OR NEWSLETTER

Operational Research Society of New Zealand (Inc.), PO Box 904, Wellington, New Zealand **October 1995**

EDITORIAL

Hans Daellenbach, University of Canterbury, Christchurch, N.Z.

My editorial in the January 1995 *OR Newsletter* 'Some overseas impressions' has brought almost as much controversy as the 'Alternative OR' featured in the December 1994 issue of MS/OR Today. It gave rise to two guest editorials, as well as the letter by Prof. George B. Dantzig of Stanford University, reprinted in this issue. I was somewhat taken aback when I opened the April 1995 issue of the UK *OR Newsletter* and saw it reprinted under the title 'OR literature — less plausible than sci-fi?', accompanied by a Disneyland castle, referring to my sarcastic pun of economists building imaginary mathematical castles.

UNIVERSITY OF AUCKLAND
10 OCT 1995
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Naturally, I agree with much of Prof. Disney's guest editorial (July *OR Newsletter*) about the rigours of the editorial process followed by most journals and his and Prof. Dantzig's comments about the role and responsibilities of OR practitioners.

Anybody who has read the first eight chapters on systems thinking and the MS/OR process in my *Systems and Decision Making* text (Wiley, 1994) will immediately see that I see the roles and responsibilities of the practising operations researcher along similar lines as Prof. Dantzig. I also think that there will be genuine and legitimate disagreement about whether MS/OR is a 'sick man' — note I do not say 'sick person' since the MS/OR culture is still predominantly male oriented, which brings up an interesting point whether the development and direction of OR would have been different if women had taken, or been allowed, a more prominent role — and if so what is in part behind this ailment, and how it can be cured, or whether it should be cured.

My point is that OR academics, in their role as teachers of future operations researchers and by the type of articles they publish, have to take much of the blame that OR does not live up to its potential of being perceived by our customers as the instrumental discipline helping at the forefront or cutting-edge of managerial and strategic decision making, but tends to be relegated to the backroom of often trivial tactical and operational aspects. As Prof. A. Reisman, Carnegie-Mellon University, said at a the 1994 Alaska TIMS meeting, MS/OR academics may be their own

Contents

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worst enemies in terms of promoting their discipline to its rightful place in decision aiding and decision making.

Ralph Disney is probably correct that a real mathematician would laugh at the claim that any but a tiny fraction of OR publications is in fact mathematics, nor is it the fault of mathematics if it is misused. It is also correct that much mathematics seen as 'obtuse' at the time it was developed has only much later been recognized for its brilliance and become the cornerstone for important breakthroughs in its own or in other disciplines. But I was not talking about similar mathematical contributions in operations research. I did not refer to the work of Dantzig or Beale and the many other past and present illustrious operations researcher who have made and are still making fundamental and ground-breaking contributions to the theory and solution methods in mathematical programming, stochastic processes, scheduling, and so on. I was talking about the trivial, asinine papers cluttering our journals on a special case of another special case of another special case . . . . or papers in the guise of applications that with their highly restrictive assumptions assume away the real problem. The problems they address are in many instances trivial from the very beginning, promise small savings if any at all, or require a degree of sophistication by any potential user that in most instances just is not there nor is likely to be there over the foreseeable future.

I would like to demonstrate this with an area familiar to me where these sorts of publications flourish, namely inventory control. A perusal of just two journals, namely *JORS* and *EJOR*, shows that over the last *five* years 9 papers have been published, assuming a deterministic demand, instantaneous replenishment, various types of arbitrarily chosen replenishment rules (in contrast to model derived rules), and

- *a demand rate that varies linearly over time*, i.e., increases or decreases linearly,
- *complete backordering* of demand,

and an additional 5 papers that add the further assumption of

- *a constant rate of deterioration* or spoilage.

Does it take that many trials to get it right? In none of these cases did the authors justify the reasonableness of their assumptions or provide examples of relevant potential uses of sufficiently general interest. It is also interesting to note that many authors seem not to be fully aware of the work of others in the area, i.e., the references are often incomplete or highly selective.

Although taken individually, some of these assumptions may serve as reasonable approximations, several of them taken jointly often render the model highly restrictive, questionable in terms of practice, and sometimes even absurd. For example:

- Demand rarely maintains a linear trend for any length of time.
- Backordering of deterministic demand does not make sense in a competitive environment. No customer will suffer such a practice for long, particularly of the competition offers better service, and they are bound to do so. So demand is affected by the policy, an aspect completely ignored by the models. In fact, backordering rarely makes sense unless the demand is stochastic. I also doubt that any firm would tolerate such practices for internal customers — heads would role quite promptly.
- Few products deteriorate or spoil at a constant rate. Usually deterioration or spoilage is zero initially and only happens towards the end of the useful life of the product at an accelerating rate, or the product has a fixed shelf life.

The authors propose intricate heuristic or algorithmic solution methods to their models. You can also already see the next generation of articles with extensions to several products with substitution effects, joined replenishments, group discounts, a single special occasion to buy at a reduced price, several transportation channels, and so on.

However, the realities of practical inventory control work against the use of complex and computationally onerous models:

1. The savings that can be secured by the use of mathematical inventory control models are generally small. It is only the fact that the same model may be applied to hundreds or thousands of products that justifies the cost of the analysis. Furthermore, the law of diminishing marginal return applies strongly to inventory control models. Easily 80 to 90 percent of the potential savings can be captured with very simple models. The extra cost of analysis and programming for more sophisticated model, particularly if the assumptions used

are of questionable validity, is just not worth it.

2. The 'customer' of inventory control projects are usually people, although highly competent on the practical side, who have little or no background in operations research, let alone mathematics. They will not be able to understand these complex models that may require the use of differential equations or complicated heuristic or algorithmic procedures to find an optimal or close-to-optimal solution. Hence, they will not be able to do the analysis and implementation themselves. A sufficiently trained analyst has to do the job. The required computational power, even the simple presence of a spreadsheet, may not be available. Such models are unlikely to get credibility of the user, and without credibility implementation is unlikely to occur or unlikely to be maintained for long.

