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THE INDUSTRY FILE SYSTEM:

A PROGRESS REPORT ON A PROJECT FOR AN INDUSTRIAL PROGRAMMING DATA BANK[1/]

1/ This is an abbreviated version of the UNIDO document "The Industry File System: Report of the East African Working Party on Industrial Programming Data, Nairobi, 24 - 29 November 1969". Copies of the foregoing are available upon request to the Industrial Programming Section, United Nations Industrial Development Organization, P O Box '0', Vienna. This document has been reproduced without formal editing.

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TABLE OF CONTENTS

THE INDUSTRY FILE SYSTEM

I. INTRODUCTION

1. In 1967, a recommendation was made by the Athens International Symposium on Industrial Development to the effect that:

> UNIDO should immediately explore . . . the possibility of putting into effect a "data bank" service, in order to create a permanent effective machinery for systematic centralization and exchange of information to be available at the national, regional and international level.

2. As a result of this recommendation a programme of research and development was launched in early 1968, and by the end of that year UNIDO convened the First International Working Party on Industrial Programming Data to review progress on this matter.[1/] One result of this meeting was a series of recommendations and guidelines for the further development and specification of such a project. Subsequently, after the completion of additional studies and research on this subject, UNIDO convened the East African Working Party on Industrial Programming Data in November of 1969, to consider the proposal in a greatly expanded form. The substantive results of the Working Party's considerations are summarized in the following report.

3. The Working Party made it very clear that the Industry File System (IFS) proposal in its current state of development is not intended to present a fully specified, finally determined, "optimal" information system which can be regarded as being universally appropriate for any and all development contexts. Rather, what is available at this point is a

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1/ A summary and report on this meeting is currently available in the form of a UNIDO Document "Industrial Programming Data: Report on the First International Working Party on Industrial Programming Data" (ID/42) English only.

moderately detailed general development methodology on the strength of which a national data bank or alternative information system proposal can be designed and instituted in an efficient, cost-saving manner.

4. Before serious consideration can properly be given to the prospects for establishing an IFS, it is necessary that the relevant authorities in a given country be in general agreement

- that accelerated industrial development hinges on active and effective planning and decision-making at all levels of the economy;
- that industrial planning, in turn, must be supported by an adequate, flexible, and timely supply of information on the industrial sector and its chief sub-sets, as well as on the economy as a whole; and finally,
- that all such data should be made available by means of properly institutionalized, cost-effective procedures.

Clearly then the IFS will represent an appropriate undertaking in only certain kinds of developing countries

5. There must also exist a general willingness and determination on the part of those individuals and organizations who are concerned at the national level with the supply and demand aspects of the data problem to work out a comprehensive, institutionalized approach It should be fully recognized that the sort of remedial action that will be required to support an IFS will demand considerably more effort and dedication on the part of its sponsors than the more easily implementable short-run expedients, which usually entail little more than a tinkering with the existing system or coming up with partial, ad hoc "solutions".

II. BACKGROUND

6. One common characteristic shared by a large number of developing countries is that the entire series of activities associated with the word "planning" have gained increasing significance at all levels of activity in the national economy. Not only is there an ever greater quantity of activities making use of both macro planning and project programming techniques, but, what is equally important, these activities

are becoming increasingly data-intensive. A chief result of all this is that as planning techniques are more widely used and accepted in the developing countries, the overall demand for data and other informational inputs is witnessing more than proportional growth.

7. It is precisely at this point that the problem-focus of the IFS proposal emerges. The sharp increase which has been registered in overall demand for a different quality and larger quantity of supporting background data has not been met by a proportional increase in institutionalized sources of supply. In most countries, the problem of the data gap is being "met" by one or both of two sets of expedients, each of which suffers from certain inherent limitations.

8. On the one hand, the ad hoc, often rather personalized, data search activities which are generally relied on to fill the gap in the short-run have proven not only too expensive to accommodate on a suitably broad scale, but also grossly inefficient in the larger perspective. As a "solution" to the data gap, this approach proves, thus, doubly costly from the view-point of the society as a whole.

