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The study focuses on the field of predictive monitoring for enhancing business processes, showing the crucial aspect of assessing forecast reliability to enable proactive adjustments in processes, pertinent in transports and logistics for example. It proves how reliability estimates offer preview into prediction errors, developing their calculation methods and techniques. By integrating reliability estimates into decision-making processes, the study shows real benefits in terms of enhanced cost efficiency in proactive process adaptation, showing an average cost savings of 14%.

Operators in monitoring and controlling large-scale processes using computerized control systems are facing complexities, highlighting the imperative need for intelligent decision support systems incorporating a spectrum of AI and non-AI techniques for effective analysis of process data. It insists on three approaches—data-driven, analytical, and knowledge-based, used with techniques like Principal Component Analysis (PCA) and Partial Least Squares (PLS). PLS emerges as an essential method for monitoring and predicting product quality processes in process control engineering, with successful applications in multiple industries.

The knowledge-based approach is very important, taking advantage of AI technologies such as expert systems, fuzzy logic, machine learning, and pattern recognition for monitoring, control, and diagnosis of industrial processes. It insists on the integration of expert systems with other methodologies like neural networks and pattern recognition to enhance system performance and accuracy in fault detection, diagnosis, and process monitoring endeavors, highlighting the imperative collaboration between diverse methodologies to make progress in process optimization and efficiency.