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Review of National Priorities and National R&D Projects

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Ministry of Science and Technology(MOST)
Republic of Korea

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Ⅰ. Basic Direction of Nat' l R&D Program

A. Basic approach

S&T and Globalization

- Promote and facilitate globalization of S&T activities and simultaneously pursue consistent international collaborative efforts on HAN(Highly Advanced National Project) and national R&D project.
- Maximize effectiveness of R&D globalization through expansion of R&D system and active participation from overseas researchers.

S&T from imitation to creation

- Promote development of transforming technology base from light to core generic technology as well as S&T development in areas of innovative technology and Mega-Science.
- Explore and implement new areas of innovation programs for the 21st century national R&D.

S&T and Quality of Life

- Provide continued support for R&D projects in areas of medical engineering, environmental engineering.
- Increase support for new areas of technology (i. e. soft science) that would add to the quality of life.

B. R&D Management

Participation and Expansion of national R&D

- Adopt open door policy to allow participation by foreign research institutes and individuals in special R&D projects.

Incorporation of Opinions on R&D Policy

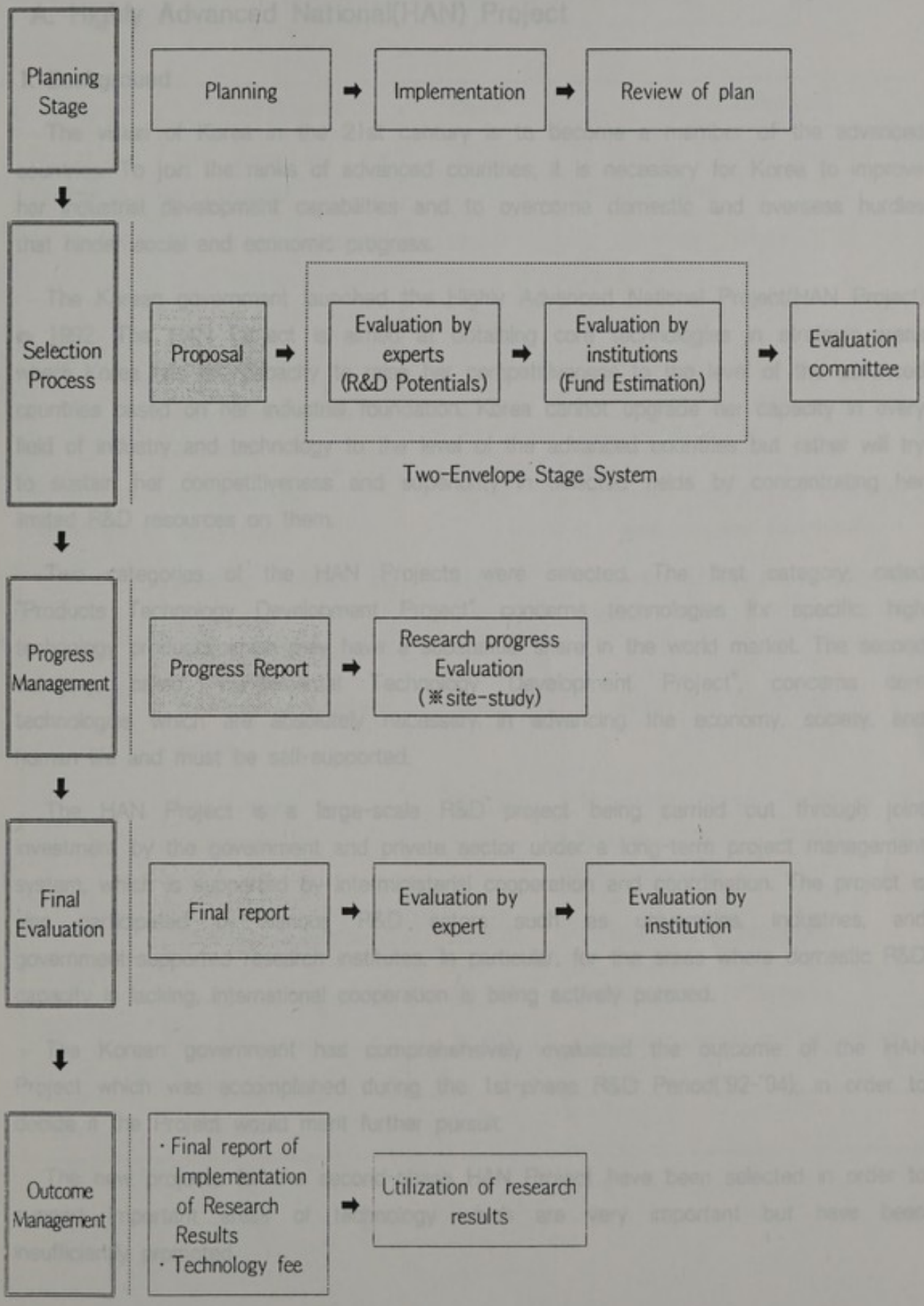
- Conduct "R&D Policy Monitor" system:
  - Announce public notice and select 500 personnel.

