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Shift from bilateral to multilateral relationship assistance: a perspective from Science and Technology

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SHIFT FROM BILATERAL TO MULTILATERAL RELATIONSHIPS ASSISTANCE: A PERSPECTIVE FROM SCIENCE AND TECHNOLOGY

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ABSTRACT

International cooperation on science and technology (S&T) can be translated to any form of sharing S&T-based activity between or among different nations within the context of mutually acceptable conventions for the exchange of knowledge. The sharing of knowledge is like international trade which can be through bilateral / reciprocal and multilateral / regional / integral relationships. Both or all parties benefit, so that the total amount of knowledge after the exchange is greater than the sum of the knowledge actually exchange. This has been achieved through a systematic attempt in promoting interactions among governments, academia, institutions and industries with specific focus on areas of common interests. The purpose of this cooperation is to provide opportunities to exchange ideas, information, skills and techniques and to collaborate on S&T endeavors of mutual interest. To keep abreast with global competition and accelerate technological capability development, it is imperative that effective partnerships, institutional linkages and networking that can expedite rapid knowledge and information flows are needed. Different approaches will be part of the discussion presenting linkages, partnerships and networking schemes. Other regional experiences and present day realities are also illustrated. An attempt to assess the current trend of international cooperation highlighting the bilateral and multilateral relationships will be made with due emphasis given to science and technology perspective. In the sidelight, an analysis of the different mechanisms to support S&T developmental framework essentially on the national innovation system concepts and knowledge-based economy principles are also underscored. This paper will focus on the possible trend in international cooperation which is geared towards shifting from bilateral to multilateral relationships and its possible effects among the different stakeholders involved.

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Introduction

A major concern with the current trends in the global distribution of science and technology (S&T) activities are the apparent gap between industrialized and developing countries. This gap underscores the difference between nations, but it does not itself clarify what could be done to facilitate technological innovation in developing countries. The gap does, however, point to opportunities for international cooperation in S&T development.

In transferring knowledge to less developed nation, the donor nation stands to gain as well. International cooperation in S&T can be viewed as "good business", a "win-win" situation in which both parties benefit. In as much as governments may promote international exchanges for foreign policy reasons, they also promote international cooperation in S&T to gain access to research and developments results, possible initiate technology transfer and create opportunity for market expansion. The spillovers from the cooperation program are captured by the nation as a whole.

This paper is aims to present general features of S&T in terms of innovation, growth and application in gaining national and global competitiveness. Possible effects and directions of the Japanese shift from bilateral to multilateral programme influencing international cooperation will be analyzed and underscored. This is done within the context of the prevailing knowledge-based economies.

Science and Technology

Science and technology plays a critical role to realize national development. It assumes two major roles in furthering sustainability. The application of scientific knowledge and technological know-how in the industrial sectors results in dramatic increases in output. It also promotes efficiency and develops product competitiveness, which is a distinct advantage in international trade.

Public Value of S&T

Niching and clustering

If there is any lesson to be learned from the experience of technological-advanced countries, it is that the development of industries or technologies does not happen simultaneously and independently or in isolation from other industries or technologies.

Rather, technological development occurs on a relatively narrow front and often in clusters of related interacting or supporting industries. Considering very limited resources, the forward and backward linkages of industries will be an important criterion in prioritizing industries to be provided with technological assistance and other available incentives.

Addressing Pressing National Problems

S&T should address not only long-term or continuing concerns (e.g. human resource development, national security) but also short-term and medium-term problems. The most pressing problems which need to be addressed include poverty, poor health, rapid population growth, shortage of food, water, energy, housing, jobs, low levels of income, low productivity, deterioration of the environment, cyber-terrorism and poor gbvernance. (NSTP 2002-2020, DOST 2002)

For that matter, S&T has been viewed by the public in varying light. For some, S&T is supposed to offer goods and services dependent in the "demand pull – supply push" paradigm. S&T is also viewed as a factor in wealth creation and is an important component as a tool to solve pressing national problems. S&T can act as a catalyst to initiate proactive approach to address future needs.

