maintain/enhance quality. This tutorial will use an example to illustrate how **advanced predictive models can be used to predict malfunctions within processes, in fact even before such situations occur**. The earlier these malfunctions are detected, the less time and money are wasted processing defective products. Furthermore, because of the high cost of modern equipment, if a scheme can quickly detect malfunctions, it will result in considerable savings due to higher equipment utilization.

It’s often observed that quality can be improved by reducing the variability in process and raw materials. Since variability can be described only in statistical terms, statistical methods play a vital role in quality improvement efforts. The case study explains a complete set of tools and techniques and supporting systems for process control, which would be an invaluable resource for any technical manager, production engineer, or technician in any manufacturing enterprise.

**CASE STUDY: PREDICTIVE PROCESS CONTROL**

This case study will be illustrated using a real-world example to demonstrate the possible application of predictive data mining in the field of process control. The proposed analyses workflow used in this case integrates advanced predictive models that will be trained, tested, and automatically compared to find the best model for deployment. Various design approaches used in this specific example to tackle the problem will provide you some useful insight into how predictive models can be used to detect quality problems ahead of time, thus helping floor engineers to adjust parameter settings even before quality starts deteriorating.

**Understanding Manufacturing Processes**

Manufacturing processes are inherently complex; as a result, process development is often a tedious and experimental task. Process parameters settings, such as temperature, pressure, speed, etc., are typically chosen by costly trial-and-error prototyping, with the result that solutions are often suboptimal. Producing high-quality products within such a suboptimal environment is not easy. It’s often noticed that too little attention is paid to achieve all dimensions of an optimal process: economy, productivity, and quality. Every manufacturer should realize that all three aspects could be accomplished by focusing on just one dimension—quality—because quality helps in increasing productivity and reducing cost.

**STATISTICA QC Data Miner** is a powerful software solution designed for manufacturing enterprises to help achieve an optimum level of quality. A wide array of advanced analytic tools and techniques helps to monitor processes and not only identifies but also anticipates problems related to quality control, providing improvement with unmatched sensitivity and effectiveness. It combines the most powerful tools for QC and SPC with data mining technology. **STATISTICA QC Miner** integrates the complete functionality of **STATISTICA** software for quality control and improvement with **STATISTICA Data Miner** software for uncovering hidden trends, explaining known patterns, and predicting the future.