I could have chosen other areas, such as one-, two-, or three machine scheduling, repairable item models, multicriteria programming algorithms, etc. In each of these areas, some important, seminal papers have been and still will be written, but the majority are exercises in mathematical masturbation on nonexistent or trivial problems (in terms of real life). Note that I have nothing against this if the authors get their kicks out of it. What I object to is that such work is paraded as operations research. It does not further the discipline, it diverts energy away from where it should go, namely into the process of OR and significant and useful applications that survive more than a few weeks after the operations researcher has disappeared from the scene, it denigrates MS/OR as a discipline of trivial mathematics of questionable usefulness — in short, it gives the discipline a bad name. The only purpose I can see for such publications is that they enhance the promotional prospects of academics. If this is want we want, maybe we should designate some of our journals as '*Letters for the enhancement of academic promotion*' or *LEAP*s. Nobody would then be fooled into believing that they deal with operations research. Adequate subscription rates would be guaranteed by the fact that all universities would need them in their libraries for their struggling academics who are looking for opportunities to score another small extension to a previous extension or another special case of a special case. No doubt, such *LEAP*s would serve a useful purpose!

Ralph Disney is correct in saying that it is very difficult to get journal submissions that are genuine applications. Again, the editorial policies and their implementation by the editors are not without fault. It is much easier to write and get accepted a highly 'mathematical' paper, even if its content is of little relevance. One does not even have to get out of the comforting environment of one's office! One can be reasonably confident that, if it is free of mathematical and logical errors, it will ultimately find a journal, since it will be refereed by other academics who are in exactly the same position as the author(s), i.e., wanting to publish papers on similar or related topics. Recommending the acceptance of such papers may even open up new opportunities for a further variation on the theme. On the other hand, real-life applications require a lot of work, and unless they are path-breaking or close to, they are likely to be rejected as déjà-vue by the same academics who write 'theoretical' papers, nor will they count much towards promotion. If you get your thrills from doing real OR work, would you want to waste your time going through this kind of exercise when the next exciting adventure already beckons you. The current publications practice, with some notable exceptions, such as the applications papers in *Operations Research, JORS,* and *Interfaces,* is largely self-serving to an academic community that pays lip service to dealing in an applied discipline.

What is needed is a complete reassessment of editorial policies and refereeing practices. Papers should not simply be judged for their logical and mathematical correctness, but also for their realism and practical importance. Assumptions need to be properly justified as realistic in total or it should be established, possibly by suitable simulations, that their impact is small over a sufficiently wide range of parameter values. I am sure that such a message will sooner or later sink in. Journals that continue filling their pages with trivia will be recognized as LEAPs. Genuine applications, even if they may be similar to earlier publications, should get preference, particularly if they stress the process of OR, including implementation and maintenance, rather than simply the mathematics of model used and its solution.

Similarly, the teaching of MS/OR should become more application oriented. Many of us are still far too enamoured by the beauty of the mathematics underlying an algorithm, rather than by its practical use. I was rather amused when I recently explained to a colleague at another university the underlying philosophy of my text *Systems and Decision Making,* namely looking at the process

of MS/OR rather than at techniques. His first action after opening the text was to look at the chapter on linear programming and search for the simplex method. He was rather disappointed when he could not find it. 'But how can you teach LP without the simplex method?' he asked. My answer was: 'Why would you even want to teach the simplex method in an introductory OR course. Isn't your aim largely to give an introduction at an appreciation level and to whet the students' appetite for the subject? Why not concentrate on problem formulation, solutions by a spreadsheet solver, and interpretation of the results, including sensitivity analysis, all of which can be taught without knowledge of the simplex method.' But then he was just echoing what practically all introductory OR texts do, even those intended for a first course in OR, namely concentrate on algorithms, supplemented by a few rather meaningless examples of potential applications, simplified beyond recognition.

I do think it is high time that academics reassess their role in how their own actions contribute or hinder the future development of operations research as a discipline for practical applied decision aiding with a potential to impact on strategic issues.

WHY HAS ENORMOUS OR/MS POTENTIAL NOT TAKEN ROOT?

Comment of January Editorial 'Some overseas impressions'

Prof. George Dantzig, Stanford University

I, too, am a firm believer that *"OR/MS has a vital role to play in the real world" and that "there are also many complex and important problems out there where the use of sophisticated OR tools can bring about valuable insights which may translate themselves into substantial additional benefits in terms of lower costs, better performance, or higher returns."*

So why then has this enormous potential not taken root and played a vital role in the real world?

The fault lies not, as your article seems to imply, with the academics who have turned O.R. into a mathematical and computable science. According to von Neumann, this trend to mathematize is inevitable once a subject field begins to be formalized and abstracted into mathematical terms no matter whether the field be physics, chemistry, D.N.A. or the art of decision making. The fault lies elsewhere. As long as O.R. in industry is expressed as software delivered to an operating or planning group and the people skilled in O.R. are not a party to its application, O.R. will continue to have no firm roots.

To have a future, it has to be organized so that it becomes the brains of the firm. Any company that organizes itself from top to bottom with highly skilled O.R. modellers using O.R. methodology will quickly outstrip its competition. To support this claim, I cite three cases where this type of organization was achieved.

During the second World War, I participated in one such effort in the U.S. Air Force Statistical Control and Program Monitoring functions. We worked with many parts of the Air Force in the Pentagon and with the forces in the field. The pressure of war, of course, was necessary to make such a coordinated effort happen. The techniques we employed were recognizably primitive by today's standards, nevertheless, it contributed much to the rapid development of air power and the shortening of the war. In the post-war period, some of us seized the opportunity to spur the development of two important planning tools — linear programming and computers.

I was once told by a Japanese colleague, who later denied it, that O.R. is running Japan. According to my source, one of the secrets of the Japanese industrial success is the meticulous planning and control by small groups at every echelon of a Japanese firm's activities. My guess is that the O.R. and statistical tools employed by them are not very sophisticated, nor do these apparently need to be in order to be very effective. The result is the remarkable rate of penetration of Japanese firms into foreign markets (like a powerful well-coordinated military operation).

