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CRYSTAL BALL

Oracle Crystal Ball and Minitab

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Executive Overview

If you have successfully deployed Minitab within your organization as a statistical analysis and data visualization tool, congratulations! You have taken the first step in the journey towards data-based decision making. However, it is vital that you complete this toolset by implementing robust simulation and optimization capability to understand and manage risk --- or face the possibility of leaving significant money on the table, often in the millions of dollars.

Today's Business Climate

Competitive pressures and the global economy have forever changed the way people work at companies around the world. Risk and uncertainty exist in virtually every functional and support area in today's enterprise. While once the analytical domain of a few business specialists, companies now require employees in nearly every occupational discipline to both understand and manage business risk.

White For example, they expect those who make decisions to quantify the risks of their decisions; they expect those who develop products to reduce development time and expense; they expect engineers and scientists to increase product performance and quality; and they expect those who manage to control variation in all processes, products and services. These expectations require people across functional areas and disciplines to perform statistical-based analysis --- frequently with a minimum of statistical training.

Why Statistical Analysis and Simulation Analysis are Critical

Statistical methods were created as tools to help understand how real systems behave in the natural world. Models developed through these methods have become essential aspects of business and science. For example, to design a product, an engineer relies heavily upon models of physical systems. To assess a business plan, a financial analyst or decision-maker uses models of economic and business systems. Statistical analysis software such as Minitab is vital for statistical analysis and data visualization. It is used to create, study, and verify a statistical model of a physical system (i.e. product, service or process).

Simulation and optimization methods are used to **predict and reduce risk** in the aforementioned statistical model. They are used to study large quantities of virtual experiments which are impractical or impossible to study in the business world. For example, a manufacturing engineer can simulate the impact of tolerances on the fit of parts in a product. Without building a single prototype, the engineer can eliminate the risk of fit problems and assure a trouble-free production startup. Even phenomena which are impractical to measure with accuracy, such as fluid flows or market penetration, can be studied economically and effectively with simulation.

Together, these methods enable us to understand how real systems behave and to predict how they are likely to behave in the future. Understanding this behavior allows us to make complex decisions faster, with more confidence and less risk.

Complimentary Tools for Statistical Automation

As such, software to automate this business analysis has become CRITICAL in the areas of *risk analysis* and *decision analysis*. It is important that we gain insight into a business process through statistical analysis and modeling of data but it is **absolutely vital** that we understand and address the areas and magnitudes of risk prior to committing to a decision.

To succeed, any software solution must allow people to perform these types of analysis without requiring them to master the theories or methods behind such analysis. Crystal Ball and Minitab® are two such complementary software products.

A Case Study Example

In a recent project, an engineering team within a well-known Industrial Manufacturing company studied the failure rate of a security product deployed in the field. Specifically, the team was tasked to examine the predicted time-to-failure as a function of component dimensions. As the internal parts wear out, which parts are the most significant contributors to product malfunction? How can this design be improved to reliably deliver the performance required?

To answer these questions, the team utilized the following approach:

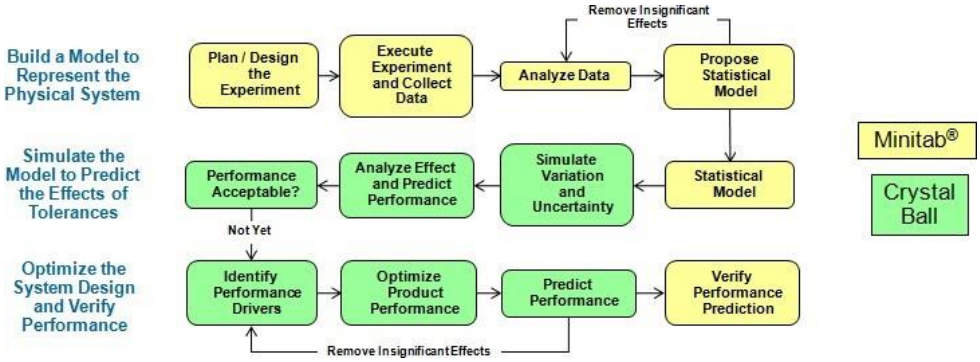

Figure 1. Minitab and Crystal Ball

Of note in this project is that the simulation clearly identified inadequate reliability in the product and identified the key performance drivers. With this information, the team used the Crystal Ball Optimizer (OptQuest) to search and find a better and more stable design solution resulting in over $1M in replacement and return savings.

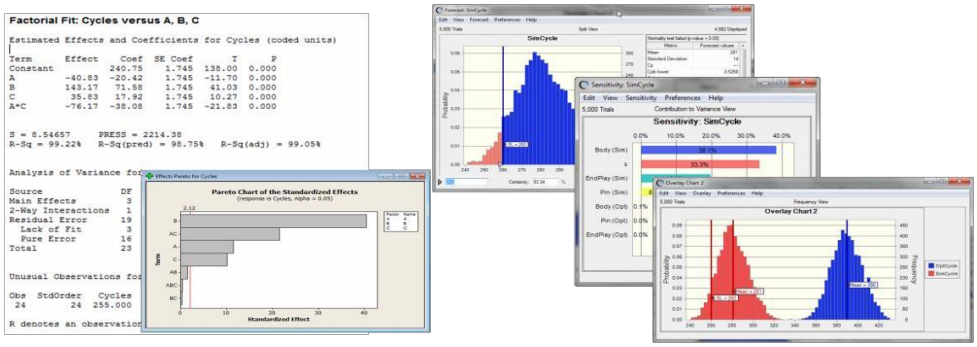

Figure 2. Minitab: Statistical Modeling vs Crystal Ball: Risk Analysis

Conclusion

Mathematical models are essential tools in all areas of science, engineering, business and quality improvement. For example, to design a product, an engineer relies heavily on models of physical systems. To predict demand for the product, a marketing specialist relies on models of consumer behavior and competitive pressures. People who work with models need software tools to automate statistical tasks that would otherwise be impractical.

Minitab and Crystal Ball are two powerful and user-friendly software tools to create and use mathematical models. Minitab helps to plan experiments, analyze data and visualize the meaning within the data. Crystal Ball simulates system performance, helping the user understand risk and optimize the system very rapidly. When used together, Crystal Ball and Minitab provide a comprehensive statistical automation toolkit for technical professionals in all fields.

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Integrated Cloud Applications & Platform Services

Oracle Crystal Ball and Minitab
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