalties and other expenses such as fees for technical know-how, assistance, operation services, marketing of products etc. should not exceed an aggregate limit of 6% of the previous years sales of the firms as declared in tax return.

The above mentioned incentives given to foreign owners of technologies amounts to encouraging their R&D efforts by the government of Bangladesh. In order to encourage local invention Ministry of Finance (National Board of Revenues) should provide tax exemption to Bangladeshi nationals earnings from royalties and know how fees.

## **6.0. SUGGESTIONS FOR FUTURE ACTIONS ON TECHNOLOGICAL COOPERATION BETWEEN BANGLADESH AND JAPAN**

Japan has high technological and strong financial capability to provide necessary support for the rapid economic development of BIMSTEC group including Bangladesh. The following suggestions have been made for Bangladesh to harness the benefits from the BIMSTEC programme in the areas of technology for development.

Due to conceptual problems there is lack of understanding among the policy makers to understand the important roles of technology for the development of different sectors of economy. There is a need to undertake appropriate human resource development programmes (e.g. seminars, workshops, short courses etc.) to develop capabilities in undertaking Technology Based Development Programmes for different sectors. Institute of Appropriate Technology (IAT), BUET has been conducting some training programmes during the last 10 years.

It may be noted that the importance of technology for development of different sectors of economy has been duly recognized in Japan by making separate budget allocations for Science and Technology for different Ministries and Agencies. The government of Bangladesh should also follow similar principles and practices in making separate budget allocation for science and technology for different ministries and ensure their effective use. A comprehensive review of Promotion of Technology Utilization in selected Asian Countries has provided useful guidelines for developing countries for effective applications of technology for economic development (Kang, 1986).

In addition to application of newly invented technologies developing countries have good prospects to introduce technological innovations in all sectors of socio-economic development. Necessary institutional arrangements should be made to harness these benefits.

Technology Atlas Project (Sponsored by the Japan Government) has made a major intellectual contribution in developing methodologies for undertaking technology based development. The outcome of the project could be made more useful if the knowledge gathered by study could be disseminated within the participating countries among the policy planners and decision makers through post graduate courses and training workshops. There is a need to initiate a postgraduate programme (M.Sc., Ph.D.) on Technology Management at BUET to train capable manpower to undertake technology based development programme for Bangladesh. Collaborative arrangement may be sought with appropriate Japanese organization(s) to implement the programme.

There is a need to undertake a systematic research study to assess the experiences of transfer of technology and technology innovations from Japan during the last 40 years to decide appropriate strategies for transfer of technology in future.

Government of Bangladesh need to pay serious attention to remove various impediments identified by SHOO-KOO-KAI and Japan

External Trade Organization (JETRO) studies to encourage FDI from Japan and other developed countries.

Government of Bangladesh should also consider in preparing a long term collaborative research and technology transfer program between different science and technology organizations of Bangladesh and corresponding organizations in Japan.

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