About ten years ago, City Service, a company distributing petroleum products via pipelines, was operating in the red. The head of the company was a friend of Darwin Klingman, a specialist in network optimization. He put Darwin **fully in charge of planning and executing the schedules according to plan.** Darwin had to fire a lot of people who stood in his way and nearly got himself killed in the process. His results were spectacular. City Service soon became profitable again.

Many examples can be cited where O.R. software was turned over to unskilled operating people who successfully operated it for awhile. Then, because those using the software had no understanding of it and its originators had disappeared, the software became replaced or out sourced. In such an environment, O.R. has no real roots and no future.

By way of contrast, in the three cases cited, the leaders were obsessed by the idea of beating the competition. Their enterprises were very complex. The formula they chose for success was to put highly skilled and experienced experts in charge of finding the "best" combination of alternative activities for a firm to engage in and also gave these experts an active role in the execution of the resulting operating schedules.

Moral: *Don't install a piece of O.R. software and walk away. Instead, find a way to dig in and become part of the firm.*

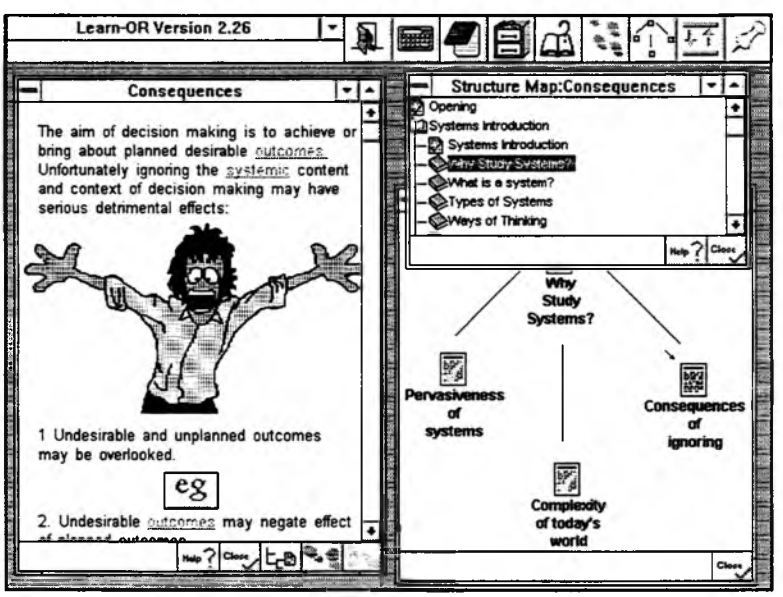
SYSTEMS AND OR/MS METHODOLOGY MODULE FOR MENTOR

Hans Daellenbach and Nicola Petty, Dept. of Management, University of Canterbury

We are developing a module on Systems and OR Methodology for the MENTOR project. The MENTOR (Multi-media EducatioNal Technology for Operational Research) project is a non-profit grouping of teachers of MS/OR producing multi-media teaching materials to increase the efficiency and effectiveness of teaching and learning. It is directed by Valerie Belton and Mark Elder from the Department of Management Science, University of Strathclyde, Glasgow. The materials are in the form of seventeen modules, each covering a different OR topic and each designed to support a course which could traditionally be taught with about ten hours of lecturing plus accompanying tutorials and computer laboratories. The modules aim to encourage active learning, to support different learning styles, and to allow students to learn in their own time at their own pace.

So far several of the completed modules are used as support for teaching MS/OR at the University of Canterbury. The Introduction to OR, Linear Programming, and Simulation modules complement the first-year *Systems and Decision Making* course, MSCI 101. The Linear Programming and Forecasting modules are available for second-year students in the corresponding courses. The feedback so far indicates that students enjoy the interactive aspects of the modules, while finding large amounts of printed text uninviting. The modules are varied in their effectiveness. They appear extremely useful as an adjunct to 'traditional' teaching methods, particularly with large classes.

The MENTOR system has a very accessible authoring package, which enables teachers to adapt modules for their own particular courses, and create their own. A Tutor Support System allows teacher to monitor students' progress closely.



Together with the existing Introduction to OR Module, which gives brief surveys of various OR applications, the new module on systems is intended to serve as the front-end of this learning package. Its aim is to place OR methodology within a broad systems framework. It will closely follow the modeling philosophy and development described in Chapters 1 through 8 of Daellenbach: *Systems and Decision Making* (Wiley, 1994). The non-quantitative nature of the topic led the MENTOR team to assume that this topic might not be a suitable candidate for an interesting module, compared with, say, simulation or networks. However, we have developed numerous ways to make the topic come alive, which is not possible to the same extend in a text that needs to be read

linearly.

The module will consist of seven units, covering the equivalent of about 10 sessions:

Unit 1: Systems concepts and systems thinking. (2 sessions) It will look at 'why we should be concerned with viewing the world in terms of system?' by exploring a number of systems, such as an airline as a transport providing system, the greenhouse effect, the operation of a fast-food restaurant. It explores what might happen if the systemic content of problem situations is ignored. This is followed up by defining what constitutes a system and a classification of systems. Traditional thinking mode based on reductionism and cause-and-effect is contrasted with systems thinking and we show that both modes of thinking are essential. The unit ends with exploring the meaning of and differences between efficiency, and effectiveness. This unit is completed, except for the Visual Basic programs.

Unit 2: People and systems. (1 session) The kind of systems of concern to MS/OR are human activity systems. As a result, the problem identification and the system developed for it are all influenced by the Weltanschauung or world view of the stakeholders. This unit explores the human aspect and the subjective nature of how the problem is viewed and its system definition. It emphasizes the importance of dealing with the human aspect to prepare for and enhance implementation of any recommendations derived. It demonstrates how some aspects are more difficult to change than others, such as values or an organization's culture.

Unit 3: A problem situation. (1 session) The example chosen deals with the producer of TV commercials, faced with the perennial problem of balancing artistic aspects with cost constraints, completion deadlines, and idiosyncratic people. It will be in the form of simulated interviews. The information in the interviews is first captured in a rich picture, which will ultimately lead to the identification of various issues. One of these is selected for more detailed study in the following units. This module will show that individual problems are embedded in problem situations, i.e., complexes or 'messes' of interconnected issues. It will illustrate how different stakeholders in the problem situation may have different world views and how this imparts a degree of subjectivity into the whole process of problem identification and problem description.

