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LES DECISIONS EN RECHERCHE ET DEVELOPPEMENT
(Decisions in Research and Development)

Paris, DUNOD, 1971, 345 pages

The work "Decisions in Research and Development" deals with the examination of some concrete cases of decision in research, development and technical innovations. This examination sets out from certain objective data and from the behaviour of the decision groups, the respective processes being analysed together with the technical characteristics and the noted experimental sequences. Based on the resulting findings, the development model is then formulated, taking into consideration the latest results from the decision theory and the information theory. The concrete reference case in this work is the „Phoenix" nuclear reactor, the innovations materialized by this prototype being major innovations applying to very new techniques of particular economic importance, being liable to new improvements and applicable to many nuclear power stations which will be built by 1980.

Involving considerable material and human forces, the case of the „Phoenix" reactor is not fundamentally different, from the point of view of decision, from the general case of the prototype in any productive activity. The close relation between research and development in the elaboration stage of the prototype is noted, a stage where a number of classical problems of investments appear.

This study is not applying only to the techniques of classical statistics (correlation, regression, estimation and tests), but wants, first and foremost, to direct research towards a certain methodology linked to the fundamental mechanisms of decision.

In this connection, the theory of decision is used, as it was mainly defined by von Neuman and Morgenstern, developing the problems of effective use of models at the level of "general methodology" to which special importance is being attached.

After a brief review of work already carried out in the problems of decision on research and development, the author passes on to the analysis of the prototype, dealing with the various stages of decision on the introduction of a technical innovation in mass production. The general characteristics of the implicite model of research and development are dwelt on afterwards, special stress being laid on the establishment of technical, economic and strategical variables. As a novelty in the tackling of these problems appears the introduction of production functions and their utilization as part of the models. Chapter four — the explicite form of the decision models — deals with several utility functions (linear and nonlinear), the notion of "risk" is introduced and two models are presented: B. Roy's model and the "Electre" model.

The work concludes with a numerical application and conclusions.

We mention the contribution this work can make to the development of decision problems at a micro level, especially when speaking about the successful launching in mass production of prototypes of industrial installations and equipment.

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