

INFORMATION NEEDS, TASK ANALYSIS AND INFORMATION INPUTS TO TASKS

ABSTRACT

In a study of Information needs at a new level, task analysis of basic research and the product development process are presented, with Information inputs indicated for the separate tasks. These are based on interviews with research and product development workers on how they put Information to use in their work. Information input analysis has managerial significance for Information systems. The inputs show where to look for the Information required in research and they can also be used to show a benefit from the expenditure on materials and people which is involved in an Information service.

Thomas Whitehall
Department of Library and Information Studies
Loughborough University of Technology

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Over the past thirty years or so studies have been made, apparently with the aim of collecting facts about the Information needs of professional people which would be useful in the design of information systems. Reviews of these studies have pointed to deficiencies which most of them share:

— useful generalizations cannot be made from them, because separate studies are usually so dissimilar in concept or execution that they cannot be used in an additive or confirmatory way;

— it is demands that are studied, not information needs; and it is unhelpful to accept demands as an indication of needs, because demands are result of users' expectations of what can be supplied as well as of their requirements.

"We are still groping for the ideal method to isolate and consider needs" (Slater 1969).
"We must look to different methods and to some radical re-thinking of the problem of information needs" (Britain 1975).

What sort of knowledge about the information needs of their clients could be put to use by the designers and operators of information systems?

I think they need information on two levels. They need detailed "profiles" associated with specific pieces of work undertaken by their clients, to use at a level where personal current awareness service is attempted. They also need a more general view of the information requirements of the activities of their clients.

I have in mind a task analysis of the job of a professional, so that the information inputs required for the completion of each constituent task can be identified. At this level knowledge of information-needs has a managerial significance for the designer and operator of systems. If you refer to figs 3 and 4 you can see that knowledge of information inputs indicates where to look for the required information — what sort of material to collect and scan. It can also be used to justify expenditure on the documents and people needed for an information service, by pointing to the valuable inputs to clients' work which are being supplied.

If the constituent tasks which make up a professional activity are in a time sequence it can help a current awareness service to supply information

at the time it is needed by a client, rather than just because the information is available. It can help in the evaluation of IR systems and data bases, not at the level of recall and precision, but at a level closer to the application by the client of the references supplied by these systems.

Task analysis and the tracing of information inputs to tasks could be applied to the job of any professional (teaching, social work, medicine, law etc.) but I want to consider basic research in science and new product development, because it is here that I have tried to understand the tasks involved.

A task analysis of basic research in science might appear as in Fig. 1.

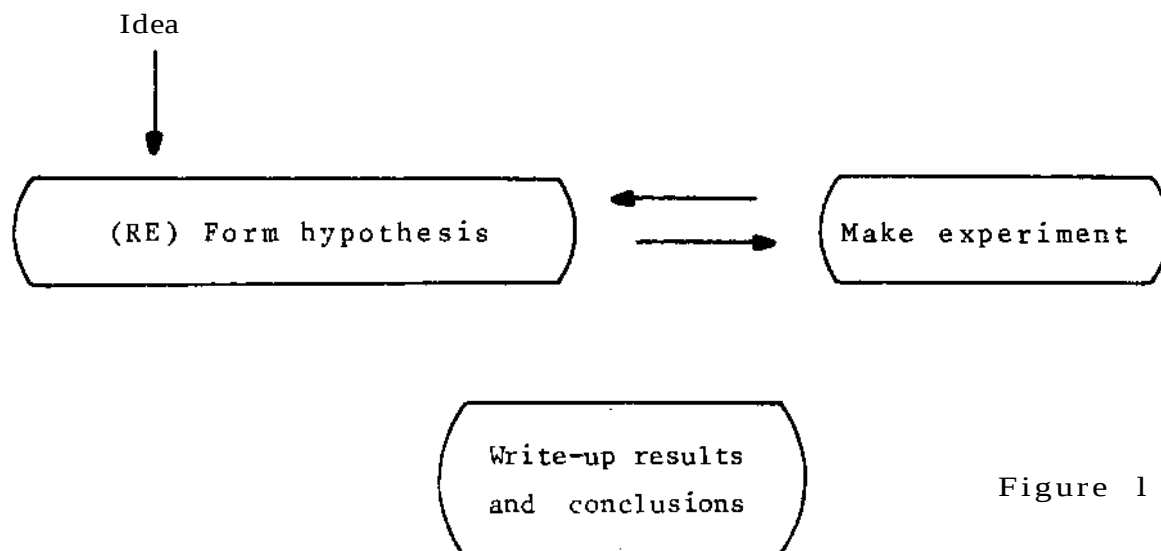


Figure 1

This model was shown to people doing basic research in science. On the whole, they agreed that it was representative. One comment was that research is indeed like a loop, and that one cannot always be sure whether an experiment or a hypothesis comes first. Another comment was that sometimes the "idea" is part of the loop, because one can reach a stage in research where the experiment — hypothesis pattern breaks down, and whatever is done, there are just more problems.

