THE ORGANIZATIONAL STRUCTURE OF S&T POLICY-MAKING*

(EDITORS)

DESIGNING THE S&T POLICY PROCESS

In Chapter 1 of this compendium we noted that a science and technology program can only be successful if it is compatible with the society for which it is designed. Aqueil Ahmad said that a country must define its social goals and tailor its S&T policy to them. The following model for S&T organization, by Omar Rahman, takes account of this concept.

A national science policy, as defined by UNESCO, is:

> The sum of legislative and executive measures taken to increase, organize and use national scientific and technological potential with the objective of achieving the country's overall development aims and enhancing its position in the world. The country concerned needs a science policy organization (SPO) that will meet the needs of government, industry, the scientific community and the general public. The goals and content of policy will be outlined further after a possible structure for the organization is developed.

UNESCO has identified three functions performed by different elements within the SPO:

1. Decision-making: Usually the responsibility of the Cabinet, or executive level of government, perhaps served by an advisory council which provides an alternate viewpoint.

2. Planning, Monitoring and Coordinating: The job of a central agency, department of science and technology, or a ministry of science. The planning agency may seek advice and consultation from non-governmental organizations, professional groups or science academies. An independent monitoring unit may be established.

3. Implementation: Carried out by government research and development institutions, private industry and universities.

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*This paper represents the Editor's short paraphrase of a much longer article by Omar Abdul Rahman entitled, "Substantive Policy--Targetting II: Organization--Developing the Process for Formulating S&T Policy," prepared for *The Asian Science and Technology Policy Development Program: High Level Consultative Meeting* (Canberra, Australia: 4-8 March, 1985).

The structure of the SPO will vary according to the type of system a country chooses. J. Ronayne describes four possibilities:

1. Pluralist System: Funds are allocated directly to independent organizations which determine their own priorities and, collectively, have close to absolute control of national science policy. However, the central government treasury has general control over the institutions' activities.The system in the USA fits this model.

2. Coordinated System: Organizations initiate projects on their own but recognize the need to coordinate their activities to avoid duplication. They are linked by different advisory systems. Most OECD countries favour this method.

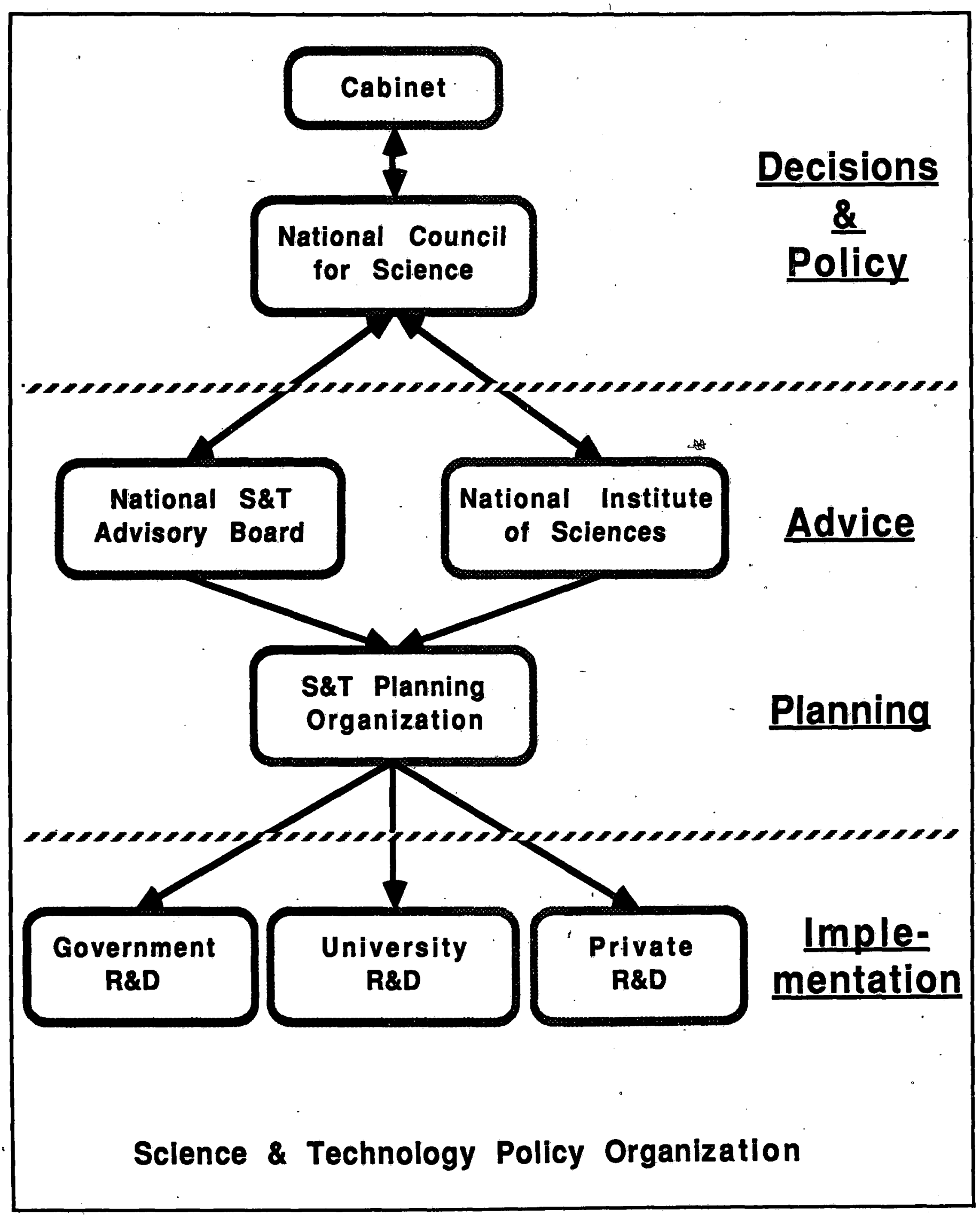
3. Concerted System: A central agency or government ministry collects budgets prepared by various S&T organizations. It proposes this "research envelope" to the government and, upon approval, distributes funds to the institutions. The central agency plans, coordinates and initiates policy-making. Both Japan and Canada use this system.