National Innovation System

Innovation

Innovation has been viewed through several ways:

a. "Innovation consists of the purposeful search for changes and the opportunities that such changes might offer (Peter Drucker in Carthy, 2002)"

b. "Relentless innovation and upgrading of productivity are the keys to international competitiveness in the modern economy (Michael Porter, 2000)"

c. Competition is not based on price but on the ability to innovate. Innovation, for that matter, is not always the introduction of totally new thing. It can be the creation of a new utility from something in existence.

Creativity and innovation are methods by which new knowledge is created. Innovation comes out of increment changes to existing products or processes. It can also result into a radical change, which is different from the original process or product. Radical

changes give a new dimension to the existing knowledge base. Incremental changes, on the other hand, result in changes in perceptions and line of thinking leading to new knowledge insights.

The National Innovation System (NIS) has been defined as "Dynamic network of public and private institutions whose activities, strategies and interactions create, modify and diffuse new technologies and knowledge" (Dodgsun, 2002)

The NIS approach has taken on increased analytical importance in the technology field due to three factors: 1) recognition of the economic importance of knowledge; 2) increasing use of systems approaches; and 3) growing number of institutions involved in knowledge generation. The study of NIS focuses on flows of knowledge. Analysis is increasingly directed to improving performance in "knowledge-based economies" – economies which are directly based on the production, distribution and use of knowledge and information (OECD, 1996)

In the 6th Asia Pacific Science and Technology Management Seminar held last November 2000, the Program committee has selected the "National Innovation Systems (NIS) - How to Maintain a Sustainable Growth of the Asia Pacific Region" as the title for the event. NIS is one of the most important and strategic approaches for the Asia Pacific Region in aiming for sustainable economic growth to be attained in the 21st century. The NIS concept depends not only on each individual and organization related to S&T doing its best individually. It actually involves the whole system achieving the highest results based on strong cooperation among all elements that include individuals and organizations of the NIS. It is extremely strategic.

The DOST-NSTP 2010

In the Philippines, the National Innovation System is embodied in the National Science and Technology Plan for 2002-2020 (NSTP 2020). It is a long term indicative plan which defines, in broad strokes, the direction of science and technology (S&T) development in the Philippines for the next 18 years. It is the S&T community's response to the national leadership's call for S&T to be the foundation of future economic development in the country. The Plan is supportive of the visions and goals stated in the Medium Term Philippine Development Plan (MTPDP) which are: macroeconomic stability with equitable

growth based on free enterprise, agriculture and fisheries modernization with social equity, comprehensive human development and good governance.

The development of the NSTP has been a highly participatory process which took a year to finish since it was started in 2001. In coming up with the NSTP's visions, goals, strategies and area thrusts, consultations involving S&T experts and opinion leaders and stakeholders from the private sector, government, academe and non-government organizations were held. (NSTP 2002-2020).

To ensure that a national innovation system works, innovation intermediary institutions must be strengthened. These institutions are organizations that link all stakeholders and encourage these stakeholders to accumulate, diffuse, use and create technological innovations. (Freeman, 1987 in Dodgson, 2002)

Knowledge-Based Economy

Before the on-set of the knowledge-based economy, the old model of working is characterized by: a) being mission-oriented, b) risk minimization, c) limited partnerships, d) minimal community involvement, e) ad-hoc international relationship. (Carthy, 2002).

In the present day market scenario of intense competition, organizations need to know what they know and be able to leverage on it's knowledge base to gain competitive advantage. In this knowledge era, organizations can create and sustain competitive advantage through initiation of appropriate knowledge management processes. The organizations that can leverage technology to exploit the data will realize the benefits by creating a competitive advantage for itself. The competitive advantage could be in the form of identifying trends, unusual patterns, and hidden relationships. The recent emphasis on knowledge management arises out of the need for organizations to manage resources more effectively in a hyper-competitive, global economy. The need for emphasis on knowledge management is also stressed by Nonaka and Takeuchi (1991) in their statement "In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge. Successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products".

