OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

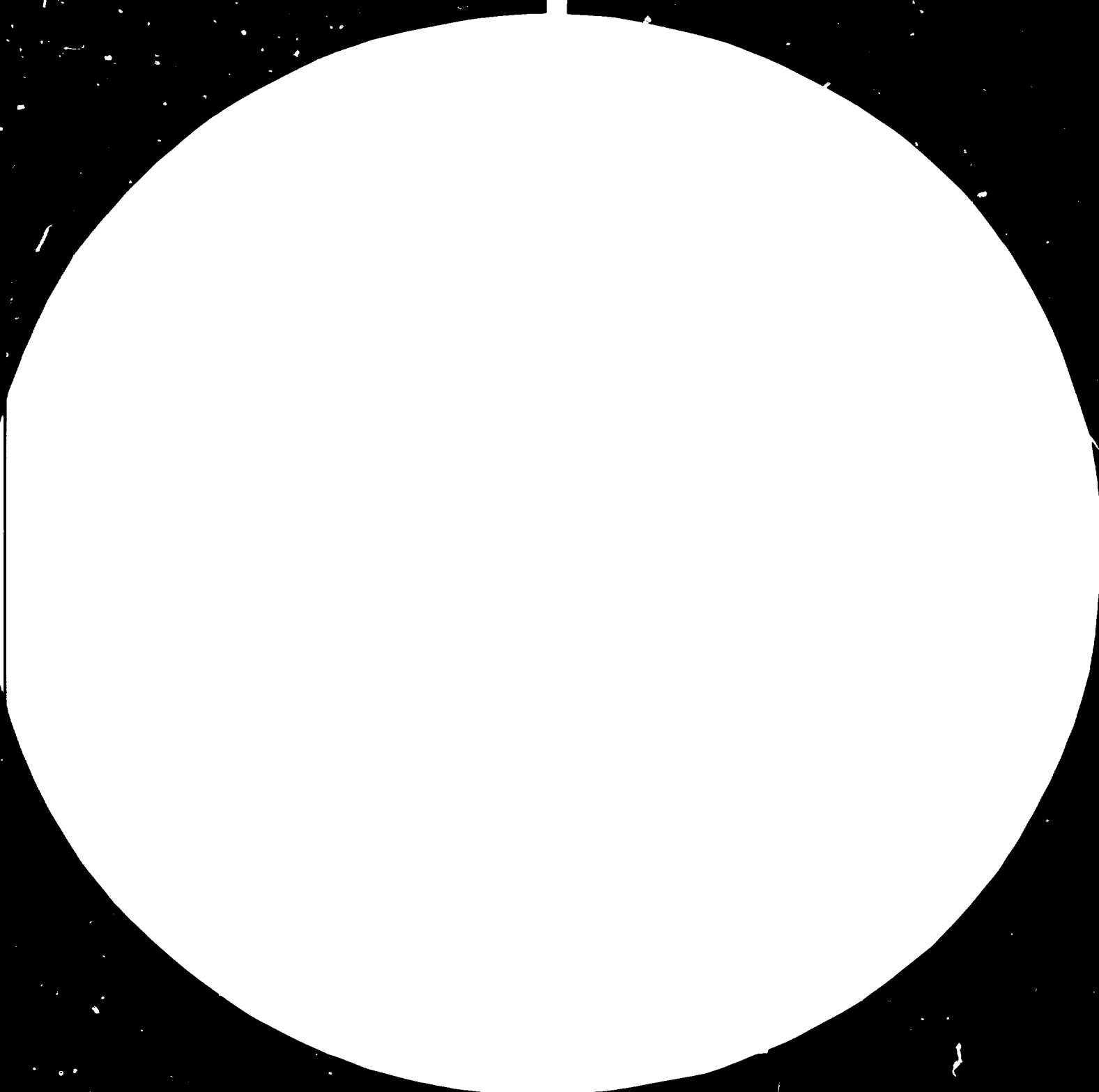
FAIR USE POLICY

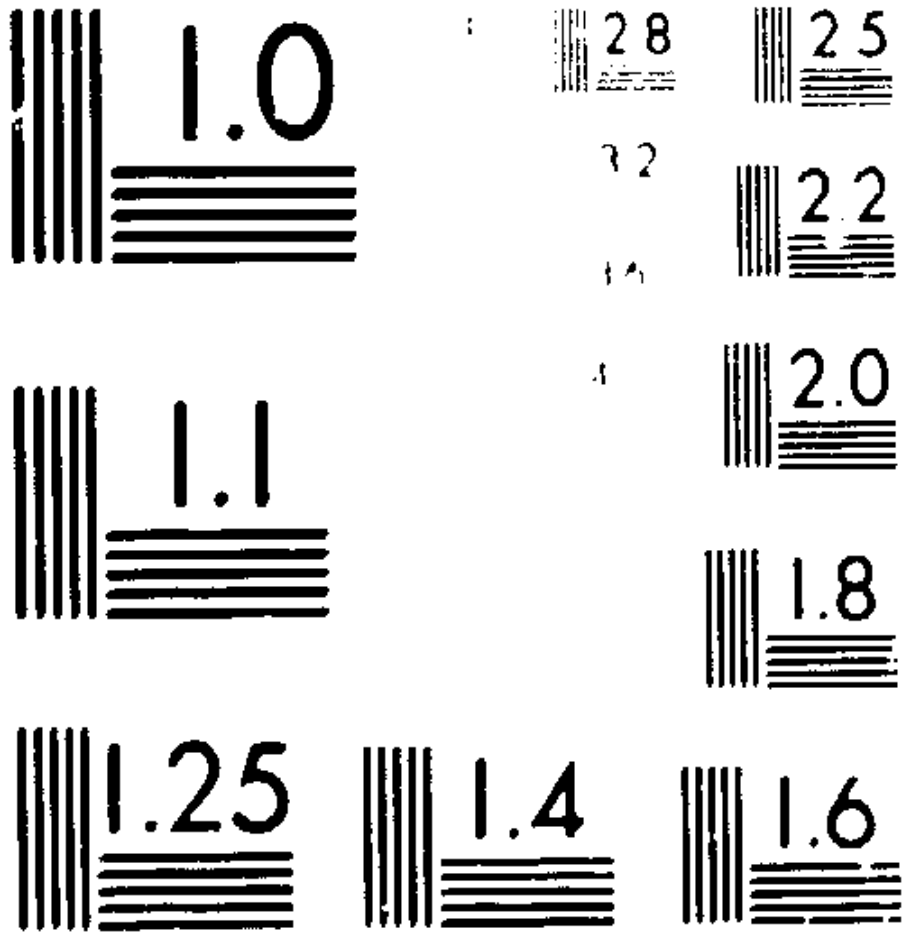
CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org




1.0
2.8
2.5
3.2
2.2
2.0
1.1
1.8
1.25
1.4
1.6

09655

Distr.
LIMITED

UNIDO/EX.116
29 May 1980

ENGLISH

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

UNDP/UNIDO STAFF WORKSHOP

on

INDUSTRIAL RESEARCH AND SERVICE INSTITUTES

2 - 4 June 1980, Vienna

Effective Utilization of IRSI Services and Research Findings in Developing Countries *

A paper prepared by

JOAQUIN CORDUA
Consultant

* This document has been reproduced without formal editing. The views expressed are those of the author and do not necessarily reflect those of the UNDP or UNIDO.

INTRODUCTION.

To start with, I would like to clarify two points. The first one is that my professional experience comes only from working in Latin America. Therefore, the statements that follow are probably somehow biased, in spite of the efforts I made to introduce the findings of colleagues from other regions. The second point is that a thirty minutes presentation about "Effective Utilization of IRSI Services and Research Findings in Developing Countries", necessarily has to be very schematic. In this case, the simplification intends to underline what I consider the most critical problem of many IRSIS, which is the very limited impact they have on the local industry.

ACTUAL UTILIZATION OF IRSIS SERVICES.

A large part of the work performed by many IRSIs seldom reach the implementation stage, regardless of their technical quality. Many different studies about IRSI agree in this conclusion.

The final report of the "Joint UNDP-UNIDO evaluation of IRSI"* made the following assesments:

---------- /....

* UNIDO/75-4411, 19 April 1979, p.46-8.

Industry, in general, is often reluctant to use IRSI services. other than for routine analysis and testing, quality control, etc., for a number of reasons, including:

- Lack of information about IRSI objectives and functions;
- Lack of confidence in IRSI knowledge and experience in industrial problems and competence on specialized industrial technology;
- Belief that IRSI fees and costs are unreasonable;
- Lack of IRSI appreciation of the cost/benefit industrial motivation.