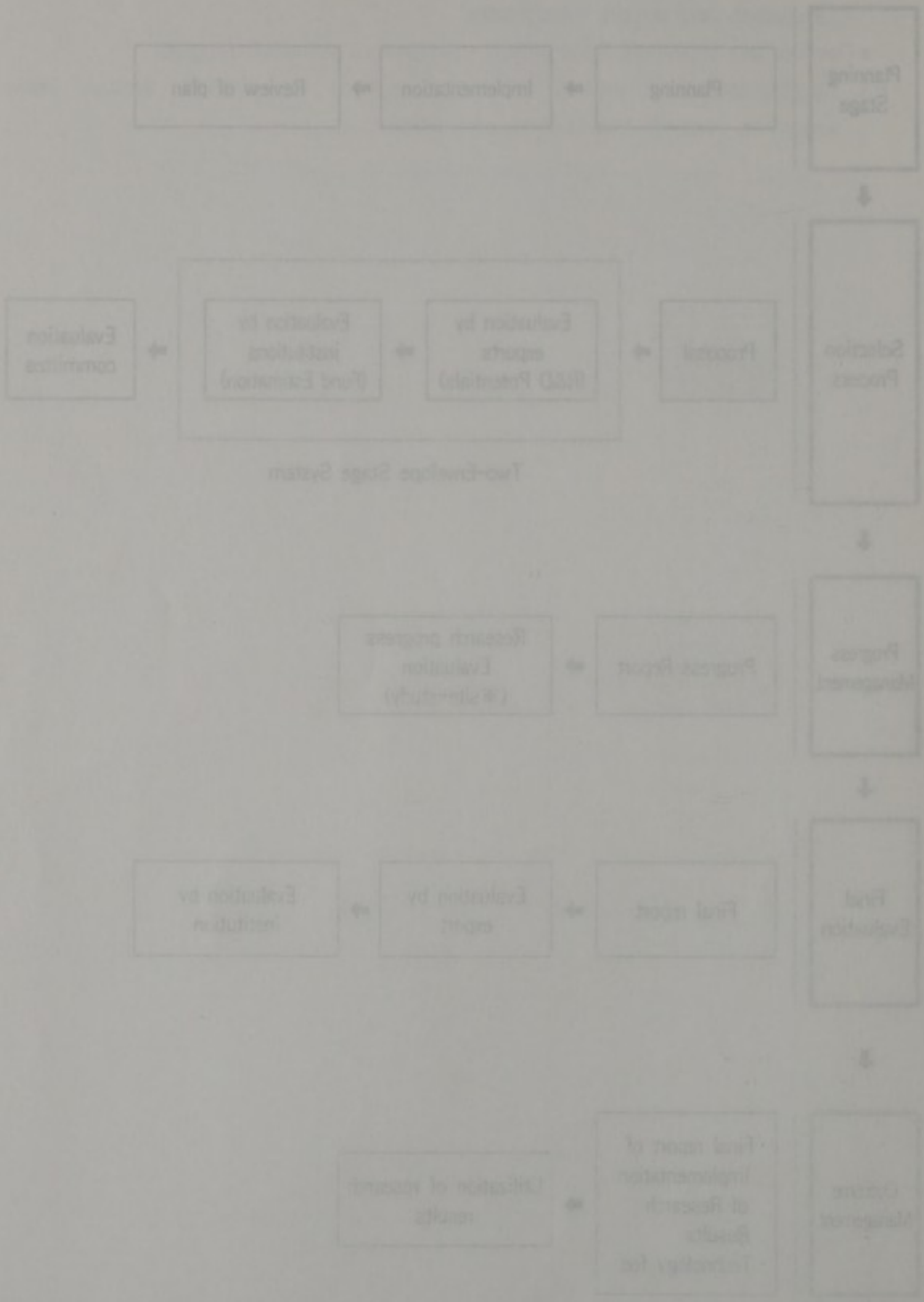
Maximizing effectiveness of R&D project implementation and management

