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S&T/R&D - Medium-Term National Action Agenda for Productivity (MNAAP)

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S&T/R&D - Medium-Term National Action Agenda for Productivity (MNAAP)

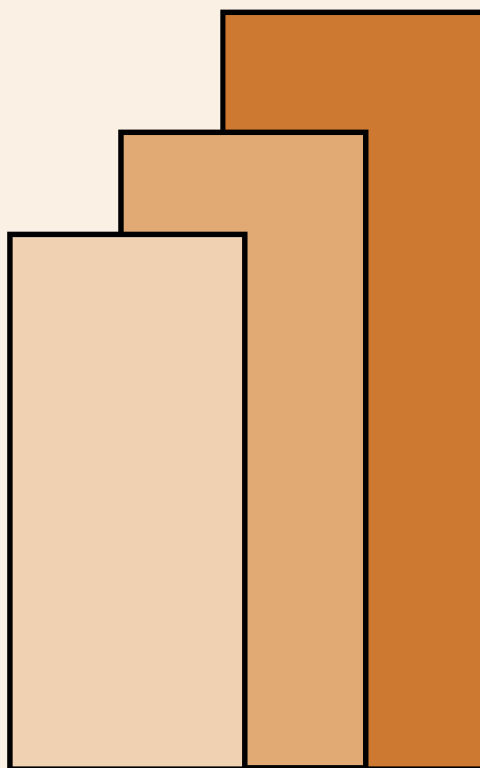
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S&T/R&D - Medium-Term National Action Agenda for Productivity (MNAAP)

Abstract

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April 2000**

The paper looks into the S&T/R&D-MNAAP by examining whether the strategies, programs and activities set are able to address the real issues surrounding the S&T sector. The paper discusses the major insights drawn from the recent study conducted by PIDS on R&D and compares these with the programs in the MNAAP to see whether they do address the major gaps in the sector.

Generally, it was observed that the recently formulated strategies and programs in the MNAAP on S&T/R&D may not be able to adequately address the structural deficiencies in the sector. These structural deficiencies in (a) leadership, focus, and direction; (b) organization of the sector; (c) inefficiencies in the structure of incentives and allocation of R&D resources, present a set of stumbling blocks that may prevent and hinder any new set of programs and activities from attaining the goals set in the S&T/R&D-MNAAP. Major structural reforms may be needed before meaningful programs and funding requirements are set.

S&T/R&D - Medium-Term National Action Agenda for Productivity (MNAAP)

*Caesar B. Cororaton*¹

I Introduction

This paper looks into the S&T/R&D-MNAAP by examining whether the strategies, program and activities set are able to address the real issues surrounding the S&T sector. The paper discusses the major insights drawn from the recent study conducted by PIDS on R&D and compares these with the programs in the MNAAP to see whether they do address the major gaps in the sector. Policy recommendations and direction for further research are suggested towards the end of the paper.

II. Identification of Issues and Gaps²

In a recent study conducted by PIDS on R&D, four major areas of concern in the technology sector were identified: (a) low R&D investments, inefficient allocation of limited resources, and inadequate R&D manpower; (b) institutional weaknesses as a result of poor system, management and leadership; (c) policy lapses and failures; and (d) poor statistical and information system.

R&D Investment and Allocation. The estimated gap in R&D investment is 0.5778 of GNP, or about P14 billion in current prices. Underinvestment is observed in almost all sectors, particularly in agriculture and manufacturing. Thus, the biggest challenge is: Who will fill in the gap?. For sure, the government cannot be expected to fill in all the gaps because of financial constraints. For one, the government has other equally important concerns such as basic infrastructure and other social sector needs. Naturally, it is the private sector.

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² Largely based on the recent R&D study conducted by PIDS. Major contributions come from the various papers of Cororaton et al; Halos (1998); Patalinghug (1998); Nolasco (1998); Macapanpan (1998); David et al (1998); and Israel (1998).