Unit 4: Formulation of problem. (2 sessions) A suitable system is defined for the issue selected. The unit explores various ways of capturing the systems definition with various diagrammatic aids, such as influence diagrams, precedence charts, material and information flow charts, decision flow charts, etc. It identifies the inputs into the system and its various sources, the transformation process of the system, and the system outputs, such as performance measures. It will highlight that the systems definition is a conceptual entity that may not exist in this form in the real world, and that different world views will lead to different systems definitions.

Unit 5: A model for the problem. (2 sessions) The unit explores various types of models and their use. It then guides the learner into developing a quantitative/mathematical model for the problem defined in unit 3. The unit also includes other examples to explore a wider range of models and the modelling process. Some of this will be used to demonstrate the art of modelling, namely as an iterative process of enhancement and enrichment. It will look at desirable properties of models.

Unit 6: Model solution and what-if analysis. (2 sessions) The learner will be guided to find a solution method to the model developed in unit 4, and directed to do what-if analysis, leading to the concepts of sensitivity and error analysis. Some of the other examples developed in unit 4 will be used to explore different solution strategies.

Unit 7: Validation and implementation issues. (1 session) Explores why models need to be validated for relevance and appropriateness, as well as verified for logical correctness. It explores different views of implementation and then demonstrates the issues associated with planning for implementation, control and maintenance of the solution, and the final implementation audit.

The module contains an extensive glossary of systems and modeling terminology in the form of hypertext. In each unit, a concerted effort is made to get the learner involved through various nontrivial tasks, as well as allowing the learner to select the path through the unit and the level of depth or detail. It will provide feedback on the student's learning progress.

Each unit will make use of various clipart, extracted from Coreldraw and other sources. Interactive tasks and brief animation will be programmed in Visual Basic. Since the module is intended for use in a computer laboratory setting, it will not use sound, although this would be highly valuable for unit 3. Similarly, the memory requirements for movies are such that no video-clips will be included initially. Instead, sequences of pictures will be used, where appropriate.

A first version of the module is expected to be available by end of February 1996, in time for trials for the 1996 academic year at the University of Canterbury.

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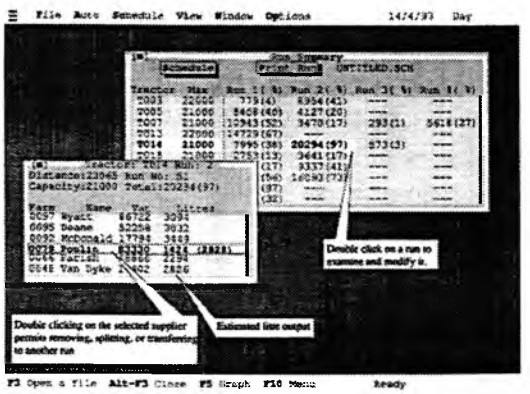
FLEETMANAGER: A VEHICLE ROUTING DECISION SUPPORT SYSTEM

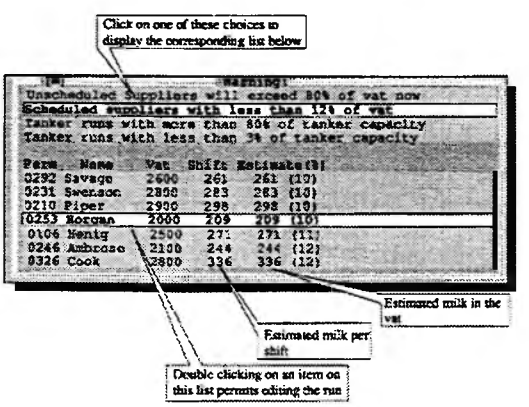
Chuda Basnet and Les Foulds, Dept. of Management Systems, University of Waikato

It seems that there is a resurgence in the application of vehicle routing to the dairy industry. The last OR conference had four papers on vehicle routing, of which two related to the dairy industry. We would like to introduce our work in this area. **FleetManager** is a vehicle routing package we have developed at Waikato. It has been installed at a few locations in New Zealand.



FleetManager is a decision support system (DSS). It is designed to help schedulers make the decisions rather than have the package make the decisions for them. The schedulers can build or modify a vehicle schedule (here used synonymously with routes or runs) and see what effect the vehicle schedule would have on the milk collection scenario. The package incorporates vehicle routing and travelling salesperson algorithms, but we found that the users seldom build schedules *ab initio* using these algorithms. They usually modify some previous schedule to fit the current conditions. In carrying out this task they find a digitized map of their milk collection area particularly useful. Because some suppliers have a relatively low output at certain times of the season, it is not considered worthwhile to visit them daily. Thus part of the scheduling problem is the identification of which suppliers are to be visited for the current shift. There is also the question of the accurate prediction of supplier output. We provide a forecast of milk yield for each shift to help the scheduler in this task. FleetManager is designed to meet the following functional requirements:

- File manipulation: File opening/closing, database managing, etc.
- Schedule Creation: Creating new schedules.
- Schedule checking: Checking how well a schedule will meet the requirements of the scheduler. A schedule may be checked for tanker capacity used, amount of milk collected from individual suppliers, and the amount of milk remaining in the vats of suppliers.
- Schedule Modification: Modifying an existing schedule by such means as adding a new supplier to a run, deleting a supplier from a run, transferring a supplier from one run to another, interchanging suppliers between different runs, etc.
- Schedule Query: Querying a schedule on the relevant statistics, such as tanker capacity utilization, run duration, etc.



To show the operation of the DSS, Figure 1 depicts a window with a summary of all the generated vehicle runs (the top window). All runs can be modified. If the scheduler wants to edit a particular run (say run 2 of tanker 14) double-clicking on it will select the run. The system then automatically displays the bottom part of Figure 1 (the run window). At this point, the output of a supplier can be removed from the run or partly or wholly transferred to another run. This is a very important feature of the DSS, making it a useful tool to respond to different circumstances.