- Adopt a new management system
  - Form an "overview evaluation committee" to make periodic assessment of strategic project plan, selection evaluation, progress management, and outcome evaluation.

- Implement paperless system for National R&D projects
  - Complete project management via computer network with regard to application, evaluation, and project management.
- Develop and implement R&D project management education program
  - Create short-term training education programs for research director, fellow researcher, research management administrator.

C. Evaluation Process of National R&D Project





II. Major Program

A. Highly Advanced National(HAN) Project

1. Background

The vision of Korea in the 21st century is to become a member of the advanced countries. To join the ranks of advanced countries, it is necessary for Korea to improve her industrial development capabilities and to overcome domestic and overseas hurdles that hinder social and economic progress.

The Korean government launched the Highly Advanced National Project(HAN Project) in 1992. The HAN Project is aimed at obtaining core technologies in strategic areas where Korea has the capacity to raise her competitiveness to the level of the advanced countries based on her industrial foundation. Korea cannot upgrade her capacity in every field of industry and technology to the level of the advanced countries but rather will try to sustain her competitiveness and superiority in selected fields by concentrating her limited R&D resources on them.

Two categories of the HAN Projects were selected. The first category, called "Products Technology Development Project", concerns technologies for specific, high technology products which may have a substantial share in the world market. The second category, called "Fundamental Technology Development Project", concerns core technologies which are absolutely necessary in advancing the economy, society, and human life and must be self-supported.

The HAN Project is a large-scale R&D project being carried out through joint investment by the government and private sector under a long-term project management system, which is supported by interministerial cooperation and coordination. The project is also participated by various R&D actors such as universities, industries, and government-supported research institutes. In particular, for the areas where domestic R&D capacity is lacking, international cooperation is being actively pursued.

The Korean government has comprehensively evaluated the outcome of the HAN Project which was accomplished during the 1st-phase R&D Period('92-'94), in order to decide if the Project would merit further pursuit.

The new projects for the second-phase HAN Project have been selected in order to support important areas of technology which are very important but have been insufficiently promoted.

The first-phase HAN Project

Category	R&D Projects	Period	Target Technologies
Product Technology	New drugs and new agrochemicals	'92-'97	To develop 2-3 new antibiotics & germicidal agents
	B-Integrated Service and digital Network (B-ISDN)	'92-2001	To prototype products of 10 giga-ATM
	High definition television(HDTV)	'92-'94	Finished in 1994
	Next generation vehicle technology	'92-'96	To develop an electric car of 120km/h speed
Fundamental technology	Next-generation semiconductor	'93-'97	To develop basic & core technology of a super integrated semiconductor
	Advanced materials for information, electronics and energy	'92-2001	To develop 30 kinds of new advanced materials
	Advanced manufacturing system	'92-2001	To develop FMS, CIM & IMS
	New functional biomaterials	'92-2001	To develop process technology of bioactive, new material for commercialization
	Environmental technology	'92-2001	To develop core technologies
	New energy technology	'92-2001	To develop fuel cell system
	Next generation nuclear reactor	'92-2001	To develop concept and basic design
Total	11 Projects		