9. On the other hand, all attempts to deal with the long-term institutional aspects of the problem by generating improvements in the existing national statistical apparatus are, while certainly of great importance in the long-run, likely to remain handicapped by the prevailing interpretations of national rules and conventions concerning aggregation and statistical confidentiality.

10. Thus, it must be recognized that there is a high priority need for the rapid development of supplementary data systems at the national level in many, if not all developing countries. Furthermore, such systems should be designed to yield relatively quick results; focus entirely on just those pieces of data as are urgently needed for current analysis-planning-policy purposes; and be developed with a careful eye to both the opportunity and total cost implications of the selected alternative.

III. THE IFS METHODOLOGY OUTLINED

11. The IFS proposal does not so much imply a new technology in a physical sense as it is an imaginative attempt to apply available analytic and processing techniques in a thoroughly practical manner to the problem at hand. Few of the individual elements of this proposal will, in themselves, be novel to informed observers. Indeed, the major themes of the proposal, that is, "industrial planning", "register of businesses", "computer facilities", "enterprises harried by too many questionnaires", "gross under-utilization of existing sources of information", etc., have all been talked over many times in the context of the developing countries. However, this proposal intends to override the deficiencies of that familiar genre of data bank concepts whose early over-statement, and subsequent under-achievement, have left many disillusioned critics in their wake.

12. Accordingly, to avoid the many problems which have plagued past efforts in this field, every attention must be paid to developing this project in a fully pragmatic, use-oriented, cost-conscious way. Thus, these very characteristics have been specifically built-in as explicitly stated objectives of the project.

13. Programme Objectives: To develop an open-ended project development procedure, capable of providing for:

- the systematic analysis of the data requirements for industrial planning at all levels within the given economy;
- the identification of those required bits of data which are not adequately provided by existing systems;
- the phased development of a readily implementable, fully institutionalized, use-oriented data supply system capable of supplying the above data on the basis of a comprehensive cost-effective approach.

14. Side conditions: Since it is likely that many of the individual pieces of data which are to be provided by the proposed data supply system may currently be being sought by the regular national statistical programme, it is important to recognize the fundamental differences which distinguish these two basic approaches to the data supply problem.

- On the one hand, the national statistical agencies are primarily concerned with long-term programmes of up-grading the statistical base of the entire economy for a very broad spectrum of rather loosely defined purposes
- The goal of this proposal is, by contrast, to create a partial information system structured with attention to the pre-specified needs of a limited, but critically important, sector of the national economy.
- It is anticipated that by concentrating on a very limited quantity of data, the IFS should have a substantial advantage over existing data supply systems in terms of supplying data with the appropriate degree of
  - disaggregation,
  - freshness,
  - availability, and
  - accuracy,

  given the requirements of a specified set of users.
- Finally, the proposed system should properly be viewed to some extent as a "holding" operation which must be developed in full harmony with existing statistical programmes in the expectation that the latter can eventually be expected to expedite and expand their own systems along more operationally-oriented lines.

15. The programme objectives as stated above can be attained in a variety of ways. The general methodology associated with this proposal has been summarized in the following paragraphs. The crux of the problem is to create a system for deciding, as to which specific pieces of data should be included in the file. To do this it will be necessary to reconcile what is considered desirable for planning purposes and what is feasible, given the costs of getting data into the system. To accomplish this reconciliation, the initiators of the project will have to develop a routine technique for determining, on the one hand, the potential usefulness of each bit of data which might be plugged into the system, and on the other, the cost implications of each such choice, such as is suggested below.

16. **Methodological Note I: Identification of data requirements**

Step I: Analysis of demand aspects

(i) Identify planning tasks;

(ii) For each task, examine planning jobs at various levels;

(iii) For each job, identify data requirements (quantitative and qualitative)

Step II: Analysis of supply aspects

(i) Identify existing (and projected) sources of data;

(ii) For each source, list individual data bits with their quantitative and qualitative qualifications.