Another issue concerning investment is the inefficient allocation of the already meager R&D resources. It was observed that in terms of relative percentages, relatively greater research budgets are allocated to minor commodities. Important ones with clear comparative advantages are left out. Furthermore, little resources are available to perform research activities and to properly maintain the physical facilities. The average share of personal services to direct budgetary outlays, for example, is close to 60 percent and as high as 70 to 80 percent, leaving very limited resources for research, and therefore resulting in underutilization of existing research manpower. This inefficient allocation is further aggravated by the delay of releases of budgeted funds which causes damage to ongoing research.

Private participation in R&D activities is very poor. In fact, records show that of the R&D related-incentives offered by the BOI since 1991, only 11 companies availed. A major part of the problem concerning the poor R&D culture in the private sector is that government-owned R&D institutes which are supposed to be at the frontier in developments in technology and research have very limited linkage with the industry. Thus, commercialization of R&D results is extremely low. Thus, the recent study recommended that a careful study of the incentive system has to be done (especially those which are fiscal related, and therefore have budgetary implications), and the government-owned R&D institutes have to be "corporatized" to be able to increase active private sector participation. Essentially, the main idea is to transform the present R&D institutes into a new corporate structure that gives them flexibility as well as responsibility to gradually develop its fiscal autonomy. The reform can be patterned or modelled after the Crown Research Institutes (CRIs) of New Zealand. CRIs create opportunities for R&D collaboration and transfer of technology between the public and the private sector. Its structure also provides full commercial powers.

Another point raised in the study with regard to the issue of how to increase private sector interest is the suggestion to implement programs such as pilot testing. Demonstration of the technical viability of the technology in a semi-commercial scale helps convince an industry user to start-off the commercialization process. Commercial success is promoted when the user himself has provided material inputs to the pilot test.

There is a need to design an incentive package, with strict qualifying requirements on what constitutes R&D activities. An external peer review committee is recommended to act as the screening mechanism. Furthermore, there is a need to implement a competitive bidding, strictly based on merit, in awarding of research projects by pooling a major portion of R&D resources to be administered by an NSF-type agency.

Moreover, it has been strongly recommended that DBM must play an active role in the S&T and R&D planning exercises, together with the DOST, so that R&D resources are made available to implement such plan without delays. Plans without realistic budget are useless. They only create false expectations.

R&D Manpower. The issues surrounding R&D manpower are equally important, if not more problematic because they are traced back to the educational system. In terms of head count, it was estimated there is gap of about 197 scientists and engineers per million population. There is also a big problem of relatively low level of scientific qualification. There is a very tiny number of R&D personnel with advanced degrees in engineering and technology. It is ironic that while the Philippines produces one of the biggest number of college graduates, compared with other countries, it generates one of the smallest numbers of graduates with science and engineering skills. Therefore, the structure of demand for skilled manpower, and supply of technical people has to be looked at carefully.

A few recommendations have been raised in the study: (i) allocation of an annual funding for the implementation of the Scientific Career System (SCS) - the entry into the SCS should be limited by giving top priority on the target groups, such as natural scientists and engineers; (ii) establish funding schemes through DOST and CHED to support consortium or network of schools to maximize use of resources; (iii) focus funding support for developing core competence in targeted regional universities; (iv) promotion of S&T culture by giving Presidential Awards to outstanding science and engineering projects selected through a nationwide competitive search, and by encouraging science TV and radio programs, fairs, plant tours and apprenticeship; and (v) upgrade the level of primary education (both

elementary and high school) through changes in the science and mathematics curriculum, training of teachers, books and school facilities.