The system can also check a schedule for user-defined deficiencies. Figure 2 illustrates a warning window. In this example,

there are four types of warning characteristics: some suppliers which exceed 80 percent of their vat capacity have not been scheduled; some suppliers which have less than 12 percent of their vats full are scheduled; some tanker runs have more than 80 percent of their capacities; and some tanker runs have less than 3 percent of the tanker capacities. When one of the four is selected, the system displays corresponding list of suppliers or tankers.

The DSS incorporates a digitized map of the area of operations of the dairy company that shows all relevant locations and roads. An example of the use of the graphical interface screen is shown in Figure 3. The information about the current tanker run is displayed at the top left and the current supplier information is shown underneath. Schedule building/editing options are available through mouse interactions.

We have had positive feedback from our users. There were cost savings, mainly in the scheduling effort. But, in addition, the transport managers enjoy the system and find that most of the time it is user-friendly. In terms of their job, they have more time available to perform more creative tasks, to work with the people and to manage the office. Their job has become more rewarding as a result of their adoption of this system.

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FOCUS ON TIME-BASED COMPETITION IN THE DEPARTMENT OF MANAGEMENT SYSTEMS, UNIVERSITY OF WAIKATO

Les Foulds, Department of Management Systems, University of Waikato

Superiority in new product development is a hallmark of many of the world's most successful companies and a key source of competitive advantage. Like competition itself, competitive advantage is a constantly moving target and the most powerful new source of competitive advantage in manufacturing may well be time. The Japanese experience provides a most instructive example. Many Japanese companies are now capitalizing on time as a critical source of competitive advantage: shortening the planning loop in the new product development cycle, trimming processing time in the factory and managing time in the way most companies manage costs, quality, and inventory. The world manufacturing environment is changing dramatically. Gone are the days of comfortable protected niches, and of geographical isolation. For New Zealand manufacturers, time can be a real competitive weapon, just as important as money, productivity, quality and innovation. Managing time in new product development provides opportunities for New Zealand companies to occupy new market niches and upgrade the technological sophistication of products. However, while some New Zealand companies have accepted this paradigm and are time-based competitors, many report that they are dissatisfied with their performance concerning new product development. Les Foulds, Professor of Management Systems, and Dr Pavel Berka, a former Postdoctoral Fellow in Management Systems, have examined why new delays occur and what can be done to avoid them. They hope that the conclusions from their research will improve the current manufacturing situation in New Zealand and elsewhere.

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THE CRAFT OF DECISION MAKING:

Book Review and Comment

John Scott, Department of Management Systems, University of Waikato

The first opening of a fresh, new, potentially interesting book is still to be savoured — kept for an appropriate moment. This came last Saturday with the early morning cup of tea, and Patrick Rivett's book *The Craft of Decision Making* (Chichester: Wiley, 1994).

The contents page: always a first indicator. Ah! Here we read of "Syringe Trouble", "The Pastry Man's Tale ", and "Tattie Fabrix". Immediate interest! "Logic and Common Sense", "Describing a Problem". No standard text book list of techniques here. Reminiscent of Russell

Ackoff's *The Art of Problem Solving* (N.Y.: Wiley, 1978).

Rivett says "The book is concerned with the analysis of the consequences of decisions and is aimed at teachers and graduates in Management Science", but "hopes that it will also be of interest to managers and executives". Cases are the main-stay, but rather than present them as lifeless objects for solemn student dissection, an attempt is made to make them lively, to mix the serious side with a little fun. For instance, "Unfortunately, hard and soft systems approaches (and even moderately squashy ones) can be taken like primitive religious beliefs in a state of hostility to all others." The nine case studies, presented as nine lives, are each separated by sections which describe some of the principles of practising MS/OR. These sections, written in narrative form, include material on uncertainty, deterministic problems, forecasting, and the analyst's role.

Are the cases relevant to New Zealand? They are mainly British-based, and I had little trouble seeing them taking on a life of their own in a New Zealand context. The degree of mathematics? There is hardly an equation to be seen. As one has perhaps come to expect of Rivett, the book is not always easy to read. It is rich in metaphor and anecdotes. Perhaps too rich in that continuity is lost at times. It is, however, an interesting, active reading for anyone interesting in practising problem solving, student or practitioner. The cases demand activity and come up with a useful moral at the end. "Further Work" gives follow-up exercises. An interesting question is: Could the book be used as a text book? My view is Yes. One possibility would be to focus the class room discussion around the narratives, using the excellent set of references and bibliography as extensions, then introduce the related case and set the "further work" as homework, to be presented and discussed at the start of a subsequent session. Two hour sessions (minimum) would be needed. However, a more challenging and lively approach would be to use the Problem-based Learning style adapted in Anthony Starfield's *How to Model It* (N.Y.: McGraw Hill, 1990) to deliver and work with the cases, still using the further work as home work. It would be challenging. There is no "instructor's manual". The students would have to be interested in problem solving, but could be undergraduates, contrary to the book's intention, or MBA students — it would be ideal there. It would be of little use for students encouraged to feel that mathematical dexterity equates with decision modelling. Students who are successful in such an environment tend to sadly get bored with cases like these, seeing the outcome as largely simple or self evident.

Rivett has produced a useful edition to the more stimulating new breed of (text) books that have appeared in the last few years. James Evan's *Creative Thinking* (Cincinnati: South Western Publishing Co., 1991) and Hans Daellenbach's *Systems in Decision Making* (Chichester: Wiley, 1994) are two that come to mind. Is this the sign of a discipline finally starting to address the issues critical to effective decision modelling and presenting them in a form that can be useful in the classroom? We might survive yet!

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THE 31st ANNUAL ORSNZ CONFERENCE, WELLINGTON 31-8 / 1-9-1995

Jonathan Lermit, Past-President

The strength of OR in NZ is increasingly to be seen in the diversity of problems that are addressed. This was amply demonstrated by the wide range of papers presented at this year's conference. While past conferences have concentrated on particular themes, it is refreshing to see a conference where so wide a range of issues was examined.