Reactions to a model of the product development

process (Fig. 2) were not so helpful. In most cases people working in this area rejected the model and replaced it with drawing which was a flow sheet for the work they were doing. This invariably covered less ground than the model, and some of the stages of my more general model were indicated as information inputs. Project tasks and information inputs for these tasks were confused and in general workers seemed unable to see an overall view of product development.

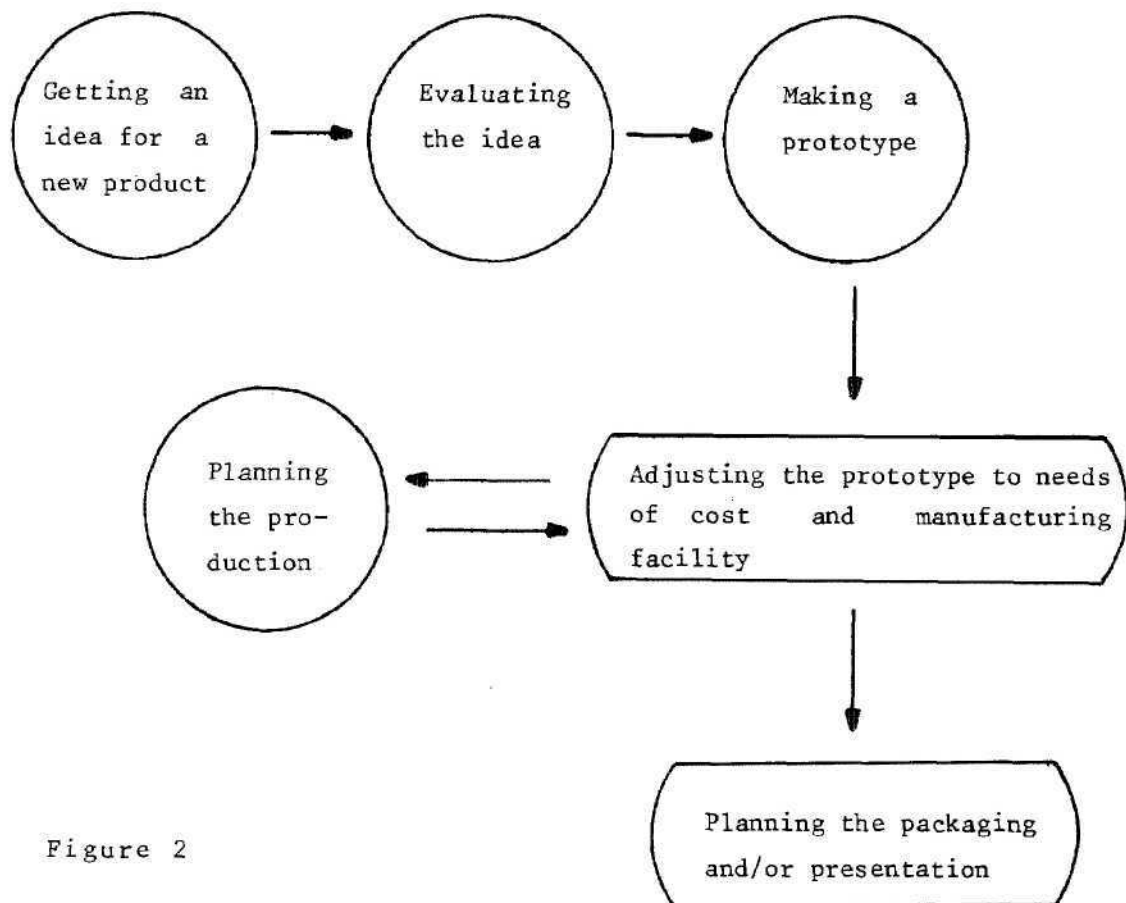


Figure 2

The next stage of the analysis is to trace information inputs to the tasks shown in the models. It is surprising that although the literature contains many indications of information inputs to tasks in commerce, there is next to *nothing* at this level for scientific research or product development. The papers by Chaddock (1969) and Wolek (1969) on the information requirements of engineering design are perhaps the only analyses of this sort where both tasks and information inputs are visible together. Some of the information inputs to research are shown in an appendix to Slater and Fisher (19). White (1973) and others list inputs to product development, but in both cases they are unrelated to a task analysis.

People working on research or product development were interviewed to try to get an idea of how they put information to use in their work, and if possible to relate the information inputs to specific tasks. These were interviews in which questions were asked to encourage workers to talk about information they put to use their work. They included a request that they report specific instances of information use. The types of work in which some of the interviewers were involved are listed below. Responses were used to construct the information input analyses shown in Figures 3 and 4.

