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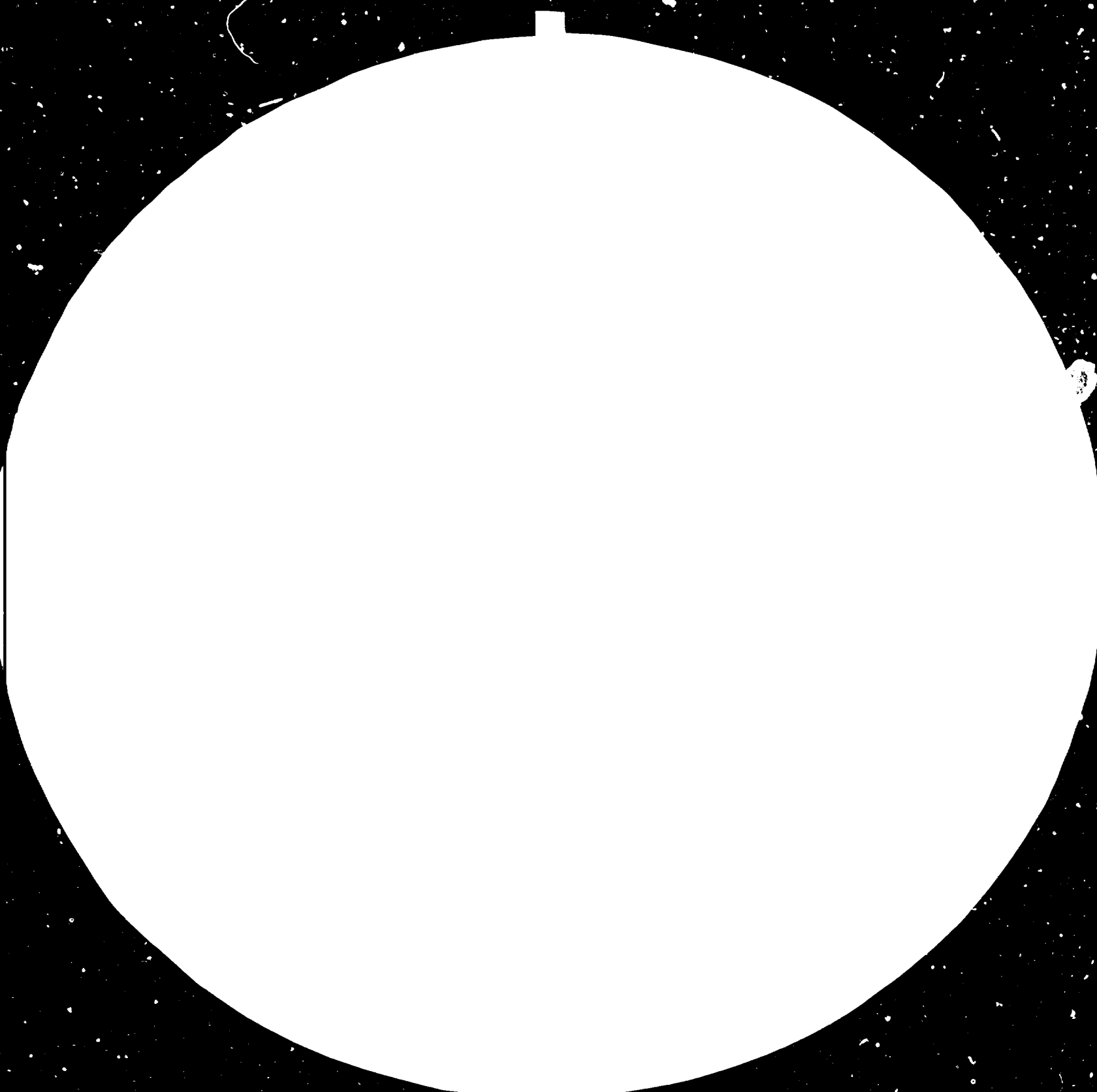