A strength of our conferences has always been the guest speakers. The choice of speakers, covering the broad issues on what OR is *about* rather than the narrower issues of solving specific problems or coverage of a technique, indicates a level of maturity in the OR community. Fred Baird gave a very challenging talk which may well help to shape the future direction of OR in New Zealand. The talk on Community OR by Ann Takert and Leroy White brought to New Zealand an area of interest which seems not to have been given its proper recognition here — perhaps we will see a surge of activity in this interesting and important field.

The conference was well attend by *users*, as well as academics and practitioners of OR. I enjoyed talking to these people and learning of their problems and concerns. It is very clear that we

are now reaching a wide audience of concerned user who can bring a rich range of problems to OR.

As always, the Young Practitioners showed their older colleagues a few tricks. Clearly, there is a great deal of talent coming through the universities under the able guidance of a dedicated team of academics. Hopefully, these people will enjoy a long career in OR, or at least take their skills into management positions.

A wide range of interesting paper on applications were presented. Besides the scheduling problems in areas such as airlines, milk tankers, and electricity, which because of their importance to NZ are a regular feature of our conferences, we saw novel applications in school time-tabling, possum control, and placement of electronic components, among others. Theory was not neglected either. Excellent papers covered on topics ranging from mathematical programming languages through concave minimisation to the knapsack problem.

I came away from the conference with the overall feeling that the contribution made by the OR community is very significant compared with the size of our country. We are, however, at a turning point as the subject matures. New issues, new themes, new ideas are coming through as the role of OR becomes increasingly appreciated for what it can do for the economy and for the community.

The conference ran smoothly, the dinner was fun, the facilities at Victoria University were excellent, and most importantly, everyone seemed to have a good time renewing old contacts and making new ones. OR is very much alive and well in NZ!

REPORT FROM COUNCIL MEETING

Mikael Ronnqvist, Secretary ORSNZ

At the first council meeting held on the 19th September we had discussions around a number of items and below I highlight some of the most important.

It was decided that Bruce Lamar and Albert Lee with the paper entitled "A Strategic Investment Model for Phased Implementation of Flexible Manufacturing Systems" should be the ORSNZ national contribution paper at IFORS 1996.

There was a long discussion about how the council would try to direct the OR Society in the future. Among the important issues were membership, the ORSNZ conference, APJOR, education, and links with other societies. Questions and comments around these areas were also raised at the AGM at the recent OR conference.

It was decided that the members of the Society should be polled seeking submissions on future directions of the ORSNZ. This is done by a questionnaire which is circulated with the this Newsletter.

The well known George Nemhauser will visit New Zealand during the second half of November. The council discussed how the Society could benefit from this visit. It was decided to offer George Nemhauser a sum of NZ$500 as a contribution towards expenses, provided that he offers seminars to the branches of the ORSNZ at Auckland, Waikato, Wellington, and Christchurch.

MISCELLANEA

ASOR establishes the Australian Institute for Operations Research (AIOR)
to promote training in OR and the dissemination of current developments to the wider community. It will offer and sponsor workshops and seminars.

OR homepage on WEBB for ASOR, established by Moshe Sniedovich, Math. Dept. University of Melbourne, called up by http://www.maths.mu.oz.au/~worms/asor/

ORSNZ Questionnaire: Please spend a few minutes filling in the questionnaire included with this Newsletter and return it promptly to Dr. A. Philpott. The future of the society is you! Hence your opinion counts!

ACADEMIC VISITORS

Professor George Nemhauser, School of Ind. & Systems Eng.. Georgia Institute of Technology
OR Group, Department of Mathematics, Melbourne University, Sept.-Dec. 1995
Contact: Natashia Boland, e-mail: natashia@maths.mu.oz.au
He will offer seminars and several workshops.
Prof. Nemhauser will also visit the University of Auckland end of November and offer seminars in Auckland (13-15/11), Waikato (17/11), Wellington (20/11), and Christchurch (22/11). Members will be advised by the various branches.

Dr Istvan Mezgar, Hungarian Academy of Science
Dept. of Management Systems, Waikato, 19/10 - 4/11/95
Contact: Chuda Basnet, e-mail: chuda@waikato.ac.nz
Interests: world class manufacturing.

Steve Wright, Maths & Comp. Science, Argonne Nat. Laboratories, USA
Visiting Dr. D. Ralph, Melbourne University, Nov. 1995
Contact e-mail: danny@mundoe.maths.mu.oz.au
He will offer a workshop.

Professor Klaus Neumann, University of Karlsruhe
Dept. of Management Systems, Waikato, 1/2/96 - 1/5/96
Contact: Les Foulds, e-mail: L.FOULDS@waikato.ac.nz
Interests: Scheduling

Professor Michael Jackson, University of Humberside, Hull
Department of Management, University of Canterbury, 16/3 to 19/4/1996
Contact: Hans G. Daellenbach, e-mail: h.daellenbach@mang.canterbury.ac.nz
He will offer graduate seminars and public lectures.

John Mingers, Warwick Business School
Visiting lecturer with the Department of Management, University of Canterbury, mid-January to end June 1995
Contact: Hans G. Daellenbach, e-mail: h.daellenbach@mang.canterbury.ac.nz
He will offer seminars on problem structuring and soft systems methodologies.

MEETINGS CALENDAR

International Conference on Globalisation and the Market Economy
28-30 December 1995
New Delhi: Holiday Inn Crowne Plaza, Barakhambra Avenue
Organised by Management Science Ass. (Univ. of Delhi), and several other organisations.
Final paper deadline: 1 November 1995 (abstracts of 2 pages may be sent earlier)
Information: Prof. S. Neelamegham, Faculty of Management Studies, University of Delhi, Delhi - 110007
Fax: 011-7257194, 6886427

Want to combine a conference with skiing? You have still time for the
9th International Working Seminar on Production Economics
12-23 February 1996
Innsbruck, Austria
Abstract deadline: 1 November 1995
Information: Janerik Lundquist, Dept. of Production Economics
Linkoping Institute of Technology, S-581 83, Linkoping, Sweden
Fax: 46 1328 1873
e-mail: JEL@ipe.liu.se