The same evaluation considered that the overall contribution made to industry was in the two lower categories of a five grade scale, in five out of seven Institutes analysed through field visits. Of course, most of them performed much better than the one evaluated by a distinguished British engineer some years ago. He said: During sixteen years not a single product or process developed by a 600 IRSI men in Asia was industrialized. Of the total staff only four had previous industrial experience. Of the eighty projects under work, many were running for more than ten years, without evaluation.

If, instead of considering the amount of services supplied by the IRSIS to industry, we look at the relationship from the other side trying to quantify the fraction supplied by IRSI of the total technology received by indust , we will also reach to the conclusion that IRSI's contribution is marginal.

/....

One of the few quantitative studies about this subject was recently published by professor Thomas Allen of the Sloan School of Management (M.I.T.)*. His data about the Irish industry agree with the conclusions of studies made by Maguire and Kentch in Australia and Ghirardi in Brazil (Table 1).

TABLE 1

PRINCIPAL SOURCES OF TECHNOLOGY FOR INDUSTRIAL FIRMS

Source	Ireland	Brazil	Australia
Contact with domestic firms	11.4 %	17.6 %	
Contact with foreign firms	47.9 } 59.3	14.7 } 32.3	91.7 %
Government-sponsored research institutes	1.4	2.9	2.9
Trade fairs	6.4	2.9	-
Publications	9.3	8.8	2.9
Other	23.6	52.9	2.5

Australian data from Maguire & Kentch (1975)
Brazilian data from Ghirardi et al. (1976)
Irish data from Allen (1977).

/....

---

* Thomas J. Allen.- "Transferring Technology to the Firm: A Study of the diffusion of Technology in Irish Manufacturing Industry". Sloan School of Management, M.I.T., Cambridge, Mass. U.S.A., June, 1977.

Finally, if we look at the willingness of the users to pay for IRSI's services and research as a particularly meaningful indicator, we will also find that in the great majority of IRSI,. income from services and research sold is very low.

In most developing countries, we certainly do not expect a full recovery of the total costs of IRSI. Nevertheless, in an IRSI that has reached a healthy relationship to industry, at least a 40 to 60% self-financing of the operational costs should be expected.

The Evaluation Report identifies several reasons that explain the lack of real demand for IRSI services:

- in least developed countries, industry has not reached the state to be aware or to recognize the need for IRSI functional services.
- large scale and sophisticated industry in more advanced developing countries provide its own basic services and sometimes R & D, particularly if this industry is part of multinational companies.
- medium scale and national industry usually requiere basic services, but they have not fully appreciated the potential benefits of R & D.
- Governments in general have taken few measures to stimulate the use and effectiveness of IRSI.

Without discussing the reality of these statements from a practical point of view, an important issue is how we manage to adapt IRSI to the characteristics of the existing industries and goverments. The recommendations that follow are based on the need to introduce some changes in strategies, organization and in the general approach of IRSI to project development, so as to adequate their work to actual clients, with all their limitations.

One of the more effective ways to improve the utilization of IRSI's potentialities is the creation of a special unit, whose aim is the marketing of IRSI services and research findings.

The setting up of these units very often comes only after the IRSI has been trying for years unsuccessfully to develop a closer relationship to industry.

Considering that in developing ccuntries most industrial firms and government institutions are not aware of the need of technological services, an aggressive promotional effort is absolutely essential.

It is not easy to reach a good level of mutual understanding between an IRSI and an industrial firm. In fact, the representatives of both parties are quite different.

The industrial entrepreneur must operate at minimum cost, facing competition and changing market conditions, a situation that normally involves important risks. In order to succeed, he has

to coordinate a large number of productive factors. Technology is only one of them and often he does not consider it the most important one.

On the other hand, the IRSI is a non-profit institution, a public service. The basic motivation of its members is professional achievement. They have mainly a technical perception of problems, neglecting usually the economic and commercial aspects.

Most IRSI were created without a previous market study for their products. Certainly, it is not easy to carry out a meaningful market study for a new kind of service when it is necessary to start persuading the future users that they really need such a service. In most cases an IRSI has to be already established in order to develop a demand for its products. That is the reason why many IRSI are not the result of a feasibility study, but of the will of a government to foster the industrialization of the country through the supply of local technology.

