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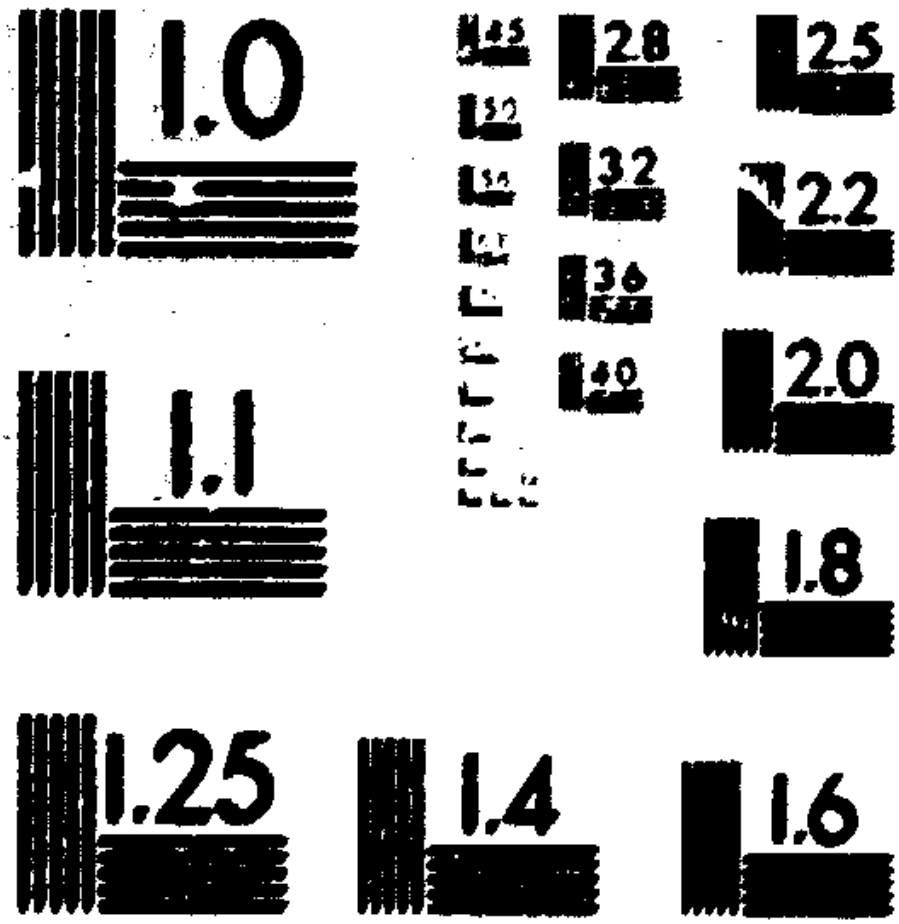

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COMMERCIALIZATION OF INDUSTRIAL RESEARCH RESULTS IN INDONESIA*

by

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INTRODUCTION.

The most important criteria of successful application of industrial research is the commercialization of its research results in industry.

By commercialization, it is meant that research result is being utilized in industry for commercial production, whether during the transfer, financial arrangement is involved or free of charge.

By experienced, unsuccessful commercialization are mostly influenced by factors like : no close relationship between research institutions and industry, financing constraint, uncertain soundness of research results and lack of promotion.

In Indonesia, these factors are also hampering the development of the domestic commercialization of the industrial research results, besides most of the large industries with foreign joint undertakings are receiving their know how from their parent companies abroad. More-over, all the industrial research institutions in Indonesia are government institutions, where as a non profit organization are not allowed to do contract research. All research projects in the institutes are previously planned in a certain fiscal year and the research funds are coming from the government budget, which are limited.

To coup with these bottlenecks, means are taken by increasing the relationship between research institution and industry; changing the law, to ensure government research institution be given the opportunity to do contract research directly with the industry; coordinating and directing research projects to be more responsive to the industrial needs;

establishing a government policy which will regulate the use of imported technology, and last but not least, improving the capabilities of the research institutions itself.

A linkage between regions, by establishing a net work system, where exchange of experiences, techniques and methods on transfer of technology to industries can be obtained, will be very useful for the acceleration of commercialization of industrial research results.

I. COMMERCIALIZATION OF INDUSTRIAL RESEARCH RESULTS

a. Industrial research institutions.

Most of the industrial research institutions in Indonesia are Government institutions, and some of them are research institutions of large Government owned company (e.i. fertilizer and cement industry). Others are owned by private companies where mostly are foreign joint enterprises, who introduce foreign technology from their parent companies; these companies do not see the need for technical services from domestic research institutes.

The industrial research institutions mentioned in this paper are institutions under the Agency for Industrial Research and Development, Ministry of industry. There are nine National and Sectoral Research Institutes who cover the industry according to major group of industries of the ISIC.