Knowledge in knowledge management

The importance of knowledge has been stressed by many management researchers and authors. Peter Drucker (1998) has declared that knowledge is just not another resource like labor, capital, but is the only important resource today. Toffler (1998) subscribes to the views of Drucker, by proclaiming that knowledge is the source of the highest-quality power and is the key to the powershift that lies ahead. Quinn (1998) shares a similar view while stating that the economic and the producing power of modern organizations lies more in its' intellectual assets and capabilities more than the other tangible assets. Nonaka and Takeuchi (1991) have focused on how Japanese companies have leveraged their knowledge assets to gain competitive advantage and industry leadership. The paradox in knowledge management is that we are trying to manage what cannot be managed. Before we set about managing knowledge, we need to understand what the term knowledge refers to and the various classifications of knowledge. Davenport (1998) has defined knowledge as a "fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of the owners of knowledge. In organizations, it often becomes embedded not only in documents or repositories, but also in organizational routines, processes, practices and norms".

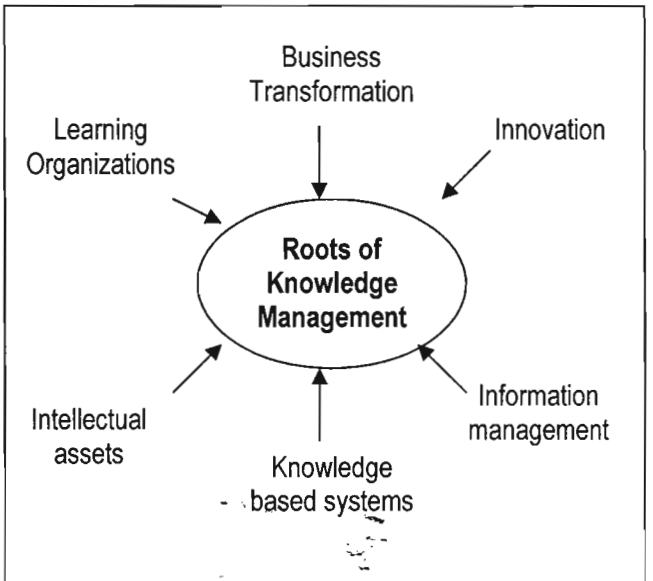

Figure 1. Roots of Knowledge Management
source: http://www.knowledgemotion.com

Roots of knowledge management (refer to Figure 1.)

Learning organization :

If an organization conforms to the required norms and can be termed as a learning organization, then it becomes one of the start point of knowledge management.

Intellectual assets :

The intellectual assets in an organization is in what the people has gained expertise through years of work experience and is tacit in nature. This knowledge has to be made explicit and managed in order to leverage on it and gain competitive advantage.

Knowledge based systems

The systems that are evolved in an organization to facilitate the smooth functioning of the organization should encourage harnessing the existing knowledge in the organization. These systems could be a basis of knowledge management.

Information management

Information is the core of knowledge management, since information combined with experience and intuition leads to knowledge. Hence, proper information management systems can result in an effective knowledge management system.

With all of these realities and the recognition that goes with it, institutions as individuals, in the context of knowledge-based economy, must involve themselves into a new way of working. This new scheme would be characterized by: a) multidisciplinary R&D excellence and economic value, b) risk taking, c) linkages and networking, d) partnership with community, e) institutionalized international cooperation, f) recognition, incentives and awards, g) effective monitoring and evaluation scheme. (Carthy, 2002)

Citing the OECD (1996) Report on Knowledge-based economies, the working definition is: "Economies that are directly based on the production, distribution and use of knowledge and information...reflected in the trend in OECD economies toward growth in the high-technology investments, the high-technology industries, more highly-skilled labor and associated productivity gains.

Although knowledge has long been an important factor in economic growth, economists are now exploring ways to incorporate more directly knowledge and technology in their theories and models. New growth theory reflects the attempt to understand the role of knowledge and technology in driving productivity and economic growth. In this view, investments in research and development, education and training and new managerial work structures are key.