But once the IRSI has been established, if there is not a systematic effort to identify what services industry and government are willing to use, the most likely result will be to end generating products that nobody wants and solving problems no one is really interested in.

An important step in this process can be reached through the selection of the main fuctional activities of IRSI.

/....

In my opinion, an IRSI still in the stage of gaining confidence of industry, should not devote more than 20 to 30% of its effort in research and in the development of new technologies for its subsequent commercialization. The main part of the work should follow the "pull approach", starting from the problems or opportunities met by a particular client, and attempting to work them up jointly with him, always using the shortest and less costly way available. Sometimes this approach will include research and development, but in most cases the solution will be to buy and to adapt already proved technology. The accomplishment of a number of increasingly complex transfers of technology will give IRSI the necessary experience to undertake more ambitious, creative, tasks.

Therefore, the main contribution that IRSI can provide to enterprises will lie in an intermediate level, between R & D and the planning and execution of industrial projects as done by engineering firms. This intermediate area includes activities such as:

- Venture analysis, consisting of market studies and a survey of the technical, financial and economical components of new projects which, as a whole, allow to make an investment decision.
- Comparison of alternative production processes from a technical and economical viewpoint.

/....

- Search for evaluation and selection of technologies, specially as part of an operation of transfer of technology.
- Adaptation of processes and products to changes in scale, in cost factors, in specifications of the final product and substitution of raw materials.

Most IRSI in developing countries do not pay the necessary attention to this type of work, but overemphasize the technological elements in industrial problems. Very often this is due to the difficulties encountered by IRSI as to attract and retain professionals with industrial experience and with a good techno-economical training.

The acceptance of transfer and adaptation of technology as a preferential field of work for IRSI, will probably meet some internal resistance. On the one hand, it may appear as an activity of less prestige than that of R & D. On the other hand, IRSIs have usually considered the creation of technologies required by local industries as their primary task and have visualized the transfer of technology as a competitive process, limiting the development of local technology.

The very serious difficulties met by IRSI in the achievement of an effective impact on industry should not lead us to the conclusion that IRSI are not appropriate institutions for developing countries.

Most firms in developing countries lack internal capacity for creating and adapting technology, and governments also need assistance in this field. Therefore, the existence of independent centers capable of fulfilling these functions is indispensable for achieving a sound level of technical development.

The very fact that several IRSI succeeded in overcoming the gap that separated them from government and productive sector, shows that IRSI can be both viable and useful institutions.

THE MARKETING OF IRSI SERVICES

When we speak about marketing IRSI's services, people usually think of the relationships with private industry. But the process of convincing potential clients is very similar in the case of government institutions, if the differences in motivations are considered. Thus, the tasks of a Marketing Department have to cover all types of IRSI clients.

The Marketing Department in an IRSI should play a role of leadership, be in front of the organization, identifying viable new opportunities through advanced studies of markets for new products and potential uses of the resources of the country. It should also provide a practical commercial orientation for all IRSI programs, building an effective team work among technical, economical and commercial specialists.

We must remember that technology cannot be economically commercialized without a clear undestanding by both parties of the

situation and objectives of the other party, which means an effective two-way communication process. To establish that communication is the main responsibility of the Marketing Department.

Another measure that can improve the IRSI - industry relationship is the training of executives of industrial firms in Management of Technology, what means, in the efficient administration of technical knowledge as a productive factor. A special course on this subject will be held for Latin American countries in Chile next September, as part of a program sponsored by UNDP.

Now I would like to present the experience of two Latin American IRSI that are seriously trying to overcome their lack of impact on industry.

Both are multisectorial institutes, of similar size, with 70 to 90 professionals and operational budgets of US$ 3 millions to US$ 4 millions yearly. At the time when the marketing function was strengthened, they were already operating for five and six years. Their level of income from sold services was abount 10% of the expenditures.

Initially both institutes had practically the same organizational chart, represented in Fig. 1. This figure shows that both IRSI had about twelve technical units integrated in four departments. Each department covered a specific industrial branch: food,

/....

chemistry, mechanics and electronics. In addition to that, both had a Department of Administration and Finances. Marketing specialists were assigned to each of the technical departments.

This type of organization originated the following problems:

1. The individual projects were generated at the lower levels of the organization, mainly reflecting the interests and personal capacities of the technical staff, instead of the actual needs of industry and government.