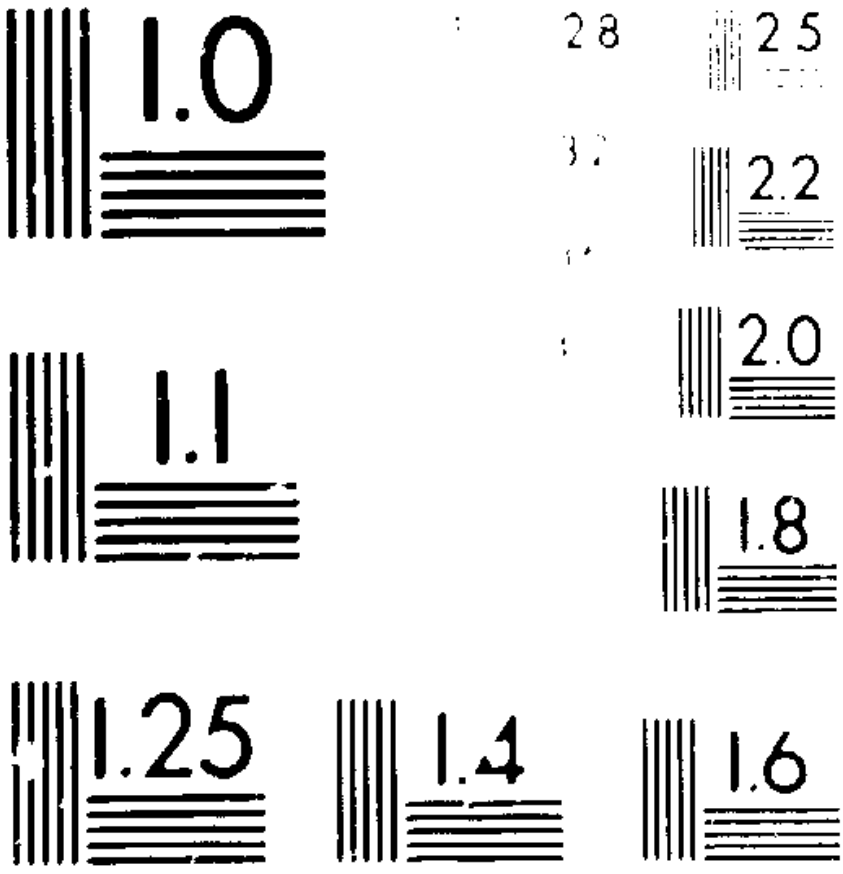

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INTERNAL TECHNOLOGY TRANSFER - ROLE OF RESEARCH INSTITUTE, TECHNOLOGY TRANSFER AGENTS, AND UNIVERSITES IN RELATION WITH COMMERCIALIZATION OF TECHNOLOGY* -

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To achieve the commercialization of new technology, one customarily has to go through the several following steps: (1) Research; (2) Development; (3) Engineering; (4) Testing; (5) Production; (6) Marketing.

In developed countries, the primary role of an independent research institute is the performance of the first two steps. However, in developing countries, generally we need "Trun Key Technology" which means a technology developed as a whole package including market testing ready to be adaptable by industry without serious risk taking.

The first step of commercialization of technology in developing countries therefore starts usually with the process of technology development aiming the substitute of imported goods with domestically produced ones. Since there is a proven market and this is one way to minimize the riskiness of commercialization of a new technology.

The role of an applied research institute has to be diversified to cover not only the R & D steps but also whole steps necessary for the technology transfer to industry. This is particularly so in developing countries.

The development of indigenous technology will be desirable but more practical approch is to identify appropriate technologies already in practise with success.

The institutes in developing countries are also required to provide active assistance for the import of advanced technology and digest it well enough for the successful transfer to industries.

This means that the institute will cast off the passive posture in the development of industrial technology, that is, research for solution of technical problems at industry's request. Instead, it will assume a positive attitude, that is, to play the leading role in the import of technology on the basis of industrial technology demand forecasts and adapt and develop imported technology for transfer to industry.

In order to support the rapid growth of the Korean economy based on the development of heavy and chemical industries, it was necessary to develop industrial technology rapidly, and this could be achieved with imported technologies playing the leading role. The Technology Transfer Center in Korea was established as a part of research institute in 1976. It was designed to help industry import appropriate technology and adapt and develop such technology for successful application to production. In other words, it helped industry identify and import the technology it badly needs on favorable conditions and terms through its technical counseling program. It also provided assistance in industry's efforts to adapt and develop imported technology through its after-import follow up, cooperating with research activities.

However, industries are generally reluctant to disclose the details of technology they want. The management of TTC has been so cerefully done to establish sound and trustable

relations between customers and center.

The research institute accelerated commercialization of research results by establishing the Korea Technology Advancement Corporation with 100 per cent of the institute investment in 1974. This has solved two problems facing the institute-the problems of inactive commercialization of research results due to the lack of an adequate entrepreneurship and the finance.