Better indicators are needed of knowledge stocks and flows, particularly related to the diffusion of information technologies, in both manufacturing and service sectors; social and private rates of return to knowledge investments; the functioning of knowledge networks and national innovation systems; and the development and skilling of human capital."

With the knowledge-based economy firmly in place, several changes and challenges have to be addressed. Has Yang (2002) had pointed it, these would include: a) Paradigm shift to effectively use R&D results to economic gains, b) Establishment of organization structure that can exploit K-economy, c) Identification and development of organizational competencies, d) Institutionalization of the change process involving innovation and growth.

Linkages, Partnerships, Networking

The globalization of the economy results into a more competitive environment. As a consequence, intense scientific and technological interactions are needed for sustained competitiveness. Corollary to this, an increased pace of generation of new ideas, models and solutions is more of the norm rather than exception.

Partnership, as a two-way relationship, entails a long-term commitment between two or more parties whose objective is to share knowledge, enhance technological capabilities, foster innovation and strengthen competitiveness, Partnerships of this kind involve interaction and mutual dependency through the sharing of risks and costs as well as market access.

Networks come in many forms, representing a broad spectrum of collaboration agreements. Usually, a network consists of a group of institutions or associations whose aim is to enhance capacity to conduct research and improve training and education through interaction. Partners benefit from their involvement in the network by gaining access to new ideas, methodologies, information and learning materials. They also benefit from networks by collaborating with others in training and research program thus sharing experiences. Networks link institutions and enterprises that are willing to share experiences, research results, skills and information in order to gain knowledge and innovate. A network has to be efficient to compete successfully against other organization forms. It also has to be attractive if participants are to stay and invest in it. One of the main characteristics of a network is that it does not require geographical proximity of the parties involved.

Government policies are indeed essential in fostering international linkages, partnerships and networking. It can hinder potential partnerships by sending confusing

signals or by simply discouraging them. The use of incentives such as the elimination of trade barriers, the opening up of markets and the reduction of taxes is likely to contribute significantly to the promotion of partnerships and networking.

Traditionally, cooperation in S&T has evolved as a random process, sometimes based on the interests of the donor countries, sometimes on the scientific interest of influential scientific and technological institutions and at other terms on the outcome of bilateral discussions. Government need to spell out clear national strategies and goals for the development of S&T if they are to forge effective technology policies.

It is very clear from the above discussion that forging partnerships, linkages and networking are important to initiate and conduct business, hasten transfer of technology and provide a platform for capacity building. Good partnership will only result if there is a meeting of the mind among stakeholders with the objectives made clear and the level of competence known. Ineffectual partnerships will arise when local needs, priorities and capabilities are not taken into account.

Present Realities

Realities in Japan

Japan has been thrust into an era of mega economic competition, resulting in worries about loss of society's vitality, lowering of the living standard and the hollowing out of industry. To try and avert this trend while opening up a brighter future, it has become vital for Japan to encourage original, cutting-edge R&D and use the results to create new industries. There is every reason for concern about the current state of Japan's S&T. Take, for example, private sector R&D investment has been going down in the last few years. Moreover, government R&D spending as a percentage of GDP remains below American and European levels.

R&D in Japan is driven and done by the private sector. For the year 2001-2005, the Government of Japan intends to increase their investment in R&D. The S&T priority areas includes life science, information and telecommunication, nano-technology materials, environment, S&T frontier areas are space, nuclear energy, ocean (Ikeda, 2002).
Some major changes on the Japanese system includes (Ikeda, 2002):

a) Government research organizations are independent administrative agencies as of April 1, 2001

b) National universities and affiliated institutions will be independent agencies by April 2004

c) Mobilization of capable researchers across institutional barriers is encouraged

d) Funding is based on competitiveness in terms of objectives, expected outputs, feasibility for commercialization and utility

e) Shift from bilateral to multilateral development assistance program.

Regional Multilateral Partnership Scheme

A major goal of most multilateral partnership scheme is to help in the development and improvement of integration among ASEAN nations to allow them to become better participants on the global scene (AADCP, 2003).