Step III: Identify data requirements

(i) Carry out a detailed comparison of a) and b);

(ii) Draw up a final list of specific data requirements to be satisfied;

(iii) Assign weighted priorities to individual data bits.

17. **Methodological Note II: Development of data supply procedures**

Step IV: Data linkage:

(i) Determine which data can be supplied by "linking" the existing, but scattered and under-utilized data sources (administrative, utilities records, etc.) with the system;

(ii) Determine costs of linkage;

(iii) Develop linkage procedures for those data bits passing priority tests.

Step V: Original data search:

(i) Estimate procedural requirements for "searching" remaining required data (i.e. those priority data which cannot readily be supplied from the existing sources through the linkage option;

(ii) Examine cost implications of the foregoing in view of respective priorities of individual bits;

(iii) For those data passing priority/cost tests, formulate the required data search procedures.

18. **Methodological Note III: System design**

- The above activities are to be handled within the context of a unified system to maximize the economic and technical efficiency of the entire operation;
- The system proposal which results should be implementable in stages and amenable to reformulation in response to its feedback while maintaining its continuity;
- The data contents in the system should provide for frequent up-dating.

19. **Methodological Note IV: Operation of system**

- The system must be structured in a way that will permit full and versatile use of all types of data dissemination procedures as may be appropriate to the system. Thus it is to be borne in mind while determining how precisely data is to be disseminated that the goal of the system is to supply the required data, in the exact form in which it is needed by a specified user, at the time when it is needed.
- Education and training: The system proposal should also provide for a two-way stream of education. Users must be able to instruct the system managers on their needs as they arise. At the same time the managers of the system must be prepared to assist the users in developing more effective planning and programming techniques.

20. The diagram depicted on the following page indicates the main categories of files to be handled in the IFS. In the first two of these files are shown several examples of the kinds of data which they might be expected to contain. For the latter three files, by contrast, only a brief verbal indication of the expected contents has been provided. The individual pieces of data are given only to provide a preliminary indication of the kind of contents that might be appropriately included in each file shown and are not intended as final or determinant enumerations of actual contents.

21. The Identifier File represents, in effect, a sharply modified version of a Register of Industrial Establishments. It differs from the latter in the first place in that its scope of coverage has been purposly limited to include only those industrial units which meet certain minimum performance requirements for inclusion in this part of the system (e.g. employment or investment). By identifying each participating unit in a

THE INDUSTRY FILE SYSTEM

A COMPLETE SYSTEM

A. Identifier File

A 1. Coded elements

- Identification number
- Locational code
- Activity code
- Establishment status
- Employment size code
- Establishment year code
- Affiliates

A.2. Non-coded elements

- Name of establishment
- Address

B. Core File

- I.D. number
- Major products
- Number of employees
- Wages + salaries
- Insurance records
- Import data
- Export data
- Value total output
- Excise and sales taxes
- Sources of principal materials
- Income taxes
- Subsidies
- Loan requests
- Telephone bills
- Size of plant (floor area)
- Water consumption
- Electricity "
- Investment
- Balance sheet data
- Etc.

C. Auxiliary File

Parallel data to A and B (though less extensive drawn from those sources which are rather irregular in terms of their coverage and availability.

D. Plan-Data File

D.1. "Project" data

"Fichiers" of parallel data to A, B and C on industrial projects in various identified pre-production stages.

D.2. "Intentional" statistics

Investment and production plans of firms which are not explicitly given the form of "projects"

E. Reference Programming Data File

A "library" of non-indigenous techno-economic data on productive units, in support of industrial programming activities. Perhaps best organized at a multi-national level.

"reasonable" degree of detail, the Identifier File thus serves as a key for all of the so-called "dynamic" data elements (that is, those parameters relating to the changing operational characteristics of industrial firms which are stored in other files of the system.

22. The individual data bits which make up the body of the system will be incorporated by means of either one of two sets of procedures. Some data will be directly searched, while others linked into the system. As has been indicated, the latter option is to be emphasized throughout this proposal.