Institutional Reforms. The present institutional set-up of the S&T sector is weak. There are systems, as well as administrative failures, that result in wrong implementation of plans, projects and programs. Furthermore, there are also policy failures due to the lack of focus on technology in the overall development strategy. The PIDS study strongly recommended structural and organizational reforms which include: (a) DBM must be involved, together with the DOST, in the S&T plan formulation stage so that S&T resources are available to implement the plan; (b) STCC must draft a Medium-Term Science and Technology Development Plan a year before the drafting by NEDA of the next Medium-Term Philippine Development Plan. An inter-agency joint committee must integrate the Medium Term Science and Technology Development Plan into the Medium Term Philippine Development Plan by decomposing them into annual budget plan, annual S&T plan, and annual economic plan, and then harmonizing its goals, projects, programs, strategies, resource requirements, and timetables; (c) DOST must establish a Project and Program Monitoring Unit staffed by at most three persons whose main job is to coordinate the selection, through competitive bidding, of external evaluators and reviewers for the different projects and programs implemented under the S&T plan; and (d) an STCC chaired by the President must meet at least once every three months to address current problems that pose obstacles to the implementation of the S&T plan. An MOT unit attached to DOST (like PIDS attached to NEDA) will act as then technical secretariat of STCC under the direct supervision of the DOST Secretary.

For sure, the points raised above require substantive change in the set-up of the S&T sector in terms of major structural and organizational reforms. However, as discussed below, such reforms are not well addressed in the present Science and Technology Medium-Term National Action Agenda for Productivity. In fact, one can observe in the statement of strategies and key activities/programs in the MNAAP to be carried out over the period 2000-2004 that nothing concerns about issues regarding re-organization and structural reforms in the S&T sector in general, and in the DOST in particular.

III. MNAAP³

II.A Goal

The goal of the S&T sector is to harness the inputs of science and technology to improve overall productivity and competitiveness of the country's economic sectors (MNAAP, 1999).

II.B Strategies

In achieving this goal, MNAAP identifies a number of broad strategies:

1. strengthen networking of innovation resources among private industry, academe and government.
2. increase private investment in S&T
3. regularly upgrade S&T support service facilities, equipment and product standards
4. privatize the acquisition or installation of support facilities
5. regionalize S&T services/activities
6. develop/maintain critical pool of technology managers and R&D experts; and
7. strengthen technology promotion and information dissemination to facilitate technology delivery.

³Science and Technology Chapter of the MNAAP.

II.C Activities and Funding Requirement

1. Comprehensive Program to Enhance Technology Enterprises (COMPLETE), which aims to catalyze R&D in the private sector, especially among SMEs. Enhance their participation in S&T activities, and upgrade the competence of governmental, academic and private sector institutions involve in S&T activities.

The program has two components:

- (a) strengthening of technological innovation capabilities in selected industrial technology areas particularly in microelectronics, information technology and biotechnology through the establishment of Virtual Centers for Technology Innovation (VCTI); and

Budget: P5.424 billion (95.43 percent of total proposed S&T funding requirement)

- (b) strengthening the capability of DOST and other government institutions in technology management.

Funding requirement: P4.0 million (0.07 percent of total proposed S&T funding requirement)

- (2) Technology Scan which is a mechanism for collaborative efforts in the collection, evaluation, transfer and development of science and technology opportunities. One component of this project is the establishment of a one-stop-shop technology information service center.

Funding requirement: no funding requirement identified

- (3) Establishment of a Packing R&D Center that will provide, among others, a common service facility for the use of industry. Through the Center, the Department will offer testing and related services for industry; conduct training programs and information dissemination campaigns, facilitate technology transfer to industry; and develop and maintain regional industry network on packaging technology and services, particularly for SMEs.

Funding requirement: P90 million (1.58 percent of the proposed total funding requirement).

- (4) Expansion of Regional Metrology Centers to provide the framework for promoting metrology awareness and application among all sectors and regions for the country. A National Metrology Program will be implemented to develop the pyramidal metrology infrastructure of the country and upgrade the capabilities of public and private calibration laboratories in the regions to match the requirements of the various users.