2. Due to the way the projects were generated, an to the lack of an integrating force or mechanism in the institution, excepting the role of the director, no interdisciplinary work was performed.

3. In this kind of organization it often occurred that the same people generated the projects, executed them and finally evaluated the results.

4. Progress of the marketing function was limited tue to the non existence of a specialized marketing unit.

During its fifth year of existence, one of the IRSI created a marketing group, reporting to the director (See Fig.2). The main functions of this group are to stimulate a stronger marketing activity of the technical staff, and to assist them in procuring contracts.

/....

Projects originated in industry are usually more complex, often demanding an interdisciplinary approach.

The lower part of Fig. 2 shows the evolution of the incomes from services sold by the institute.

After the introduction of the marketing groups in 1974, the income coming from services sold increased sharply, reaching a level of almost 50% of the operational cost.

The second Institute recently designed a more radical solution to solve its isolation from industry and government, as is shown in Fig. 3.

All the technical activities are integrated in only two large departments: one for Marketing and Project Development, and the other for Operations.

The main function of the first Department is to identify potential users of IRSI services; to coordinate the formulation of the corresponding projects and to provide assistance in the contracting process.

The main function of the Department of Operations is the execution of the projects.

The most important advantages of this type of organization are:

/....

1. The projects reflect the actual needs of the users.

2. The amount of incomes from services sold tends to increase.

3. The Department of Marketing, which is placed at the same level as the Department of Operations, is involved not only in the selling of projects but also in the control of their efficient execution. This establishes a healthy system of check and balance between both departments.

Finally, I think that the problems faced by IRSI in developing countries, as the one just described, make it worthwhile that a larger part of international technical cooperation be devoted to the improvement in the performance of already existing institutes. UNIDO could thus play a very important role in transferring successful experiences among the IRSI and in supporting the necessary changes.