23. Record Linkage: The full versatility of the IFS will become apparent only when appropriate procedures for linkage, providing access to a variety of (currently scattered) sources of information, are introduced into the system. The key consists of assigning a uniform identification code to each industrial unit as it appears in different records, thus permitting inter-linked uses of a variety of potentially useful sources of establishment data. The latter would include not only a variety of administrative records as are available in the existing governmental and non-governmental institutions, but also raw data extracted from such sources as the national statistical programme.

24. Original Data Search: The number of pieces of data to be directly "searched" by the system should, for considerations of cost and expediency, be severely limited, especially in the first stage of the system's development.

25. In the full report on the Industry File System each of the individual files is explained in detail in terms of its: scope of coverage (the number and kind of firms included), depth of coverage (specific data contents), sources of data, data selection methodology, coding problems, etc.

IV. THE INSTITUTIONAL CONTEXT: WHERE TO ESTABLISH AN IFS

26. Before going on to decide where to position the IFS within the existing hierarchy of government organizations, it will be essential first to identify alternative institutional possibilities within which the system might be expected to function, and then to trace the consequences of each such arrangement. In determining an appropriate institutional context, it is necessary first to consider three pre-conditions which must be met:

- Methodological independence: The managers of the system must be completely independent in selecting, developing, and applying an appropriate methodology for the system's development. Thus, it is important that the IFS parent institution not be likely to impose a prematurely determined methodology which lacks the flexibility, breadth, and efficiency required of the system.
- Broad-based support: It is critical that the IFS have extensive technical and institutional support on the part of all the major organizations concerned with the industrial development planning process. The IFS must be developed so as to be broadly responsive to the data needs of the planning process as a whole, and to involve all relevant organizations integrally (both as the suppliers and the users of data) in the organization and running of the unit.
- Authority: It is essential that sufficient authority be placed into the hands of the IFS parent organization so as to guarantee its ability to enact and operate a comprehensive and efficient system. Since the IFS may eventually develop into a rather extensive undertaking, it is desirable that the organizers be given a broad general mandate, as well as having direct access to an authoritative and comprehensively inter-institutional governing body.

27. Given the above, perhaps the most promising alternative will be to place the IFS under the immediate direction of an independent, inter-institutional organ, something like an Industrial Programming Data Centre,

which will, in turn, be directly responsible to an authoritative, broadly representative governing body. The latter might be organized along the lines of an inter-ministerial commission, including such key organizations as:

- Ministry of Economic Planning (and Development);
- Ministry of Finance;
- Ministry of Commerce and Industry;
- Bureau of Statistics
- National Development Corporation and/or Bank;
- Computer Centre;
- Economic Research Bureau, industry study centres, trade associations, local universities, etc.

28. The size and relative importance of the Centre will vary considerably in accordance with the exigencies of its particular context. Its versatility is more important than its size since the goal of the system is not to create a new institution for its own sake, but rather to meet a series of explicitly defined, operational requirements of the participating development institutions.

29. The organizers of the IFS may wish to initiate the project within the framework of the National Statistical Office. This could be particularly attractive during the early stages of the project, when attention will be focussed on the development of the Identifier File, examination of alternative data supply possibilities, and identification of the data requirements of industrial planning-policy agencies. At the same time, however, great care must be exercised so that the IFS will not be "locked into" the ordinary statistical system, since this would have undesirable effects on its use potential. Ideally, the IFS would be "spun-off" at a stage when both the scale and the technical implications of its operation so warrant.

V. POSSIBLE USE PATTERNS

30. The first responsibility of the IFS managers will be to establish and maintain the system, as well as to provide a variety of ancillary activities and capacities whose common purpose it will be to make use of the data generated by the system. The following represent the three principle use patterns that might be associated with the system.