INFORMS Spring Meeting
5 - 8 May 1996
Washington D.C.: Washington Hilton and Towers
Abstracts: 7/10/1995
Information: T. R. Gulledge Jr., George Mason University, Fairfax VA 22030-4444
FAX 001 703 764 4692
e-mail: gulledge@gmu.edu
Note: same venue/time for Joint Conference of Information Systems and Technology (abstracts 1/9/95) **and Analysis to Support Public Sector Decision Making**

1996 Asia Pacific Decision Sciences Institute Conference
21-22 June 1996
Hong Kong: The Hong Kong University of Science and Technology, East Kowloon
Abstracts: 4-5 double-spaced pages of full paper, plus a title page with authors, affiliation, complete addresses, phone/fax/e-mail of corresponding author, by 1 February 1996; notification of acceptance by 1/4/96; full paper by 1/5/96
Information: Kar Yan Tam, Information and Systems Management
HKUST, Hong Kong
e-mail: apdsi@usthk.ust.hk

4th European Conference on Information Systems
2-4 July 1996
Lisbon, Portugal
Complete papers: in the style of European J. of Information Systems of no more than 5000 words, by 30 November 1995
Information: Prof. J. Dias Coelho, ISEGI, New University of Lisbon,
Tv. Estevao Pinto, 1070 Lisboa, Portugal
Fax: 351 1 387 2140
e-mail: ECIS96@EPSYLON.ISEGI.UNL.PT

1996 IFORS Conference in Vancouver, B.C.
8 - 12 July 1996
Venue: Hyatt Regency, Vancouver
Conference theme: OR bridging the theory and practice of decision making
Deadline for abstracts: 31 October 1995
Format: submit three copies, single space, paper title, 50 word abstract limit, author's name(s), full mailing address, presenter. Include abstract fee of CAD$100, payable to IFORS 96, by cheque, VISA, or Mastercard.
To: Conference Secretariat, IFORS 96, Venue West Conference Services Ltd., 645 - 375 Water Street, Vancouver, BC, Canada V6B 5C6, FAX (604) 681 2503
Chairman program Committee: Prof. Theo Stewart
Dept. of Math. Statistics, University of Cape Town
Rondebosch 7700 South Africa
FAX +27 21 650 3918/3726
e-mail: TJSTEW@maths.uct.ac.za

APORS' 97 - 4th Conference - PRELIMINARY ANNOUNCEMENT
30 Nov. 1997 - 4 Dec. 1997
Melbourne, Australia
Invitation to be added to mailing list, contact:
APORS' 97, c/o ASOR Melbourne Chapter
GPO Box 1048H, Melbourne, Australia 3001
e-mail: P.Lochert@sci.monash.edu.au
FAX (61) 3 903 2227
If you intend to give a paper or organize a session, contact P. Lochert

Operational Research Society of New Zealand *(Inc)*

At the Annual General Meeting of the Operational Research Society of New Zealand held at the Conference in Wellington on August 31, a number of important issues confronting the ORSNZ were raised. The central issues raised related to:

1. A perceived decline in membership;
2. The function of the Asia Pacific Journal of Operational Research (APJOR);
3. The role of ORSNZ in education, especially of people who had recently embarked on a career in operational research.

As incoming President of the ORSNZ, I promised members at the conference that they would be invited to make submissions to the Council on the above issues as well as the future direction of the Society. The purpose of the following questionnaire is to assist you in making these submissions. This questionnaire is anonymous, but responders may sign it if they wish. In any case the opinions expressed will be treated in confidence by the Council.

Please attempt to answer the following questions, and feel free to accompany the answers with comments. The completed questionnaire should be posted to

Dr M. Ronnqvist
Secretary, ORSNZ
Department of Engineering Science
University of Auckland
Private Bag 92019
AUCKLAND

so as to reach him no later than November 20, 1995.

Dr Andy Philpott
President
ORSNZ

Questionnaire

Q1. I work primarily in

(1) an academic or teaching institution,
(2) a public/government organisation,
(3) a state-owned enterprise
(4) an OR consultancy
(5) industry
(6) none of the above (please state) _____

Q2. Give the approximate percentage of work time that you spend on each of the following activities:

(1) OR teaching, _____%
(2) Research and reading the OR literature, _____%
(3) OR in practice. _____%

Q3. Give the number of years you have been engaged in OR activity: _____

The ORSNZ is running an annual deficit, and its membership appears to be declining. It was agreed at the AGM that Society fees would not increase this year. However it is important to see whether the current fee ($45.00 for most members) is perceived to be a good deal. This is the purpose of the next question.

Q4. Membership: Would you continue to remain a member of ORSNZ if, with no change in the services provided by ORSNZ, subscriptions were increased by

(1) $10 per annum?_____
(2) $20 per annum?_____
(3) $30 per annum?_____

Q5. Membership: General comments and suggestions for boosting membership

_____
_____
_____

The following questions relate to APJOR, the subscription for which forms part of the ORSNZ member subscription. The editor of APJOR stated at the AGM that the journal receives few submissions from ORSNZ members. The recent survey results published in the April 1995 ORSNZ Newsletter show that members (or at least survey respondents) overwhelmingly support "debundling" APJOR from their subscriptions. This may mean that members are dissatisfied with the content of APJOR, or simply want a choice. We need to determine how widespread any dissatisfaction is, what function members wish the journal to perform, if any, and seek some remedies.

Q6. Journal: The journal APJOR in its current form has much to offer ORSNZ members.

0 1 2 3 4 5
disagree agree

Q7. Journal: I would favour more OR/MS applications to be published in APJOR in preference to OR/MS theory.

0 1 2 3 4 5
theory applications

Q8. Journal: In the past five years I have submitted _____ papers for publication in APJOR.

Q9. Journal: I would like the APJOR subscription to be continued to be bundled with the membership subscription.

0 1 2 3 4 5
disagree agree

Q10. Journal: I would prefer another journal/magazine to come as part of my ORSNZ subscription.

(1) OR/MS Today : _____
(2) Interfaces : _____
(3) Operations Research : _____
(4) JORS : _____
(5) EJOR : _____
(6) Management Science : _____
(7) Other (please state) : _____
(8) No journal at all : _____

It is conceivable that if there was sufficient interest in some titles, the ORSNZ could negotiate a reduction in subscription for each member for OR/MS journals of their own choice, either instead of a bundled title for every member, or in addition to it.

