

Smit Consult offers Consultancy in Statistics

We offer the best assistance in statistical consultancy in various fields:

1. **Setting up experiments.** How should Experiments be set up in order to meet the requirements, such as high D-efficiency and preserving orthogonality as much as possible to gain as much information as possible from the responses. Apart from that, tests for linearity of the model for the response(s) can be incorporated in the design; expected non linearity may affect the experimental set up. The number of experiments may depend on the required sensitivity of the resulted model, and on the costs of a single experiment, and the available resources. It is of utmost importance to incorporate the a-priori information of the responses and the experimental domain in the experimental set up. All experiments should not have a specific order, as this may affect the responses, randomly assigning the experiments to an order may solve this. Depending on the constraints in the domain of the experimental factors, we can chose for a split plot design, or random assignment of experiments to the groups of raw materials.

2. **Analyzing the data and obtain a model.** This implies a number of techniques to obtain a model that best describes the data, and that meets the assumptions such as equality of variance and normal distribution of residuals. This data is in most cases multivariate (for the predictors or independent variables), but also the response variables are nowadays multivariate, which implies that the residuals are multivariate. The response variables can be highly correlated, so that techniques should be used to reduce the dimensionality of the data. The model should be highly sensitive to small changes in factors that are not included in the model, in order to obtain a robust model. Models can be compared with each other in order to obtain the “best” model, and models can be further validated in other environment. There are numerous techniques that goes with analyses, such as weighting the variables (both predictor and response variables), and weighting observations depending on the quality of measurements.

3. We have much experience with **presentation of the data**, and retrieving information that may be of much interest. Our multivariate experience strives to find, with the people in the field, patterns and relationships that otherwise cannot be found. Multivariate analyses require multivariate presentations.

4. **Literature drives the use of statistics**; not software products for statistical analyses. Most analyses can be made with many software products. Nowadays there are no, or hardly differences between these products. We started to work with SPSS in the 1980-ties, but have experience with many products, such as **JMP**, **STATGRAPHICS**, **SigmaPlot EViews**, **GAUSS** and **MODDE**, the **Unscrambler** and others. Many analyses can be made with Excel, even Maximum Likelihood, bootstrapping, and simulations. At the same time some products are developed for specific applications, which can be fully used.

5. **Multivariate techniques** are not always easy to use. In most cases we have to stay in line with the statistical methods, such as including in the model autocorrelation, if present. Using transformations if non-normality is obtained in the residuals, and adjusting for non homogeneous variance in the residuals. Using lack of fit statistics can increase the accuracy in the model.

In Excel we have set up a number of statistical techniques such as:

- A number of non parametric tests to compare group medians (paired, groups, and others)
- Exact tests
- One or more Factor fixed effect Anova
- Regression analyses
- Equality of probability
- Exact confidence interval with a specific level of a probability
- Multivariate regression
- Equality of probabilities
- Multivariate Logistic regression
- PLS and PCA
- Various smoothing techniques and classification analyses.

All analyses contain the following aspects :

- General statistics from the data
- Test of hypotheses
- Power statistics of test
- Test of meeting assumptions
- Model specification
- In addition : bootstrapped statistics, simulation and others

Drs Ing. J.A.C.M. (Jan) Smit is much numerical oriented and also much service minded. Each consult goes with a description of the work to be done, and what is advised.

Our mission: working with industry and institutions to come to improved new products, new insights in the field, by means of the use of statistical analyses. With the use of statistics one can obtain solid and sensitive results that can be used for modeling and prediction of response for new observation. With statistics one can obtain a production environment with lower faults; and find settings of parameters of controllable factors, such that uncontrollable factors have less effect on the process. And where the resulted standard deviation is lowest.

Our rate is depending on the number of hours expected for the job; the elapsed time of the job and the distance to the organization. In many cases providing a short statistics course to the field experts is part of the job.

We are looking forward to serving you! Please contact us for more information:

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