Experience tells that business cannot thrive with technology only. Management capability and other non-technological factors are as equally important as technology in business. K-TAC studies research results in an objective manner, that is, from the viewpoint of a businessman, and prepares a concrete plan for commercialization of research results on the basis of such study. Then it selects an appropriate company capable of commercializing the studied research result or establish a joint venture firm with it for commercialization, or construct a factory at its own cost and sells it to industry in package-deal after commercialization proves successful in such a factory.

Through K-TAC, the institute could accelerate commercialization of research results and develop new research projects urgently required by industry. In addition, marketability study of new products is possible through sales of experimental products and side products of research projects.

K-TAC has established four companies-two in joint venture with local business firms, one in joint venture with a foreign firm and one with direct investment. These companies are now under business operation. In the years to come, K-TAC will establish new firms in the form of joint ventures, holding company or direct investment in order to insure successful

transfer of the institute developed technology to industry, and if all goes smoothly, K-TAC will make business profits also.

Dr. D. F. Hornig, former President of Brown university has made a clear statements on the role of an institute as follows:

1) to serve as a researvoir of technical and scientific knowledge and talent on which the country can draw whenever appropriate.
2) to acquaint industry and government with the state of technology in various areas in advanced countries so that
   a) sound investment decisions to purchase know how can be made and
   b) future possibilities and competitive positions can be realistically appraised.
3) to help industry to maintain quality controls and technical standards at world levels
4) to adapt foreign technologies to take maximum advantage of local raw materials and labor skills
5) to develop new products and processes. It seemed unlikely, though, that a new institute would develop entiely, new technologies for a considerable time after its founding.
6) to help industry to solve technical problems as they arise and to constantly improve the economics of their products and processes
7) to help develop technical management skills in industry.

Dr. Ronald W. Schmidt, senior vice president, Gereral Electric Company, has emphasized the recognition of the research university system.

He said that the system of research universities in the states was one of the nation's oldest and greatest strengths. He has also pointed out that "If we are really serious about the health of our universities, we should increase the flow of federal funds for basic research to them.

Another vehicle for technology development that builds on resources already in place in the university system in the growing number of university-industry research arrangements. There has been enormous ferment in this area over the past few years. It is now hard to find a major university that does not have some sort of new institutional arrangement with industry. The United States already has a greater tradition of effective industry-university cooperation than any other nation in the world."

Dr. Marshall Ledger, associate editor of the Pennsylvania Gazette, has remarked on the changing relations between business and universities. Universities have ideas and need money. Industry has money and needs ideas. The scientific and financial gains on both sides can be spectacular. But there are risks as well: The money may seems to have been wasted if the research comes to nothing or goes in an unexpected direction.

And there are intramural concerns: Will university faculties be torn apart if members of the same department are funded by competing companies? Will they be able to engage their students in the projects?

Such questions, not all of them new, have become more pressing in recent years because the research stakes have been raised considerably.

And also many of the industry-university arrangements are at the cutting edge of new science-based technologies such as

biotechnology, mocroelectronics, and robotics.

Even though the relations between business and universities has been promoted in various manner, yet there are also difficulties to overcome. Transfer of the experiences in the developed countries to the developing countries has to be implemented in accord with their needs and levels of development.

Vice President A. Keynan of the Hebrew University of Jerusalem has stressed the important role of universities in the development of the country.
He pointed out that there has been an involvement of universities in the process of industrialization of Israel. The most important method, he explained, is to create the science based or know-how industries on ideas born at university level. University then tries to sell the idea to industries, or create industries to manufacture innovative products. This method has brought some modest success in Israel.

The original aim of University research is to make the students aware and keep them abrest of the developments of new knowledges in science and engineering. The industrial research mostly oriented toward commercial technology development is somehow different from the university's intrinsic aim of education. However, the cooperation between universities and industrial research institute in the research stage has to be emphasized. In Korea, as many other developing countries, we are lacking of well experienced researchers. How to organize indigenous research teams effectively is a key to the success of technology transfer. The nature of research project is becoming more multidisciplinary and the mutual respests and cooperation among scientists in the community is one of the significant elements of the development of science in the nation.

References

(1) Proceedings of the colloquium commemorating the 10th anniversary of KIST foundation (1976)

(2) Science Policy and Development: the Case of Israel National Council for Research and Development(Jerusalem) (1970)

(3) Economic Impact (USIA) No.44 (1983)