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	B-Integrated Service and digital Network (B-ISDN)	'92-2001	To prototype product of 10 gbps-ATM
	High definition television(HDTV)	'92-'96	Finished in 1994
	Next generation vehicle technology	'92-'96	To develop an electric car of 150km/h speed
Fundamental technology	Next-generation semiconductor	'93-'97	To develop basic & core technology of a super integrated semiconductor
	Advanced materials for chemistry, electronics and energy	'92-2001	To develop 20 kinds of new advanced materials
	Advanced manufacturing system	'92-2001	To develop ITMS, CIM & FMS
	New functional biomaterials	'93-2001	To develop process technology of bioactive new material for communication
	Environmental technology	'93-2001	To develop eco technologies
	New energy technology	'93-2001	To develop full cell system
	New generation nuclear reactor	'93-2001	To develop comfort and safe design
Total	11 Projects		

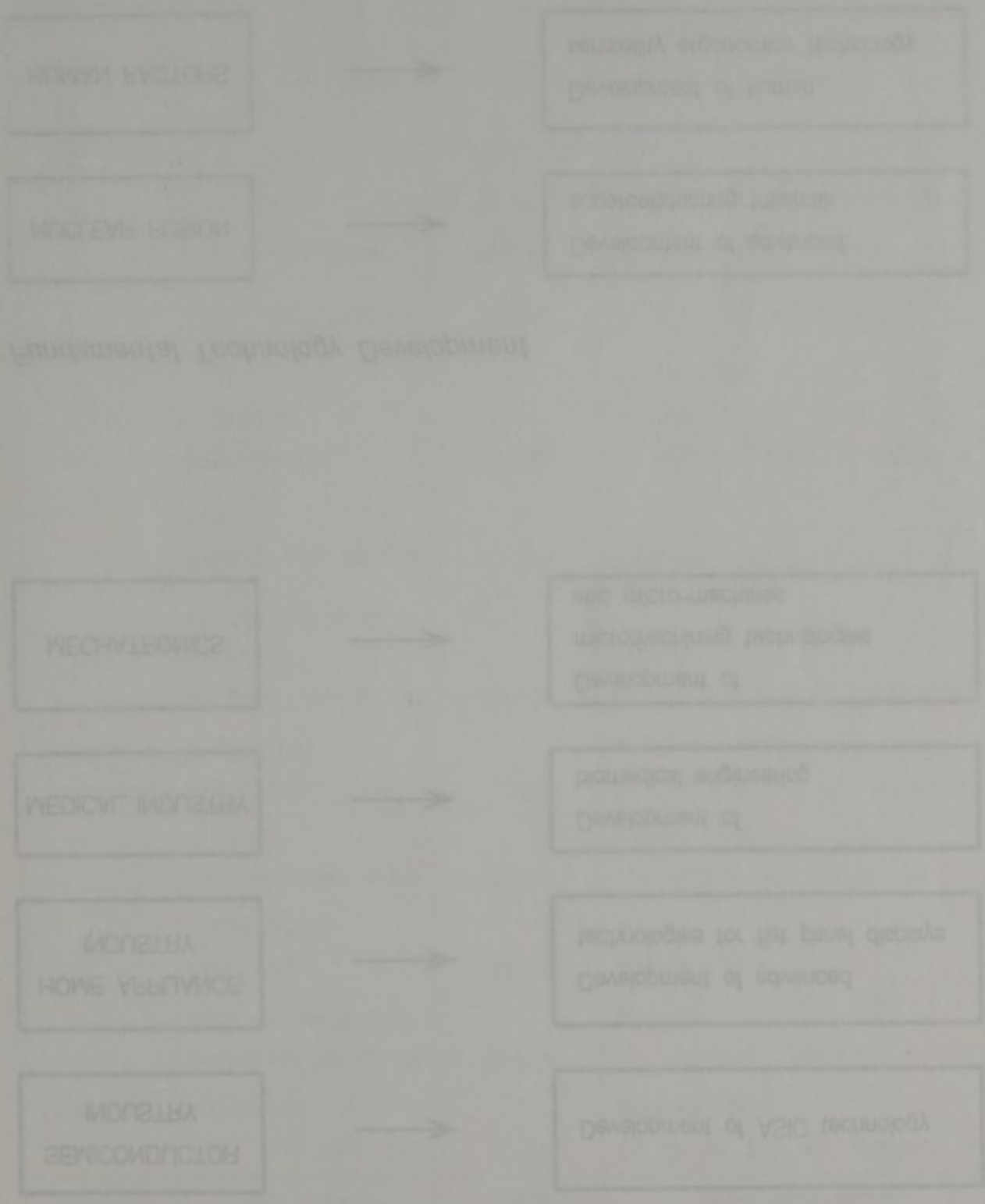
The second-phase New HAN Project

Product Technology Development

SEMICONDUCTOR INDUSTRY	→	Development of ASIC technology
HOME APPLIANCE INDUSTRY	→	Development of advanced technologies for flat panel displays
MEDICAL INDUSTRY	→	Development of biomedical engineering
MECHATRONICS	→	Development of micromachining technologies and micro-machines

Fundamental Technology Development

NUCLEAR FUSION	→	Development of advanced superconducting tokamak
HUMAN FACTORS	→	Development of human sensibility ergonomics technology



B. IJRP - International Joint Research Project

1. Project Outline

- Strategic development of cooperation projects with foreign countries in the field of regional-specific and national-specific technologies.
- Participate in large-scale international research programs and/or seek joint projects with foreign research institutes to overcome domestic R&D capability limitations.

2. Strategic Implementation of Joint R&D Project on Specialized Technologies.

- Develop effective financial assistance system to facilitate Korean-initiated major R&D projects within APEC