The program has 4 components:

- a. identification of gaps in the present metrology system;
- b. the development, through the upgrading and expansion of regional/ calibration laboratories, of a national measurement system;
- c. the establishment of a metrology training center; and
- d. the development and adoption of a laboratory proficiency evaluation program.

Funding requirement: P160 million (2.82 percent of the proposed total funding requirement).

- (5) Integrated Program on Clean Technologies which aims to promote sustainable development and strengthen the competitiveness of Philippine industries, particularly SMEs by providing them technical information and assistance in adopting clean production technologies and waste minimization techniques.

The program will have 4 components

- (a) policy study on the promotion of clean technology transfer;
- (b) establishment of a center for clean technology development;
- (c) setting up of a regional network for clean technology transfer;
- (d) the identification of market-based and command-and-control instruments for the adoption of clean technologies.

Funding requirement: P4.7 million (0.07 percent of the total proposed funding requirement).

- (6) R&D Incentives. Review the proposed 'Rationalization Incentives Bill' and effectiveness of other existing laws, policies, incentives and programs and prepare policy recommendations that will make R&D attractive to the private sector.

Funding requirement: P1 million (0.02 percent of the proposed funding requirement).

(Note: Total funding requirement is **P5,683.7 million**).

IV. Policy Insights and Some Recommendations

In comparing the insights drawn from recent study on R&D with the recently formulated strategies and programs in the MNAAP on S&T/R&D one can observe the latter does not seem to have adequately addressed the structural deficiencies of the sector. These structural deficiencies in (a) leadership, focus, and direction; (b) organization of the sector; (c) inefficiencies in the structure of incentives and allocation of R&D resources, present a set of stumbling blocks that can prevent any new set of programs and activities from attaining the goals set in the S&T/R&D-MNAAP. Major structural reforms are therefore needed before any programs and funding requirements are set. Thus, the following points are suggested:

- (a) Draw up a framework for structural reform in the sector. Particular focus is given to:
 - (a.i) how to change the traditional planning exercise into an active participation of key agencies in government
 - (a.ii) how to monitor the programs and projects vis-à-vis the targets set in the plan so that the goals set are achievable
 - (a.iii) how to "depoliticize" the allocation of very limited R&D resources
 - (a.iv) how to transform the government funded R&D institutes into new corporate structure that gives them flexibility as well as responsibility to gradually develop its fiscal autonomy and to focus on commercialization of R&D outputs
 - (a.v) how to improve the efficiency of the present structure of incentives, particular those related to R&D activities.
- (b) Design effective measures to determine and improve the quality of S&T. Particular focus is given to:
 - (b.i) policies that can generate appropriate, as well as state-of-the-art, technologies that are properly suited to the local environment, resource endowment of the country, and comparative advantage.
 - (b.ii) programs that can develop local expertise (or technical capability) in assessing available technologies in the market.

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SCIENCE AND TECHNOLOGY ACTION AGENDA 2000-2004

