

Management science in the 1980s

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ommunications

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Management Science in the 1980s

What are the long-term perspectives of Operational Research/Management Science? The 1980s include the ominous year 1984. The third millennium of Christianity towers above us. Is it a coincidence that TIMS and the (British) Operational Research Society simultaneously started a series of views on the long-term future of OR/MS [1, 2]? Is this interest inspired by the vigour of enterprise or the concern for survival?

What struck me in the view of Layton [1] was a kind of uncanny optimism that I would like to strip of its veils. After describing the turbulent environment of the future (all views congrue in foretelling a turbulent environment in the future), Layton describes the many theoretical developments needed to cope with increasing uncertainty and vicissitude, e.g., multiple objective decision-making, fuzzy set theory, entropy based modelling, the contingency approach and catastrophe theory. He concludes laconically: "the gap between the scientists and the managers may well become much greater," hence managers and management scientists should be brought closer together in a "genuine learning system."

When Layton, and other scientists, speak of a gap, I suppose they have in mind a picture of science breaking the ice and practice following in its wake. Although the gap may increase if practice cannot keep pace with theory, the time will come when practice reaches the point where theory is now. This might be called the chase model of practice and theory (Fig. 1a).

I am concerned about what might be called the repulsion model of practice and theory (Fig. 1b). According to this picture, practice is repelled by theory (and vice versa); practice moves away from theory and will never cover the ground now covered by theory. Management scientists should try to prevent this by all means. The worlds of Russ Ackoff and of Peter Drucker should not be allowed to drift apart. Therefore, management scientists should be very cautious about trying to administer their theories to managers in a genuine learning system. The managers may be repelled and discard "management science" in toto, just as they have discarded "scientific management."

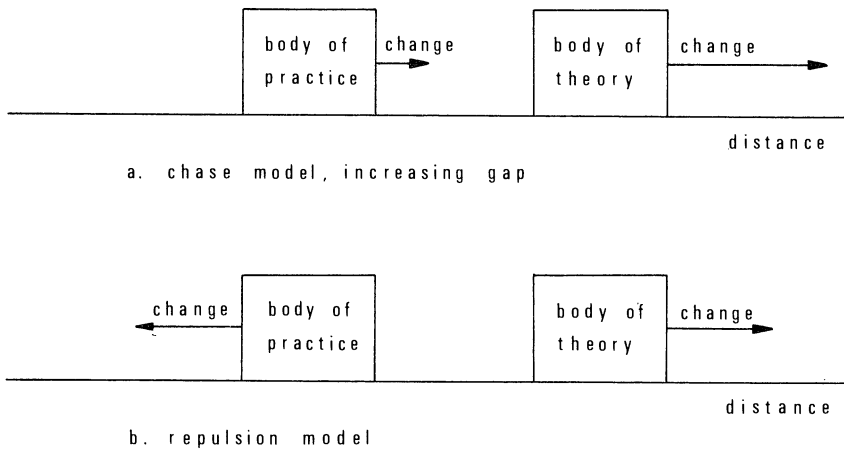


FIGURE 1. One-Dimensional Change Models of Theory and Practice.

To prevent repulsion, some areas of theory should be discarded, deprived of their quasi-management terminology, and left to the closed circuit of mathematical theory. Other areas of theory that have proved to be productive and still look promising, should be developed vigorously. Some intermediate areas of theory that have not yet proved their usefulness should be given the benefit of the doubt—but at most for twenty years!

It is hazardous to categorize areas of theory, but I venture to give the following examples:

- (1) *to be abandoned*: game theory, general systems theory, correctness proofs;
- (2) *to be given the benefit of the doubt*: multiple criteria decision making, fuzzy set theory, information theory, complexity theory;
- (3) *to be developed vigorously*: combinatorial programming, gaming (cf. [3]), production planning, project management, heuristics, information systems management, decision support systems, commercially successful OR software.

What goes for areas of theory, also goes for individual theories and theorems. Their incidence rate is often too low, and every theory looking around for a problem endangers the goodwill of management science/operations research. For example, someone developed a theory of “flexible programming” recently [4]. The odds are 10 to 1 that it will never be used. It should be abandoned.

What struck me in the view of Näslund [1] is that in Sweden he sees a trend away from academia in the national Operations Research Society. The same cannot be said of the Netherlands [5]. At a stock-taking in 1978, 39 per cent of the members who were aged 45 and above, and 38 per cent of those aged below 35, were academics. On the other hand, “only” 74 per cent of those aged 45 and above were university-trained, whereas 90 per cent of those aged below 35 were university-trained. I agree with Näslund that the membership of TIMS, ORSA, the (British) OR Society, etc., should be analyzed and trends detected. Is the membership from academia 80 per cent in TIMS/ORSA, and only 20 per cent in the (British) OR Society? And what are the trends? In particular, I think we should guard against disintegration. If the OR/MS societies should disintegrate in the 1980s, the floating power for most of the OR/MS activities would dissolve. I have considered the degree of organization in a handful of

countries and found the following ratios of OR society membership to total population (in millions) for:

<u>the UK</u>	3539 :	55.8 = 63	per million people
<u>the USA</u> (ORSA/TIMS*)	11,847 :	221.0 = 54	per million people
<u>Sweden</u>	400 :	8.3 = 48	per million people
<u>Denmark</u>	220 :	5.7 = 39	per million people
<u>the Netherlands</u>	467 :	13.9 = 34	per million people
<u>Canada</u>	600 :	23.7 = 25	per million people
<u>Germany</u>	701 :	61.3 = 11	per million people
<u>Spain</u>	251 :	37.1 = 7	per million people

*The union of the ORSA/TIMS membership includes the many foreign members.

If such great differences are possible, strong trends are possible. These should be watched. Apart from the membership numbers, compositions should be monitored. Is the membership balanced between academics and practitioners? Is the membership aging or not? Does a substantial part of the membership have a below university level of education? What is the effect of high, or low fees on the membership? By watching these aspects, the OR/MS societies may be steered through the turbulent environment of the 1980s.

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Application of Management Science Concepts to Accounting Problems

The two articles on the application of management-science tools to accounting problems, which appeared in *Management Sci.*, Vol. 26 (1980), prompt me to report an experience related to charts of accounts because it suggests an area in which collaborative efforts by management scientists and accountants might be productive.

In the early 1960s, the president of Columbia University asked me to assist in developing a new chart of accounts for the University. After agreeing to do so—perhaps too hastily—I reflected both on the enormity of the task and the difficulties associated with its accomplishment.

A chart of accounts, of course, is a systematically arranged list of the account titles for an organization. It commonly includes account numbers, notable purposes of