Figure 3

Basic Research: task analysis and information inputs to tasks

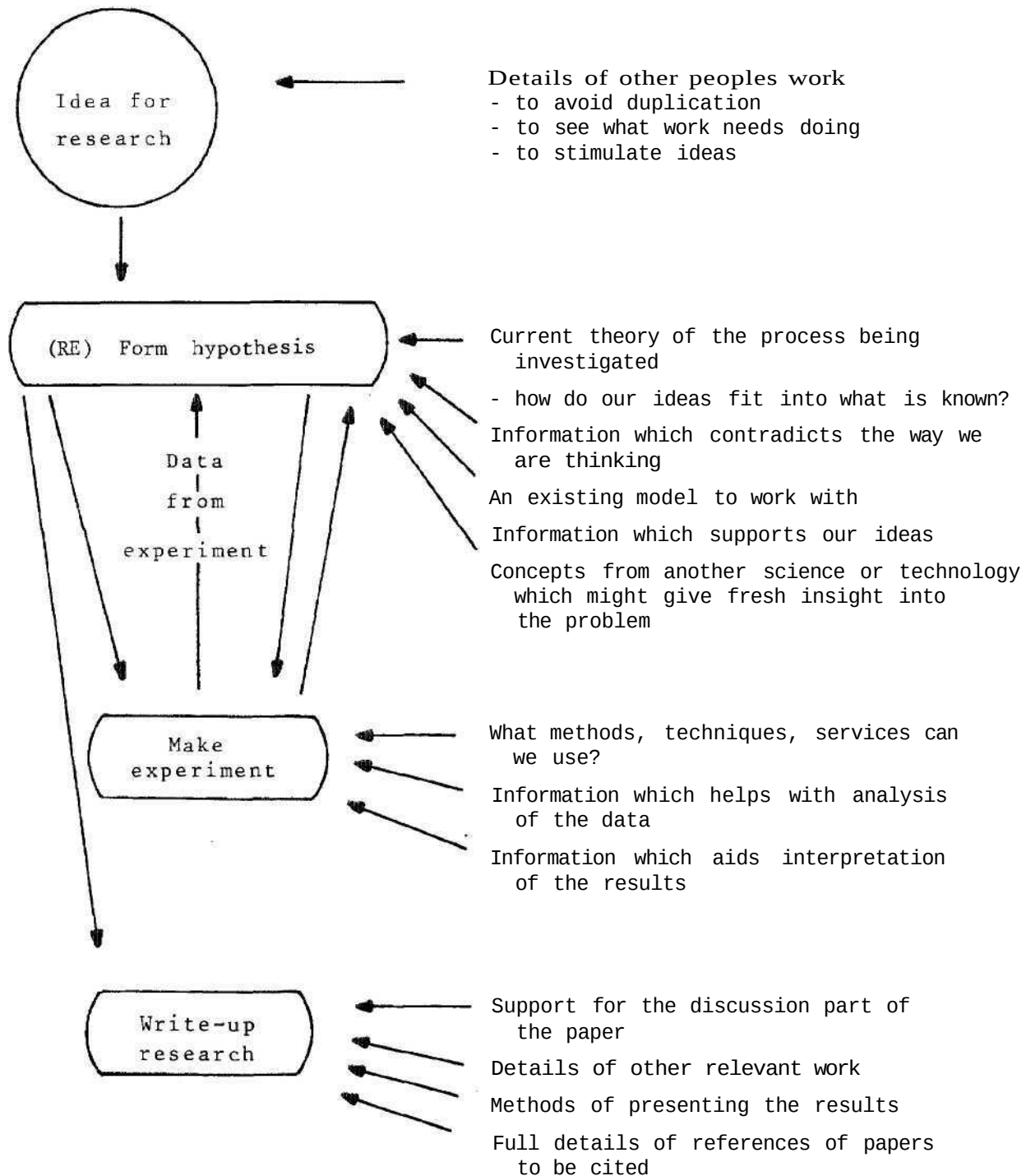
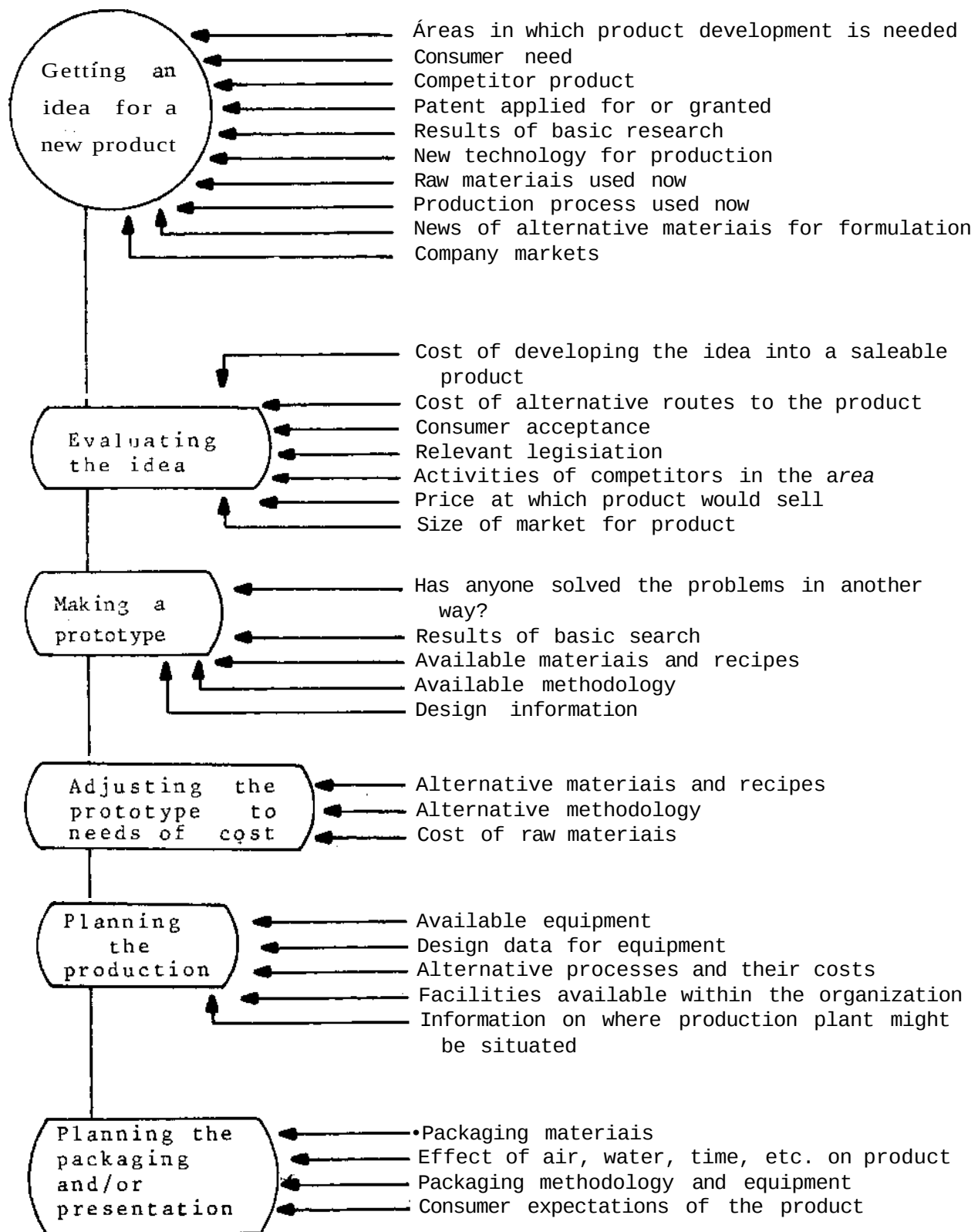


