# The evolving landscape of data analysis in semiconductor manufacturing



The complexities of semiconductor manufacturing are becoming increasingly intricate, and the need for advanced data analysis tools has never been more crucial. In a historical context dating back to the late 1990s, a significant incident involving one of the world's largest semiconductor companies highlights just how vital precise control and analysis of data can be in this industry. A new technology had shown promise in an R&D facility without issue; however, once it was implemented in the production environment, yield issues arose. Despite extensive efforts, including three months of experiments with wafers being shipped back and forth, the problem persisted, risking a hefty investment of approximately $10 billion and delaying product launches.

The investigation revealed that a single chemical used in the clean cycle was responsible for the production failures. This pivotal moment underscored the importance of having the right technological tools for engineers. Brad Hopper, Vice President of Vertical Markets at Spotfire, reflected on the experience, stating, “No matter how smart your engineers are, if they don’t have the right tools – the technology to help them find insights into huge volumes of heterogeneous technical data — you may never find the answers to your company’s most difficult challenges.”

Today, while catastrophic failures at the brink of collapse are less common, the semiconductor industry continues to face challenges associated with data analysis. Hopper elaborates on the complexities involved, detailing a multitude of data types that must be monitored and assessed, including temperature, pressure, gas flow rates, maintenance records, material properties, and various defect metrics, among others. The sheer volume and diversity of this data can overwhelm even seasoned professionals in the field.

To tackle these challenges, a novel methodology known as visual data science has gained traction, particularly as implemented in the Spotfire platform. This approach aims to simplify the process of analysing vast datasets, allowing for quicker and more efficient visualisation and sharing. Michael O’Connell, Chief Analytics Officer at Spotfire, explained that the human brain is capable of processing visual information remarkably quickly, noting that humans can register entire images for as little as 13 milliseconds. By merging visual representation with data analysis, users can detect patterns or issues within massive data sets more intuitively.

“Our application helps you think and get to the action in the data,” O’Connell stated. He further elaborated on the design process, where data is connected, visualised, transformed, and then modelled, allowing users to filter and predict outcomes effectively. These advancements can significantly enhance daily decision-making processes in semiconductor manufacturing.

Engagement with the new tools and platforms, such as those discussed in the ongoing webinar series called The Analytics Forum, showcases the industry's shift towards leveraging advanced analytics for operational efficiency. As semiconductor manufacturing continues to evolve, the integration of data science into standard practices appears poised to be a critical component in navigating future challenges in the sector.

Source: [Noah Wire Services](https://www.noahwire.com)

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