GAPS/AREAS OF CONCERN	STRATEGIES	KEY ACTIVITIES	LEAD AGENCY/ COOPERATING AGENCIES/ENTITIES	2000	2001	Targets 2002	2003	2004	Funding		Cost
									Yes	Identified No	
A. Weak Industry-Academe Government Linkage											
o Limited Resources for each sector to be involved with each other's work in terms of policy advice, planning, and project selection, development and implementation	o Build-up stronger research academe industry linkages o Strengthen networking of innovation resources among private industry, academe and government	CATALYZING BUSINESS o Strengthen and revitalize STCC o Implement the Comprehensive Program to Enhance Technology Enterprises (COMPETE). COMPETE aims to catalyze R&D in the private sector and improve technology innovation and upgrade capability in technology management in DOST and other government institutions. One component of COMPETE is the establishment of Virtual Centers for Technology Innovation (VCTI) designed as mechanisms to network resources and capacities of the industry, academe and RDIs for technological advancement.	DOST/Private Sector DOST/Academe SEIPI	E.O. Issued		NPBTD functional				*	4.0M 0.07%
					3 VCTIs established in the priority technology areas					Possible loan proceeds; GOP; industry	5.424M 95.43%
B. Limited R&D Activity											
o Underinvestment in R&D - low private sector investment in R&D - limited R&D funds from government - inefficient allocation of resources	o Increase private investments in the country's S&T enterprise through proper incentives (e.g. IPR, access to capital/financing, fiscal incentives)	CATALYZING BUSINESS o Review proposed "Rationalization of Incentives Bill" and effectiveness of other existing laws, policies, incentives, and programs and prepare policy recommendations that will make R&D attractive to the private sector - Formulate considerable incentive measures to entice private participation in R&D activities o Encourage contract research - wherein industries commission RDIs to help them out with new processes bringing higher level of productivity, innovation or improved products	Private Sector/DOST, DTI, NEDA Private Sector/RDIs, academe		Policy Recommendations/ Incentive Measures					*	1.0M 0.02%
				80	80	80	80	80	*	Industry GOP	
o Deficiency in S&T infrastructure	o Regularly upgrade S&T support service facilities, equipment and product standards to draw the participation of the private sector in R&D efforts o Encourage cost sharing in the upgrading and maintenance of research facilities among stakeholders o Privatize the acquisition and/or installation of support facilities such as testing and analysis laboratories, training and common service facilities	o Establish Regional Metrology Centers. Metrology Centers will enhance the integrity of Philippine products and the competitiveness of Philippine exports through the use of approved standards of measurements. o Establish Packaging R&D Center. The center will have the following components: R&D on the most appropriate, least expensive, most environmentally friendly and attractive packaging; training and information dissemination; testing services; and a common service facility to enhance the competitiveness of Philippine products	DOST/Private Sector DOST/Private Sector		Regional calibration laboratories established in strategic locations					Possible GOP industry	160M 2.82%
					National Packaging R&D Center established					Possible GOJ GOP	90M 1.58%

LEGISLATIVE AGENDA FOR MTNAAP, 2000-2004

Title/Subject	Brief Description	Status as of May 1999
1. Increasing the yearly allocation for Scientific and Technological activities	The bill provides for the mandatory allocation for STA which shall be gradually increased until it reaches the prescribed norm of 1% GNP on the fifth year which shall include both government and private sector STA; defines STA; and creates a Special R&D Fund for science, research and development activities.	<p>Refiled for the 11th Congress as:</p> <p>SB 1238 by Sen. Sotto (filed Oct. 1, 1998) Referred to the Committee on Finance on Oct. 5, 1998</p> <p>HB 539 by Cong. Leandro Verceles, Jr. (filed July 28,1998)</p>
2. Metrology Law	To establish accurate standards and measurements that are internationally traceable and consistent with the Meter Convention in the following fields: diagnostic and therapy for healthy quality of product for economic success of manufacturers, fair trade and commerce and consumer protection; environmental protection; safety of structure, products, materials, resources and development, checking reliability of physical theory through quantitative verification of theory's protection	<p>Filed for the 11th Congress as:</p> <p>SB 1076 by Sen. Ramon Magsaysay, Jr. (filed Aug. 12, 1998). Series of inter-agency consultations are being conducted to refine the bill.</p> <p>Filed on First Reading - Senate (Feb. 1999)</p> <p>Drafted request for Cong. Duavit to sponsor the house version</p>
3. Financial and Management Reforms	The bill seeks to provide financial management reform that is more flexible to the operations of government S&T Institutions: new innovative policies in the use of the income or savings and non-reversion of funds to augment the meager budget given to STA for continued programs/projects and activities.	Draft bill is being refined by the TWG Committee initiated by the DOST-Legislative Liaison Unit. Copy of the proposed measure will be submitted for consideration of the DOST Secretary.