Q11. Journal: The ORSNZ should attempt to negotiate for members reduced subscriptions for some international journals/magazines.

0 1 2 3 4 5
disagree agree

(If so state which ones: _____)

Q12. Journal: General comments

_____
_____
_____

Fred Baird from CORE Management Systems gave a very stimulating address at the Conference which raised a number of questions about the role of ORSNZ in fostering the education of those embarking on OR/MS careers. As well as discussing what constitutes an appropriate curriculum for a tertiary qualification in OR/MS, Fred's talk exposed a need felt by a number of recent graduates (and some OR/MS "lone rangers") for continuing education in the subject, possibly administered by some experienced OR/MS practitioner acting as a mentor. The Council at its recent meeting discussed this and other approaches which might be used to encourage recent graduates to become and stay members of the Society. Sponsoring visits from distinguished visitors from overseas is one mechanism by which the ORSNZ can inspire the young (and not so young) members of the Society to stay interested in the discipline. We would be interested to hear of any other suggestions.

Q13. Education/ Mentoring: The ORSNZ should provide a mentoring system for its members.

0 1 2 3 4 5
disagree agree

Q14. Education/ Mentoring: I believe that I would benefit from the advice of a mentor.

0 1 2 3 4 5
disagree agree

Q15. Education/ Mentoring: I would be prepared to act as a mentor for ORSNZ members.

0 1 2 3 4 5
disagree agree

Q16. Education/ Mentoring: The ORSNZ should aim to invite and support an ORSNZ Distinguished Visitor on a regular basis.

0 1 2 3 4 5
disagree agree

Q17. Education/ Mentoring: What percentage of your annual subscription ($45) would you like to see spent to support a Distinguished Overseas Visitor programme?_____%

Q18. Education/ Mentoring: The ORSNZ conference organizers should actively solicit tutorial papers to allow state-of-the-art addresses on particular OR/MS topics and techniques.

0	1	2	3	4	5
disagree					agree

Q19. Education/ Mentoring: General comments

_____

_____

_____

By virtue of its interdisciplinary nature OR/MS interacts with many other fields, some of which (such as computer science) have been seen as a threat to the survival of our field. On the other hand OR/MS should endeavour to remain eclectic, and embrace the contributions which other disciplines might make to our field. This raises the question of whether the ORSNZ should seek closer links with other societies, and what form those links should take.

Q20. Links with other NZ Societies: I would favour closer links with the following New Zealand Societies

(1) Australia New Zealand Society of Industrial and Applied Mathematics
(2) Australia New Zealand Academy of Management
(3) NZ Society of Accountants
(4) NZ Strategic Management Society
(5) NZ Royal Society
(6) NZ Mathematical Society
(7) NZ Computer Society
(8) NZ Association of Statisticians
(9) NZ Production and Inventory Control Society
(10) Other (please specify)_____

(Please suggest what sort of links you favour e.g. sharing costs of invited speakers,

_____

_____

_____

The ORSNZ maintains links with other OR societies within APORS. (Vicky Mabin is Vice President of APORS, and is the ORSNZ liasion with this organization.) The Australian Society of OR (ASOR) has recently become a very active group in the promotion of OR. (The triennial APORS Conference is to be held in Melbourne in December 1997, and it has been suggested that this replace the annual ORSNZ conference in 1997.) ASOR also hold their own regular conference, and have recently sponsored a number of visits from distinguished overseas academics. There therefore seems to be some value in ORSNZ collaborating more closely with ASOR than we have done in the past.

Q21. Links with ASOR (Australian Society of OR): APORS 97 should take the place of the annual ORSNZ Conference in 1997.

0	1	2	3	4	5
disagree					agree

Q22. Links with ASOR (Australian Society of OR): I would favour closer links with ASOR

0	1	2	3	4	5
disagree					agree

(Please suggest what sort of links you favour e.g. sharing costs of invited speakers,

_____

_____

_____

Q23. Links with ASOR : I would favour a joint conference with ASOR

(1) every year instead of the ORSNZ conference
(2) every year in addition to the ORSNZ conference
(3) every alternate year instead of the ORSNZ conference
(4) every alternate year in addition to the ORSNZ conference
(5) every three years instead of the ORSNZ conference
(6) every three years in addition to the ORSNZ conference
(7) under no circumstances
(8) other (please specify) _____

_____

Q24. Links with ASOR: General comments

_____

_____

_____

Q25. Newsletter: The ORSNZ Newsletter is an important vehicle for the society to share information and experience?

0	1	2	3	4	5
disagree					agree

Q26. Newsletter: I would be prepared to pay a higher subscription if the extra money were invested in making the Newsletter a bigger part of the Society's function?

0	1	2	3	4	5
disagree					agree

Q27. Publicity: The ORSNZ Society should be commenting more often in the media on public issues within its field of expertise?

0	1	2	3	4	5
disagree					agree

Q28. Newsletter and Publicity: General comments

_____

_____

_____

ASOR have already established a home page on the World-Wide-Web. A similar service in New Zealand, linked to the ASOR page, and possibly further afield, could be of enormous benefit to ORSNZ and its members, as a means of communicating ideas, seeking assistance with OR problems, providing mentors, and placing and seeking job advertisements. There are a number of technical, legal, and economic questions to be answered (what can we do, and how much will it cost us?) before we take any firm action, as well as seeing whether it is a service which ORSNZ members would find useful.

Q29. World-Wide-Web Home Page: Do you already have or expect to obtain access to the Internet in the next 3 years?_____

Q30. World-Wide-Web Home Page: I would be interested in Council investigating the provision of a World-Wide-Web Home Page for the ORSNZ.

0	1	2	3	4	5
not interested				very interested	

Q31. World-Wide-Web Home Page: I am interested in being listed in an ORSNZ World-Wide-Web Home Page directory of New Zealand OR experts.

0	1	2	3	4	5
not interested				very interested	

Q32. World-Wide-Web Home Page: General comments

General submissions: Please feel free to write here any views or ideas you might have about the direction of the Society which are not covered by the above questions.