The nine research institutes are listed in the Annex, including their scope of work and main activities. Besides these sectoral institutes, who are all located in the most developed and crowded island of Java, there are also nine Laboratory and Testing Institutes with regional scope, seven are located in the other islands e.i. Sumatera, Kalimantan, Sulawesi and Ambon, and two of the remaining are also located in Java .

The main functions of these research institutes are: research and development, engineering, trouble shooting, training, and publications of their research results, where the testing institutes are mainly doing testing for industrial products.

b. State of art of commercialization.

As mentioned above the nine industrial research institutes, including the nine testing institutes are coordinated by the Agency for Industrial Research and Development, but the programmes and selections of their research projects are done by the institutes themselves. The Agency is merely deciding the priority projects related to the needs of the industry and budget allocations. These in-house research projects are financed by the Government Development Budget and their objectives are to solve the problems encountered by the industry.

The above mentioned selected research projects are programmed for the next fiscal year, and once they have been decided, it will be difficult to change them. Typical research projects are: Utilizations of local raw materials for substituting imports, improvement of industrial products, new process design and process modifications and prototyping of machineries: exploring new raw materials and technical assistance to small scale industry.

Except for certain sectors of industry, generally no close relationship exist yet between the research institutions and industry, resulting research projects which are not directly applicable in industry. In cer - tain industrial sector, close relationship exists through Industrial Associations where research institutions are members.

To promote the development of small scale industries, a linkage is established which is called BIPIK. A Government organization, BIPIK coordinate all the technical services needed by the small scale industry. For certain technical services, BIPIK are able to render its services directly to the small scale industries, but it advanced know how is required, BIPIK may mobilize other research institutions. The objectives of their system is to assist the small scale industry improving the products and modernize them for becoming sub-contractors of large-medium scale industry. A deletion program for certain commodities or products is being introduced, so that large-medium-scale industry are not allowed to produce these items. It seems that through this system, commercialization of research results has occured.

For large and medium scale industry, the commercialization process is still in an initial stage or practically non-existent. For the past fifteen years, most of large-medium-scale industries are foreign joint undertakings who introduce foreign technology from their parent companies abroad, which are more up to date than technology owned by the industrial research institutions. In this condition, and without improvement of their capabilities, the research institutions are not in the position to commercialize its research results to large and medium industries.

To ilustrate some example of the commercialization of research results, several case studies is mentioned below.

c. Several case studies on commercialization of research results.

i. water meter housing.

For the production of water meters required by the National Housing Project (PERUMNAS), the Institute for Development of Metal and Machineries Industries (IDMMI) formed a joint project with the National Instrumentation Institute of the Indonesian Institute of Sciences. IDMMI is responsible for the production of the water meter housing. To produce the metal housing, several small scale industry complexes was mobilized. The prototype and technical assistance was given by IDMMI to the small scale industry. During the early stage, the capabilities of the small scale industry was very low, but with constant guidance and introducing new techniques, including standardization and quality control, the project was a success. The project which lasted one year has produced 200.000 water meters housing with a total value at about US $ 1.500.000.- the quality of the waters are comparable with the imported one.

ii. Military personnel supply.

Two industrial research institutions e.i. Institute for Research and Development of Textile Industries (IRDTI) and the Institute for Research and Development of Leather, and Allied Industries (IRDLAI) was given the task by the Indonesian Army to design standard military supply for personnel e.i. shoes and textile for uniform. The production of the comodities was given to medium scale industries.

The prototypes are field tested, redesign and finally accepted, and is now becoming a standard commodity for the Army. The annual total sales values for both commodities e.i. shoes and textile for uniform is estimated about US $ 1.500.000 and US $ 5.000.000 repectively.

iii. Commercial vehicle (mini truck).

With the increasing capabilities of domestic industries to produce automotive parts (about 60 % at the various parts needed), a prototype of a commercial vehicle is designed by IDMI. This 2 tons mini truck is designed using all the local components available and it intended to be a standard commercial vehicle in the future. The prototype is then tested, using standard procedures and the results are promising. No positive response was received for product development and commercialization of the prototype from the local automotive industries, of whom all of them are extension companies of well known automobile producers in the world.

II. PROBLEMS ENCOUNTERED DURING COMMERCIALIZATION.

From the past experiences, several critical problems are identified :

a. That existing law / regulations might hamper the process of commercialization of research results especially for Government research institutions.

b. No positive response is given by large industries with foreign joint undertakings for the commercialization of domestic research results; since their technology back up comes from their parent company.

c. No close relationship existed between the research institution and the industry, so that many research projects are directly applicable in industry through commercialization, or that the research results are only at exploratory research stage with no clear prospects.

d. Limited capabilities of the research institutions, for some institutions are not able to keep abreast with the development of new technology.