4. Centralist System: All S&T institutions must conform to a national policy. Belgium's structure is typical. The Ministerial Committee for Science and Technology is chaired by the prime minister and advised by the National Committee for Science Policy. At the administrative level, the chairman of the Interministerial Committee for Science and Technology is also secretary general of the Science Policy Program Service, the agency of the prime minister's department which coordinates all research and development in the public sector and the universities.

Since their economies are developing, Rahman feels that Asian states cannot risk wasting resources by using the pluralist and coordinated systems. He recommends that policy-makers choose a structure that fits somewhere between the centralist and concerted models. However, they should be aware that science and technology policy has more applications than one government ministry can expect to cover. The organization also needs enough freedom to develop an independent policy.

Other key structural elements that Rahman has outlined are: the need for an advisory council where the head of state can be involved; close ties with other planning agencies; participation by the private sector and scientists both in and outside government; and a broad consulting process to determine priorities for research and development.

Following is a diagram showing a typical science and technology policy organization, based on Rahman's model:



The National Council for Science: This group, chaired by the head of state, includes ministers and civil servants whose responsibilities are S&T-related, and scientists

nominated by the National Institute of Sciences. Its two functions are to examine and advise on a national policy and budget to the executive level of government and to consider other policy issues relating to S&T.

The National S&T Advisory Board: The Board is chaired by the science minister and staffed by heads of planning agencies, universities, relevant government ministries, and scientists and businessmen nominated by the science institute. The Board advises the National Council on the role of S&T in national development, regularly reviews the science policy and keeps the Council up-to-date on research and technological development. Encouraging creativity in research, advising on S&T needs for manpower, institutions and new legislation, and promoting the development of priority areas are also among the Board's tasks.

The National Institute of Sciences: In addition to achieving advances in science, its members promote national capability in S&T, encourage ties between the scientific community and the government and involve other scientists in national development.

S&T Planning Organization: It prepares a national science policy and budget for consideration by the Council and the Advisory Board, writes S&T position papers, liaises with other planning agencies, and manages and evaluates new projects.

Because the Institute develops policy based on a scientific viewpoint, while the Council has an overall view of a program's feasibility given the country's economic, social and political reality, Rahman says this design achieves a "check and balance between the ideal and the possible."

According to UNESCO's "Priority Determination Method", the important ingredients in an S&T policy are:

1. Assessment of current national S&T status

2. Examination of international development in S&T

3. Identification of national socio-economic objectives and the possible role S&T can play in achieving these goals

4. Consensus on S&T priorities after widespread consultation

The Science Institute will allow the scientific community to fulfil Steps 1 and 2, and the link between the Advisory Board and other planning agencies will help to accomplish Step 3. Rahman adds that Australia and New Zealand have widened the scope for consultation by holding national seminars and establishing advisory panels.

In conclusion, he identifies four key elements of a national science policy.

1. National goals determined by national development policies
2. S&T sectoral goals which take account of the national goals
3. Medium-term plans of action called strategies
4. Short-term programs called tactics