31. The IFS Service Bureau: The most important function of such a Service Bureau will be to carry out all data search, compilation, and analytic activities in response to specific requests. These may eventually be undertaken on a fee basis, but might in early stages be provided free of charge. The major categories of activities to be performed by the Bureau will include:

- Trend analysis
- Market research/identifier service
- Industrial project evaluation
- "Control systems" for project implementation
- A variety of industrial forecasts, projections and analyses
- Management and productivity clinics for industrial units
- Ancillary services to be developed in connexion with the "Reference Programming Data File"
- Provision of information on a multi-national (community) basis.

32. For these services to be carried out efficiently, it is essential that the IFS be, in the fullest sense, "plugged" into the economic and institutional structure of the country. For this to be the case, the IFS must be developed with the idea of providing the data source of first resort on the industrial sector. Once this goal has been broadly recognized, a unique package of IFS services can be evolved in response to reliable signals concerning the particular set of informational needs associated with the given economy.

33. Associated Educational and Training Activities: The IFS can be effectively developed and operated only if a substantial, multi-directional educational programme is undertaken simultaneously. These would include:

- Seminars for potential users of the IFS
- Training workshops on planning techniques.

By participating actively in the above activities, the IFS managers themselves would be able to improve their understanding of how the contents of the IFS should be modified to meet more efficiently the needs of its users.

34. Publications: Unlike an ordinary statistical programme, the publication function will be treated by the IFS as strictly a residual activity. That is to say, although some data may well be made available in published form, the system itself is not to be shaped in accordance to the needs of publication. Despite the fact that published data alone cannot be expected to satisfy the specificity requirements of many users of the IFS, a limited scale of publication may be desired, such as:

- Publication for general distribution of a Quarterly Industrial Report (providing aggregated time-series data and key economic indicators).
- Occasional publication of a limited version of Industrial Register.
- Publication for limited distribution of Quarterly Data Sheets, providing data on a sectoral or sub-sectoral level, appropriately controlled with respect to the needs and the extent of "clearance" of the specific user-subscriber.
- Periodic publication of Industrial Opportunity Identifiers, which might be distributed to public and private subscribers.

35. The foregoing should be understood as being intended to be only generally indicative of what might be done in drawing up a useful IFS institution, providing it will serve only to provide some initial guidance for those interested in structuring a system along these lines.

VI. STEPS TO BE TAKEN IN PREPARING A NATIONAL IFS PROJECT

36. The overall objective of such a project will be to establish a fully operational, use-oriented information system along the lines of that identified in this report as the Industry File System. It is expected that a period of two to five years should be viewed as appropriate for the final development of a fully developed Industry File System.

37. It will be essential, however, to the success of the overall objective, that a pilot project first be instituted and operated, probably over a period of around six months. This is in order to determine whether or not the IFS approach is appropriate for the particular development context under consideration; and then, to provide detailed guidelines as to how such a system should be designed and deployed.

38. In studying the feasibility of such a project, several preliminary missions will be required. These should be staffed by experts who are specifically familiar with the IFS programme. Even more important, however, is the requirement that these experts be broadly experienced in both use and supply aspects of industrial programming data, and that they start work without any prejudice as to the type of data bank programme to be recommended. Rather they must be prepared to make recommendations which reflect the exigencies of the specific situation.

39. First steps in preparing an IFS project: To build on this general preliminary proposal in order to develop a specific, implementable project, it will be necessary to carry out a number of additional preparatory steps. To begin with, it will be necessary to identify the system further in terms of the specific context within which it is to be developed. Then, it will be necessary to draw up a detailed implementation programme to show how precisely such a system can best be put into effect in that context. The following paragraphs suggest the sequence of preparatory steps which must first be taken before a full-fledged implementation programme can be initiated.

40. Step 1: A tentative agreement may be made, on the basis of the proposal outlined in these pages, between the Government of Country "X" and UNIDO, as to the general desirability of undertaking a pilot study for the establishment of the IFS in that country, and the nature and the scope of UNIDO's technical assistance to be rendered in undertaking a pilot project.

41. Step 2: A National Technical Committee on the Industry File System (or some such group) should be established within the country in order to guide the formulation and eventual implementation of the project. The Committee should include at least one senior representative of those organizations cited in paragraph 24 above, as well as a resident UNIDO "industrial economist" if available.