  - Provide assistance based on shared research budget allocation, delegation of responsibilities and pre-approval as APEC joint-research project.
- Enhance linkage between on-going IJRP and national R&D programs.
  - Selected IJRP projects can be applied to 96 national R&D program.

3. 1996 Project Budget Allocation

'96 Financial Resources by Country

'96 Project Funds	Number of Project(s)	'96 Project Funds (Unit : 1000Won)		
		Government	Public	Total
Japan	16	824,000	-	824,000
USA	13	761,000	30,000	791,000
Russia	11	688,000	512,881	1,200,881
China	5	335,000	49,000	384,000
Ec	5	252,891	-	252,891
Germany	5	245,000	-	245,000
Australia	3	141,000	10,000	151,000
Canada	3	196,000	24,000	220,000
UNDP	2	114,000	-	114,000
APEC	2	406,000	-	406,000
France	2	93,000	-	93,000
Miscellaneous	3	162,000	-	162,000
Total	70	4,217,891	625,881	4,843,772

'96 Financial Assistance by Technology

Category	Number of Projects	'96 Research Funds(Unit : 1000Won)		
		Government	Public	Total
Machinery Technology	9	467,000	24,000	491,000
Basic Technology	4	266,222	-	266,000
Biotechnology	11	657,000	20,000	677,000
Material Technology	17	865,000	239,000	1,104,000
Nuclear Technology	2	97,000	-	97,000
Natural Resources, Oceanography, Energy, Environmental Tech	16	1,139,000	49,000	1,188,000
Electronic Information Tech.	8	566,891	293,881	860,772
Chemical Engineering	3	160,000	-	160,000
Total	70	4,217,891	625,881	4,843,772

'96 Financial Assistance by Project

Project	Number of Projects	'96 Project Funds(Unit : 1000Won)		
		Government	Public	Total
International Cooperation Project	25	1,517,000	522,881	2,039,881
APEC International Cooperation Project	2	406,000	-	406,000
Inter-institutional Cooperation Project	42	2,259,891	103,000	2,362,891
Selected on-going projects of '95	1	35,000	-	35,000
Total	70	4,217,891	625,881	4,843,772

C. National Biotechnology Development Program("Biotech 2000")

1. Background

Most of the world's leading countries view biotechnology as the key scientific and industrial discipline for the 21st century and are making determined efforts for scientific and technological advance in the related fields.