Figure 4

Product development: task analysis and information inputs to tasks



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- Design of a random access discrete address system.
- Breakdown products of drugs and their detection.
- Trouble schooling work in nuclear engineering.
- Microcomputer design problems
- Accumulation of heavy metals in marine organisms
- Production engineering for organic chemicals
- The noise problem in diesel engines
- Synthesis and testing of new drugs
- Research and design work with fuel cells
- Ecology and physiology of plankton
- Marine Electrochemistry
- Oceanographic surveys

The interviews were held in the summers of 1976 and 1977 at UKAEA Harwell, the Marine Biological Association Plymouth, Loughborough University of Technology and Fisons Ltd. I am indebted to the scientists and engineers who were interested enough to discuss their work and to Mrs. Lubna Amir who obtained opinions on the task analysis models and handled twelve of the twenty-four interviews.

RESUMO

Em um novo nível, um estudo das necessidades de informação, a análise das tarefas da pesquisa básica e o processo de desenvolvimento de produtos são apresentados com uma indicação dos fluxos de entrada de informação para as diferentes tarefas. O estudo é baseado em entrevistas realizadas com pesquisadores e técnicos em desenvolvimento de produto, procurando definir a forma com que estes utilizam a informação em seu trabalho. A análise de fluxo de entrada de informação possui significado empresarial para os sistemas de informação. O fluxo de entradas de informação mostra as fontes de informação requeridas na pesquisa e pode também, ser utilizado para mostrar os benefícios em relação à despesa com material e pessoal envolvidos em um serviço de informação.

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