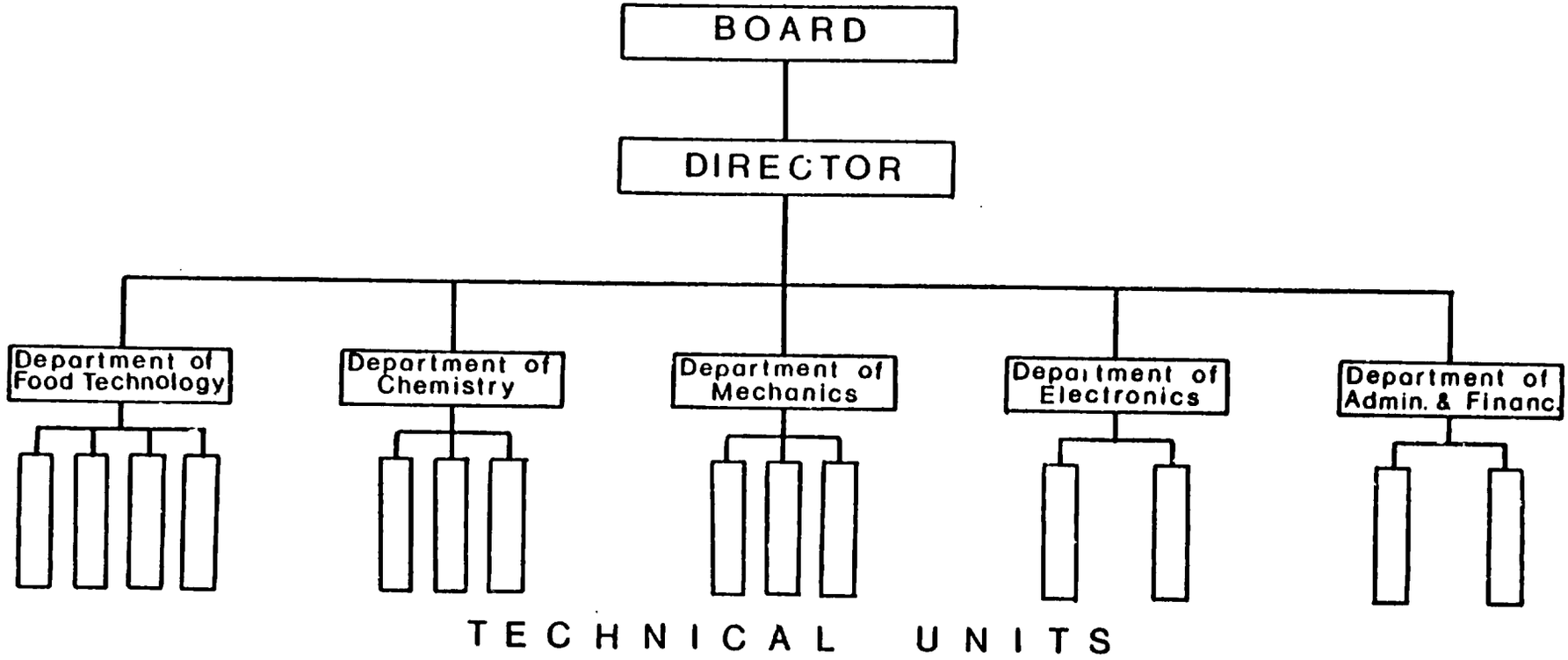
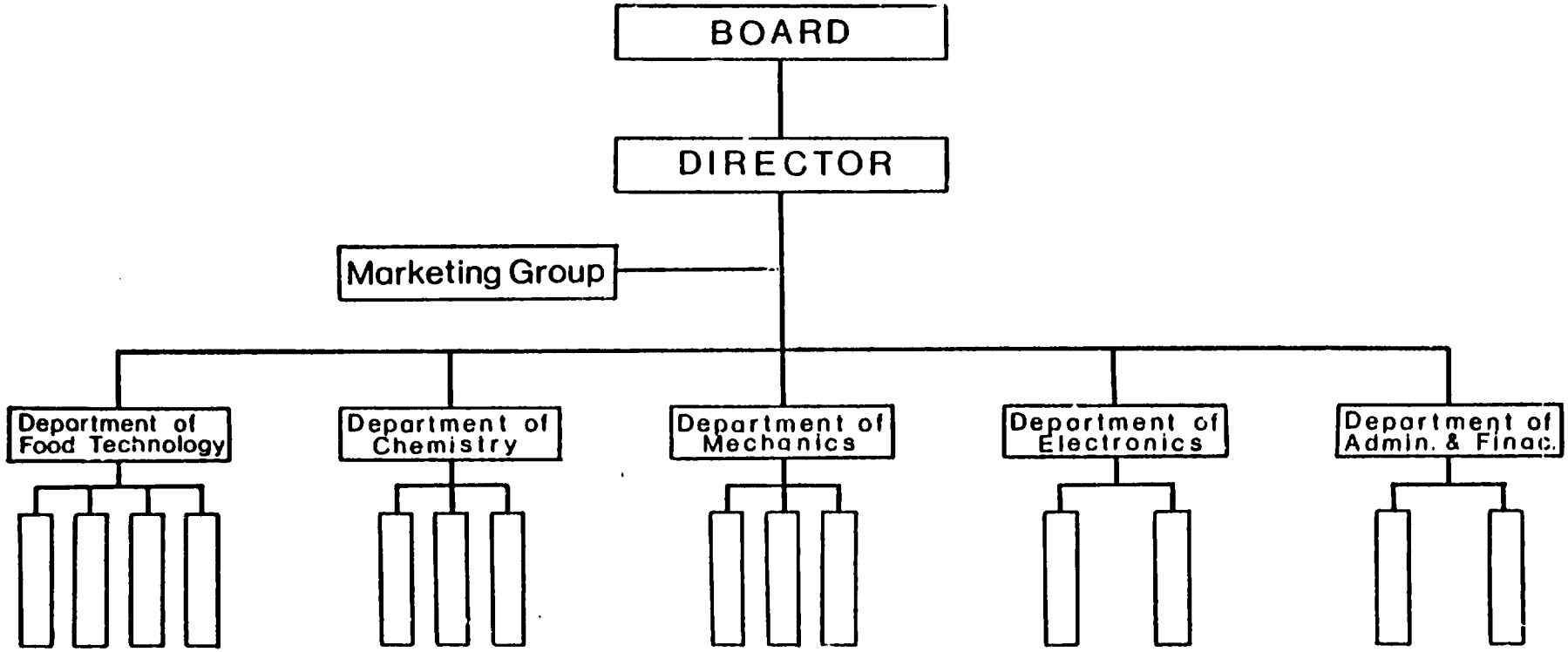
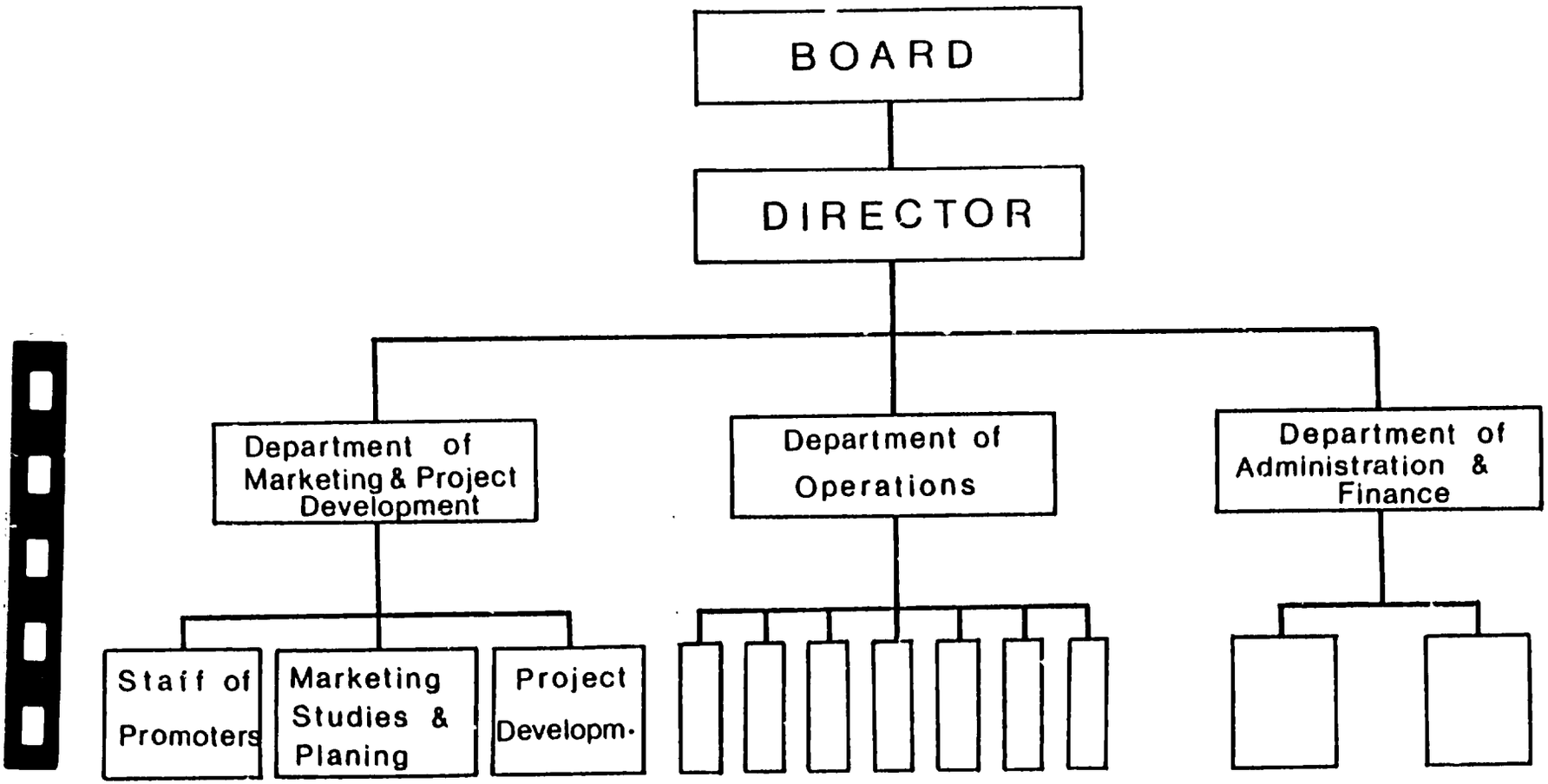

BOARD
DIRECTOR
Department of Food Technology
Department of Chemistry
Department of Mechanics
Department of Electronics
Department of Admin. & Financ.
TECHNICAL UNITS

Fig. 1



Year	1970	71	72	73	74	75	76	77	78	79
Percentage of cost financed through services sold	12.9	4.3	3.3	6.5	15.2	38.4	46.2	48.2	42.6	48.8

Fig. 2



TECHNICAL UNITS

Fig. 3