III. MEASURES AND MEANS FOR COUPING THE BOTTLENECKS.

To coup with problems and bottlenecks encountered during the process of commercialization, meanners and means have been taken, by:

(1) Changing the regulation/law for Government and research institutions, which enable them to conduct contract research directly with the industry. This opportunities will give the institutions experience and made them more responsive towards the needs of industry.

(2) Establishing linkages and setting-up mechanism of net work between the research institutions and industry through Industrial Association, where the institutes are members. These linkages will help set-up close relationship between institutions and industry.

(3) More accurate selections of in house research projects to the direct needs of industry. The right selections of the projects will ensure. More effective application and commercialization of the research results.

(4) More active promotion and publicity of research results especially those who successfully commercialized by the industry. It will informed the industry of the existance of research institutions in the country.

(5) Strengthening and improving the institutions capabilities, through joint research cooperations between domestic research institutions with similar institutions in developed countries. With the increasing capabilities of the institutes, it will help to change the image and trust of the industry toward research institutions.

(6) Recommending certain measures, e.i.; establishing national policies for regulating imported technology especially for large industry with foreign undertakings, gives incentives for industry who is willing to commercialize a certain indigenous research results, and establish a regional network between less developed countries to improve and accelerate the commercialization of the research results of its

member country.

IV. SUGGESTION FOR A REGIONAL NETWORK.

To accelerate the commercialization of industrial research results, especially in the less developed countries, a regional network between these countries sponsored by UNIDO should be organized.

The main functions of the network would be to suggest:

(1) A periodic exchange of methods and techniques on the commercialization of research results.

(2) Mutual visit of senior officials, in charge of commercialization of research results in their countries.

(3) Training programmes in the commercialization of new products and processes, especially for commercialization know how and management.

(4) Seminars or workshops, in which research results, problems encountered during commercialization and other special subjects of interest between research institutions and industry can be presented and discussed periodically.

Such a cooperative network would make better use of the limited facilities, research staff and financial resources in the member countries.

In connection with this regional network, the cooperation of Governments of each member country would be necessary

ANNEX

LIST OF INDUSTRIAL RESEARCH INSTITUTES

UNDER THE

AGENCY FOR INDUSTRIAL RESEARCH AND DEVELOPMENT

MINISTRY OF INDUSTRY

NO	NAME OF INSTITUTE	ABBREVIATION	SCOPE OF INDUSTRIES	MAIN ACTIVITIES
	Institute for Research and Development of :			
1.	Chemical Industries, Jakarta.	IRDCHI	- Pesticide, fertilizer, and plastic.	- Early stage on formulation techniques. - Standardization of plastic, fertilizer and rubber components.
2.	Agrobased Industries, Bogor.	IRDABI	- Edible oils, food and other agricultural product.	- Improvement of essential oils process. - Design and prototyping of agriculture equipments.
3.	Textile Industries, Bandung.	IRDTI	- Textile, spinning, knitting, weaving, finishing.	- Feasibility studies. - Design machinery e.i : weaving loom.
4.	Cellulose Industries, Bandung.	IRDCLI	- Wood and non wood based.	- Pulping techniques of various raw materials for paper and disolving pulp. - Product design for special paper e.i : cigarette, computer paper.
5.	Ceramic Industries, Bandung.	IRDCRI	- Art ceramic, refractory and glass.	- Process design for refractory - Development of ceramic raw materials and the improvement of production process.
6.	Metal and Machinery Industries, Bandung	IDMMI	- Metal working - Machinery.	- Design mould and dies. - Design and prototyping of agricultural machineries.
7.	Materials and Technicals Product Industries, Bandung.	IRDMTPI	- Quality assurance.	- Quality assurance for pressure vessel and boilers.
8.	Leather and Allied Industries, Yogyakarta.	IRDLAI	- L e a t h e r - R u b b e r - Syntetic leather.	- Improvement of tanning processes for various kind of leather. - Leather, especially foot wear, and limited industrial leather product.

1	2	3	4	5
9.	Handicraft and Batik Industries, Yogyakarta.	IRDHBI	- Batik, and - Handicraft; brass, silver.	- Promotion and improvement of the quality on batik and handicraft, especially for export.
	Laboratory and Testing Institute for Industrial product in :			
	Banda Aceh, Medan, Palembang, Surabaya, Banjarbaru, Ujung Pandang, Manado, Ambon.		- General industries	- Testing of material products.

Remarks : All these institutes are involved in :

- giving technical assistance to small scale industry
- industrial standardization (preparation and application)