42. Step 3: At this point a UNIDO mission (1-2 weeks) can be usefully dispatched into the country to confer with the Technical Committee and to take the first steps in drawing up a more detailed project proposal. This would represent the first step in "particularizing" the IFS proposal to ensure that it will fully reflect the exigencies of the situation in the country within which it is to be established. (N.B. This step is treated as the first in-country activity in the Implementation Programme shown below).

43. Step 4: An Expert Group Meeting may be convened to review and evaluate the technical and operational aspects of the project proposal as prepared by the preliminary mission. The meeting should be attended by representatives of the National Technical Committee, the UNIDO/IFS Field Team (see below), and a consultant drawn from leading international data banking, information processing, and computer facilities institutions, etc. A fully detailed time-phased, cost-conscious implementation programme can then be drawn up if the decision is taken to go ahead with the project.[1/]

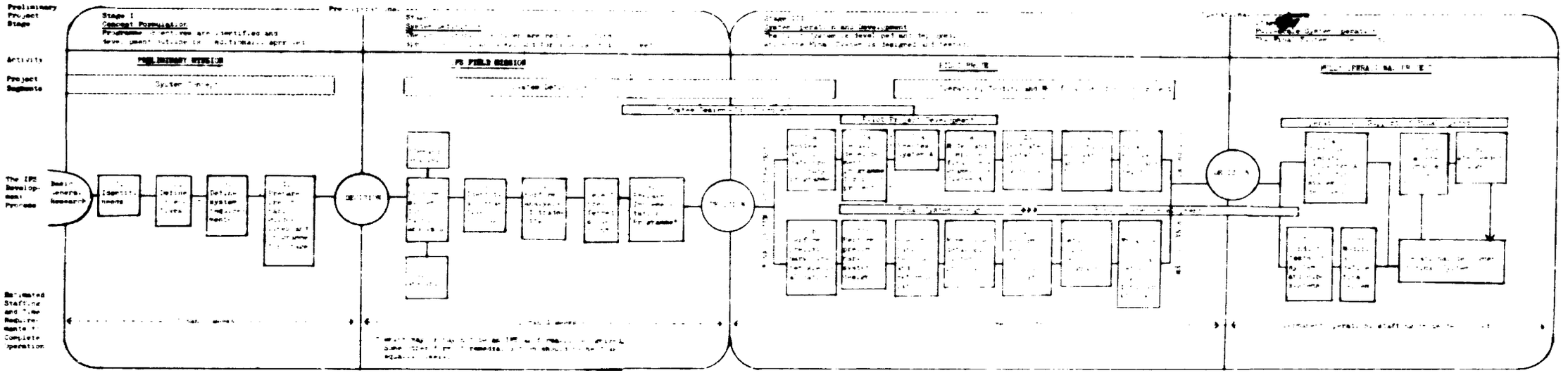
44. Suggested outline for implementation programme: There are a variety of ways in which the problem of designing an implementation programme for the IFS could be handled. The alternative sketched out below has been drawn up with a careful eye, not only to developing the best possible system to do the required job, but also to:

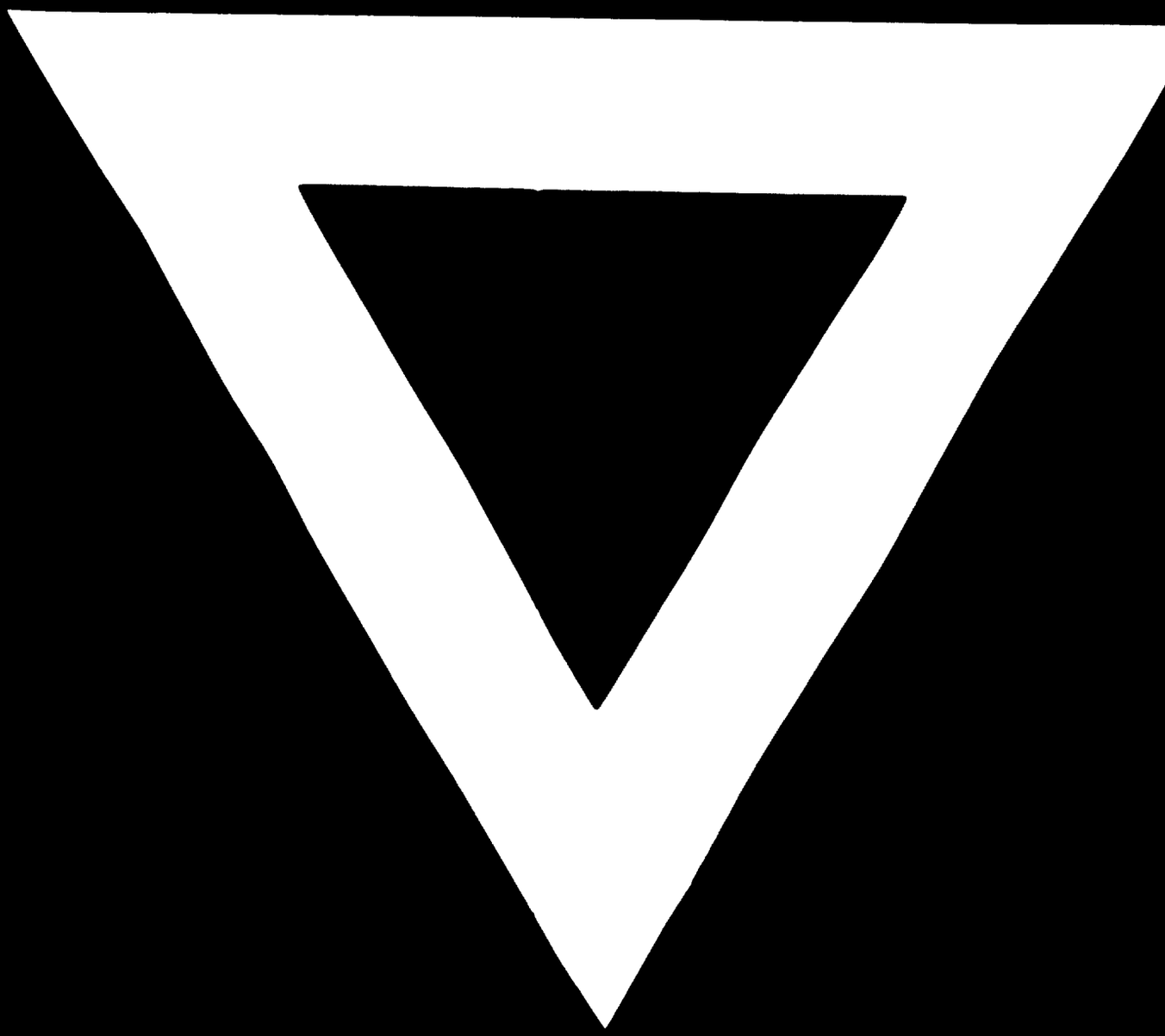
1/ Step 4 will probably be necessary only in the case of the first national IFS to be developed. The expected sequence of preparatory activities can be abridged notably once the first IFS project has been put into operation.

- minimizing total system costs;
- introducing a series of decision points which will allow an inappropriate project to be abandoned at the earliest possible stage, with the lowest possible costs;
- allowing for maximum flexibility for the identification and preparation of alternative (non-IFS) actions to be taken; and
- preparing for and introducing a short-term pilot project that will: (i) be directly useful in its own right and (ii) provide complete information as to advisability of continuing into the next stage of the project. The latter should also indicate in detail the machinery and funds required to structure and run a fully developed IFS.

45. For illustration purposes, a chart has been drawn up that indicates four discrete stages of implementation and main steps involved in each of them. Each stage terminates with a "decision point" at which time the full results of the preceding stage can be weighed and a decision taken as to whether, and how, to proceed further.

A PHASED IMPLEMENTATION PROGRAMME FOR THE INDUSTRY FILE SYSTEM





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