The level of development intervention usually includes (AADCP, 2003):

a) Integrated regional policy initiatives.

b) Harmonized institutional frameworks.

c) Capability building to implement harmonized policies.

Most of those multilateral programs have several criteria in determining which program or project will be supported. Some of those criteria includes: a) alleviation of poverty, b) link to regional development priorities, c) identification of a regional problem and searching for regional solutions; and d) ensuring that the benefits can be sustained. Table 1 shows the types of collaboration being applied by several countries.

Country	Type of Collaboration	Remarks
Australia	Multilateral, Bilateral	Exchanges collaboration, R&D
Brunei Darussalam	Regional	
Canada	Multilateral, Bilateral	Exchanges collab., R&D US major partner
Chile	Multilateral, Bilateral	
Columbia	Multilateral	
China	Bilateral	Co-op & exchanges (134 nations) gov't bilateral (86 nations) multilateral initiatives to be launched
Indonesia	Multilateral, Bilateral	Major bilateral agreements w/ Japan & Australia, other bilateral & multilateral

		mainly related to aid projects
Japan	Multilateral, Bilateral	Bilateral (20 nations) multilateral projects include megascience – space stations, human frontiers
Korea	Bilateral	Government & corporate bilateral agreements, w/ major trading partners
Malaysia	Bilateral, Regional	Mainly non-governmental
Mexico	Multilateral, Bilateral	Primarily bilateral w/ major trading partners
New Zealand	Multilateral, some Bilateral	Mainly through Int'l. S&T linkages fund
Pacific Island Nations	Multilateral	Primarily through UN affiliated programs
Peru	Multilateral	
Philippines	Multilateral, Bilateral	Exchange students & experts
Russia	Multilateral, Bilateral	Bilateral (100 nations) counterpart agreements w/ institutes (500 projects, 30 nations)
Singapore	Regional	
Taiwan	Bilateral	20 nations 80 agreements
Thailand	Multilateral, Bilateral	
United States	Multilateral, Bilateral	Primarily based on institutional agreements, mega science projects: EU & OECD projects NATO projects

Table 1. Asia Pacific Economic Cooperation (APEC)/Pacific Economic Cooperation Council (PECC) Nations Survey of International Cooperation

This multilateral approach offers a lot of advantages in terms of sharing market risks and expenditures, ensuring greater efficiency through judicious use of resources, more active exchange of ideas/sharing of knowledge and identifying new financial resources and markets.

Future Directions

The multilateral approach to development assistance offers a lot of advantages foremost of which is providing regional solutions to regional problems. However, the bilateral mode must not be totally eliminated as there are issues and problems that are common and unique between two countries. If this is the case, bilateral twinning will be a more efficient and effective vehicle.

The Future

On the principles espoused by the Initiative for the Development of East Asia (IDEA), it may be more difficult or almost impossible for a particular country to access ODA Funds

on its own. In this scheme, Japan's ODA assistance to a particular partner country under the bilateral arrangement would definitely diminish. Considering the realities in S&T, a portion of the ODA funds is recommended to be made available for priority and meritorious individual country projects.

Mechanisms have to be defined to operationalize the shift from bilateral to regional/ multilateral approach in accessing ODA. The proposed criteria for identifying future cooperation programs can still be further constrained and narrowed down. Questions like what constitute a region-wide project (e.g. member countries + consent of all member countries in the case of ASEAN), which body determines the regionality of a project and other similar issues need to be clarified. The capability of ASEAN to plan, identify, implement and monitor S&T development projects must be continuously enhanced being a focal institution in this endeavor.

Some activities may not fit in the ASEAN economic landscape considering that products produced by member countries compete with one another in the world market. The economies of ASEAN member countries should complement each other so as to facilitate the implementation of regional projects that are geared towards the economic development of the region. This may actually be true for S&T, too.

The Philippines and the other ASEAN countries for that matter must now identify initiatives that are tied to our national programs and see commonalities with the programs of our ASEAN neighbors that could be shaped as regional programs. This can be an initial step in addressing the change from bilateral to multilateral assistance scheme, which will be implemented by Japan.

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