collection of papers. A wide range of empirical ground has been covered in the analysis. In addition, the book raises numerous issues which require further research and attention. Overall, I feel that this is definitely a book to be read by policymakers as well as researchers working in this field. However, it would have benefited from another bout of editing.

REFERENCE

1. Simon K. Kusnets, *Economic Growth, Rate, Structure and Spread*, New Haven, 1966.

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On the Applicability of Computerized Production Control in an Egyptian Industry
by Pär Lind
(Royal Institute of Technology, Stockholm, 1988) pp. x + 215, ISBN 91-7170-926-6

It is always worthwhile to ask whether a particular computer system is an appropriate solution to a problem. It is a question rarely addressed in due seriousness. In this book, Lind asks whether computerised production control is applicable in the context of the Egyptian vehicle manufacturing industry, a single nationally-owned company called NASCO, the El Nasr Automotive Company. It is central to the author's concern that Egypt is a developing nation while the production control systems in question are products of advanced industrial societies. The issue is whether the assumptions that underlie computerised production control, and which are necessary to its effectiveness, are actually appropriate to NASCO. If not, then the computerised approach is not applicable.

NASCO manufactures and assembles trucks, tractors, buses and cars under licence from overseas manufacturers. Two-thirds of the components used are produced in Egypt, half by local suppliers, the other half by NASCO itself. The remaining components are imported. NASCO's production control process involves determining the items required for assembly of a product, acquiring them, and storing them. Thus, product descriptions are used to list the required parts. Quantities are calculated, and, by reference to existing data about lead times, order dates are set. The same information base tells the planners about the source of parts. Once orders have been placed, the supply process needs to be controlled, from the transport of the parts from the supplier to quality control inspection, and finally to updating the stock records or directing the supplies to a job shop. Controlling the in-house manufacture of parts includes capacity planning, resource utilisation and maintenance, as well as tracking the job flow. These are activities for which computer-based support would seem natural to a large manufacturing company.

The main analysis of the book centres on the applicability of a centralised, integrated production control system — IBM's Communication Oriented Production Information and Control System (COPICS) — which was considered

for purchase by NASCO. Its emphasis on support of operational control is a feature of NASCO's existing Material Requirement Planning (MRP) system and hence criticism of this aspect of COPICS applies to MRP too. COPICS, it is claimed, is characteristic of many such packages in use in industrialised nations. It is designed with a 'pattern company' in mind, and its software incorporates a model of such a company.

It is implicit that we see the case study as representative of industry in a developing country, and the computer application as typical of applications developed for the advanced industrial world. Lind's analytical approach is obviously intended to be appropriate to assessing any computer system in any development context. The framework used is chiefly drawn from James Thompson's *Organisations in Action* with an emphasis on internal and environmental uncertainty. There is no doubt that these simple concepts make it very easy to get a rough idea of NASCO's problems.

Lind's argument is that in many areas COPICS makes assumptions that are realistic in advanced industrialised countries, but which are not so in Egypt. The difficulty lies in the generalised uncertainty that affects NASCO, and which by its very nature as ill-understood uncertainty, is not controllable by NASCO boundary functions. A couple of examples will suffice.

COPICS requires a table of standards for values such as lead times for supply of parts, and variances on these times. Without them it cannot automatically plan ordering dates. In the West, the variations in supply time will be sufficiently small to allow reasonable prediction and hence planning. In NASCO's case these figures cannot be provided because there are so many factors making supply unpredictable; for example, government quotas on non-Egyptian freight carriers, controls on foreign currency credits and high rejection rates for local suppliers. As a result, a central feature of COPICS, the planning of order dates, cannot function adequately.

COPICS assumes that management decisions can be taken promptly in response to the warnings it generates. However, NASCO cannot respond swiftly because the shortage of qualified managers in Egypt requires many decisions to be taken through committees. The list of problems runs on. The company does not fit the COPICS model. The system is not applicable to NASCO.

Well, that's saved you reading it! It would have been mean of me not to provide a decent summary because it is a very difficult book with which to get to grips. Its structure is absurd. To understand the analysis you need to read the case study, and that does not appear until the first appendix! Throughout there are failures to signpost the argument adequately. This is made worse by some pretty opaque sentences. (While I wish I wrote Swedish as well as Lind writes English, reviewer's charity is no substitute for author's clarity.) In short, this volume dearly needs the attentions of a professional desk editor.

Publication imposes certain standards of content as well as form. The book is the author's doctoral thesis. The research was worthwhile, but it justifies little more than a single journal article. I suggest below a few areas that might have been pursued.

First, a more sophisticated analytical framework than that offered could have been effected from a detailed review of the organisational literature. Second, Lind might have asked whether the problems facing NASCO are different from those that face manufacturing companies in already industrialised countries. His failure to justify the assumption that COPIC's assumptions are realistic in a Western context constitutes a serious lack of rigour. To approach the broader, development

implications, we need to know whether NASCO's problems are distinctively Egyptian or not. For example, similar problems of government interference through regulation and direct control affect public sector enterprises in most other types of economy. Which other sources of uncertainty are common elsewhere? I want to ask how like Egypt is India, or Romania, or China, or West Germany, and on what dimensions? Without some discussion of these questions, the case analysis remains parochial. Indeed, we have no way of knowing whether it is distinctively a development study or, as I suspect, merely a specially obvious case of the tensions that exist between formalised systems and human organisation in its social setting.

Lind might also have asked, are the problems arising from Egyptian organisational culture present or not in the developed world? We are given very little idea of what constitutes culture in Lind's view. One example given is the limited autonomy of managers, but as this is associated with skill shortage, it is not clear that it is a cultural rather than a structural phenomenon.

A further valuable addition to this book would have been some account of how the existing MRP system actually works. It is one thing to analyse structural deficiencies *a priori*: it is another thing to see what really happens. This would be particularly important if we wished to assess Lind's suggestion of using computers at NASCO for low level operational control of production, such as event reporting and tracking, because external uncertainties should be negligible. Yet, unless we know that there are no other internal sources of uncertainty that would undermine even an unsophisticated system, we cannot say whether such a suggestion is any more likely to work than COPICS. Given that NASCO's inventory data is rarely correct, why should we suppose that event reporting would be kept up to date?

Finally, Lind makes what he sees as a radical suggestion, that computers might be used to match the rationality of Egyptian organisation. He suggests a system that plans what products could be made on the basis of the availability of parts, thereby reversing the existing situation. Is it rationality that is matched here? Rationality is a frequently occurring motif in the book, but it is little explained or explored. Perhaps what is rationally demanded of a computer system in this context is that it be a symbol of industrial progress.

Just as the bumper sticker reads, 'One nuclear bomb can ruin your whole day', so the slogan of this book should read, 'Environmental uncertainty can ruin your computer system'. This is a message for managers the world over, developed and less developed. It is a pity that the message is not very accessible in its present form. Let us hope that Lind will continue to research in this area to provide the basis for a more mature book.

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The Tragedy of Technology: Human Liberation Versus Domination in the Late Twentieth Century *by Stephen Hill*
(London, Pluto Press, 1988) pp. 294, ISBN 1-853-05-009-1

The basis of classical Greek tragedy lies in the contradiction between destiny and free will. Individual protagonists *appear* to have the power to control their