

General : After graduating with an honours degree in mathematics from Melbourne University, I completed a Post Graduate Diploma in Operational Research from Strathclyde University and subsequently an MSc in Statistics again from Melbourne University. Since then I have gained over 25 years of experience as a *Statistical and Operations Research consultant* working both internally and externally to organisations both in Australia and overseas. Interspersed with industrial positions, I have maintained strong links with Academia by being both a full-time and part-time lecturer and a university statistical consultant.

Application Areas : Over this period of time I have gained broad experience in a wide variety of application areas and industries, such as, telecommunications, computing, marketing, banking, government, manufacturing, transport and logistics, health, etc.

Methodology : The focus of this work has been to *propose, develop and implement*, in close collaboration with users, effective management tools to facilitate decision making. The core approach is to use the discipline of model building from a scientific standpoint in an Operations Research framework. Extensive use is made of data analysis and mathematical formulations to create specific purpose models, whose greatest utility occur in complex,

highly variable situations where problem structuring becomes an issue.

The proliferation of spreadsheets has created opportunities for the OR approach to become more current and open to wider application possibilities.

Model Building : There are many advantages to the use of a model building approach to the management of processes. Properly implemented they can form part of the organisation's learning and memory procedure, ie, become a part of the knowledge system. Over time, conditions may change or deeper insights may be gained. With a well designed model the additional knowledge can be added to the model for use when the next planning round is undertaken.

The stages of a OR consultancy may involve :-

- an audit review of a process with a view to using the model-building approach,
- the development of a proposal for the construction and implementation of such a statistical / OR model for the process,
- undertake an OR study including a detailed modelling exercise,
- design and deliver custom workshops in OR and Statistics.

Areas of Specific Expertise and Experience

Specific expertise has been built up in the following areas :

- Statistical Consulting
- Statistical Process Control
- Forecasting
- Simulation Modelling
- Model Building for Decision Support,
- Excel as a knowledge creation tool

Statistical Consulting

Design of questionnaires, analysis of survey results

Data gathering methods, reliability analysis for sources of variability

Perform business process analysis using industrial and commercial data

Experimental design and analysis using univariate and multivariate statistical techniques

Statistical model building

Statistical techniques : ANOVA, MANOVA, analysis of repeated measures designs, Principal Components Analysis, Factor Analysis, structural modelling using Lisrel, Times Series Analysis, Regression Analysis

Applications : almost all projects involve an element of statistical analysis - recent projects include the development of banking performance measures; analysis of oil pricing data, chick pea growing and cooking, bread making; surveys of multi-unit housing, library performance; modelling of a lubricants filling line, etc.

Statistical Process Control

Audit review for the potential for implementation or the current usage of SPC

Prepare a project plan for the implementation of SPC

Conduct workshops and training at all levels of an organisation. The delivery material may be prepared specifically for the process under consideration – the syllabus could include review of the Quality philosophy for manufacturing and/or service industries, the basic SPC charts, advanced process control including multivariate control charts, review of the sources of variability, etc.

Statistical modelling of process data for use in an SPC environment

Experience : Shell Bitumen plants, plastics, refineries, blending plants and laboratories, Comalco (Bell Bay), Gerrard Strapping Systems, Telstra, Academy of Grain Technology laboratory

Forecasting

Forecasting for stock control, product sales, company turnover, service demand, multi-pack multi-line products, new products and services Strategic modelling in competitive and regulatory environments, and in situations of structural changes

Review and audit forecasting processes for data quality and

Areas of Specific Expertise and Experience (contd.)

validity, forecasting models, process reliability and timeliness, hardware and software suitability, functional requirements, system integration, incorporation into wider planning systems.

Management of qualitative information in forecasting models

Forecasting Techniques: univariate methods such as the decomposition models for trend and seasonality – moving averages, exponential smoothing, complex statistical models such as Box-Jenkins, Kalman filtering, regression analysis, multivariate causal modelling.

Experience : Lyons Bakery, Philips Electrical, Telecom (Australia), European Commission, German Post Office, multi-client telecommunication projects, Linde, ICI Industrial Chemicals, Shell (Australia), ACI Glass, Incitec, BASF Ltd.

Simulation Modelling

Model definition through a process analysis

Design, capture and analysis of process data

Development of model structure in different simulation languages and packages, models may be discrete event or continuous flow,

Conduct and interpret statistical experiments incorporating selected structural model changes

Report and recommend from the statistical experiments

Applications : simulating oil platforms, lubricants blending and filling plants, WIP studies, bootstrapping parameters in statistical models.

Model Building for Decision Support

This is a general modelling situation where tools at hand such as spreadsheets are used to create a support system for aiding decisionmaking

In close collaboration with the decisionmaker, define the model structure, collect data, agree the performance criteria to be optimised, develop tool to allow the easy investigation of 'what if' alternatives. Database analysis, linking or design may also be involved.

Spreadsheets have a number of powerful facilities such as the 'solver' addin and the regression function, which may be exploited to advantage in a decision support model.

Applications : financial modelling, market performance, strategic management, manpower planning.

Areas of Specific Expertise and Experience (contd.)

Excel as a Knowledge Tool

The spreadsheet, as a paradigm, is often a misunderstood entity. By comparing it to a database system, its essential point is being missed – that of flexibility as an environment for creating model prototypes, for conducting ad hoc analyses and for collecting the abstracted views of a decisionmaker's world.

Services that can be offered:

- Model development with or without standard addins
- Model troubleshooting
- Spreadsheet auditing
- Advanced Excel training in
 - Standard addins
 - Statistical analyses and data presentations
 - Optimization
 - Monte Carlo and other simulations
- Interface and Add-in development
- VBA Coding

Experience : Alliance Capital – Excel as a Fixed Interest Management tool with application to monitoring data quality, reconciling trading positions, reporting on performance and daily attribution of performance, interfacing to a deal origination database system. Cargills- production/ distribution model using What's Best and Monte Carlo simulation. INDEC Consulting, adhoc model extension. Teaching at RMIT and Monash in MBA, Engineering and Quality Management and Business Systems in subjects using the Excel environment to develop decisionmaking skills.