Korea also needs to take appropriate and timely measures in accordance with the formation of the world's new economic order, and the environmental protection issues being imposed globally through UR, GR and Biodiversity Treaty, etc. Biotechnology is also recognized as the key discipline in Korea that would allow the nation to become one of the top developed countries in the world, in the 21st century. Such a view strongly urges the nation's policy-makers to support the life science and biotechnology with the highest priority in R&D investment in order to enhance the nation's industrial competitiveness. Basic and fundamental research in bioscience and biotechnology is yet at an early stage in Korea.

However, an effective combination of the new biotechnological disciplines and the relatively well established fermentation technology should provide the nation with a novel industrial asset.

To enhance the nation's international competitiveness in biotechnology a national strategic plan is necessary, via close interministerial cooperation to come up with a harmonized and consistent plan to foster biotechnology.

Therefore it is considered most appropriate to make a national strategic plan for the promotion of biotechnology in a well balanced and effective manner such as the "Biotech 2000" Program.

A significant governmental action then followed when the Civil Government took power in early 1993, after a feasibility study to establish a national strategic plan for promotion of biotechnology was made by the scientists from universities and public research institutes. After thorough review and evaluation of the feasibility study were made by the governmental bodies, the "Biotech 2000" Program was approved as a national program at the end of 1993.

2. Biotech 2000

2-1. Strategic Objectives

The basic promotional strategies for biotechnology for the "Biotech 2000" Program were identified as

- ▫ strengthening basic and fundamental research in biological science and technology, and subsequent development of domestic applied technology
- ▫ establishing full-cycle R&D systems and the supporting infrastructure.
- ▫ promoting international marketing by enhancing competitiveness of Korean bioindustries and their products.

According to the basic strategies suggested, strategic objectives of the "Biotech 2000" Program were outlined as in Fig. 1.

Figure 1. The strategic objectives of "Biotech 2000" Program

STRATEGIC OBJECTIVES

▸ First Step(1994-1997)

Develop bioprocessing/manufacturing technology and improve industrial biotechnology R&D capabilities

▸ Second Step(1998-2002)

Extend scientific and technical foundations for development of new biotechnology

▸ Third Step(2003-2007)

Extend world market share of biotechnological products of Korea

2-2. Implementation Strategies

IMPLEMENTATION ACTION PLAN

To fulfill the goals and strategic objectives, ten implementation strategies were proposed.

- o Promotion of Inter-Ministerial Cooperation to Establish Interdisciplinary R&D Basis of Biotechnology
- o Focussed Support for Major Strategic R&D Projects
- o Accelerate the development of Medium Technology and Transfer to commercial Applications
- o Increased and Continued Support for On-going Highly Advanced National Projects
- o Promotion of Basic and Fundamental Research in Life Science

- o Expression of Training Programs to Ensure Human Resources for the Development of Biotechnology
- o Establishment of a "Bio Techno-belt" for the promotion of R&D Bases of Biotechnology in Korea
- o Strengthen the Infrastructure and Supporting Function for Biotechnological Research and Development
- o Promotion of International Cooperation for Biotechnical Development
- o Improvement of the Institutional and legislative systems to Promote Biotechnological Development.

D. Space Development

1. Background

Nowadays, space development is in its real stage to have meteorological, geodetic and observation satellite as well as the communication satellite to improve the environment and welfare for the mankind, and energy and resources development. Most of the advanced and the developing countries also such as China, Israel, India, Brazil, Spain, and Indonesia participate in the space development actively.

Space technology is a systematic one which covers various areas of aeronautical, electronical, mechanical, material, chemical engineering and physics, which can create new technologies. Thus it is technology-leading, and future-oriented one which is expected to lead the industries in the 21st century, and it will expand its area to global environment, weather forecast, resources observation, new material and medicine development as well as broadcasting and communication.

Space development requires such a long and huge R&D cost, so that it needs to be driven systematically based on national long-term plan. The governmental steering system should establish the respective role of the industries, research institutes, and universities from the beginning stage, to support the activities in concentrated manner.

To establish national long-term plan, Ministry of Science & Technology have carried out collecting opinions from a consulting committee and 4 planning committees, holding a public hearing, gathering the opinions of space related ministries. After all, the long term plan was finalized April in 1996 after the National committee for the Science & Technology.