

# Visual data science overcomes semiconductor's greatest challenges



## The semiconductor industry is growing rapidly

The semiconductor industry is on fire. In one recent year, nearly 1 trillion semiconductors were sold globally, which is more than 100 chips for every person on Earth.<sup>1</sup>

Global semiconductor billings (billion US\$) - 12MMA

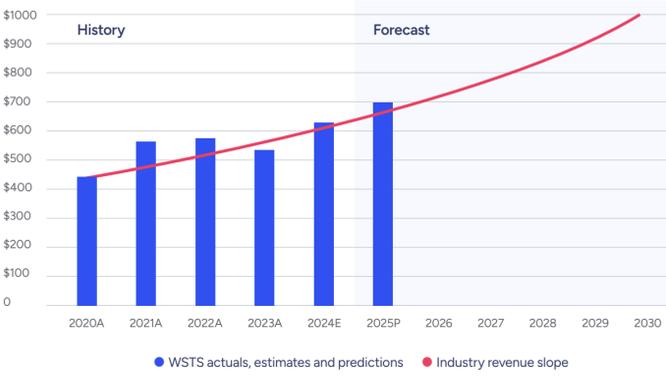


Source: [World Semiconductor Trade Statistics](#)

Rapid growth is expected to continue, with an estimated growth rate of 38.9% in the Americas and 17.5% in the Asia Pacific region.<sup>2</sup>

By 2030, that growth is expected to hit \$1 trillion.<sup>3</sup>

## The path to \$1 trillion in semiconductor revenues (\$Billions)



Source: [Deloitte 2025 Global Semiconductor Industry Outlook](#)

But this growth doesn't come without its challenges.

## Key challenges facing semiconductor manufacturers

### A data-intensive industry

The manufacturing industry is data-intensive, with data coming from sensors, equipment diagnostics, process logs, production metrics, and historical records. Cutting-edge data science and AI solutions are needed to extract this data for better decision making. However, despite investments in adopting AI and generative AI, research from the [Everest Group](#) has shown that 90% of pilots will not move into production in the near future or may never move into production.<sup>4</sup>



### Equipment performance issues:

Unplanned downtime and inefficient maintenance strategies drive up costs.

- **Inefficient maintenance strategies:** Unplanned maintenance consumes three to four hours for every one hour of planned maintenance. Planned maintenance programs increase fab availability by 5 to 7% on average.<sup>5</sup>
- **Unplanned downtime:** A missing or delayed part can create tool downtimes up to six times longer than the expected downtime if the part was in stock.<sup>6</sup>

Rapid growth in the semiconductor predictive maintenance market underscores the industry's interest in addressing equipment performance proactively.<sup>7</sup>

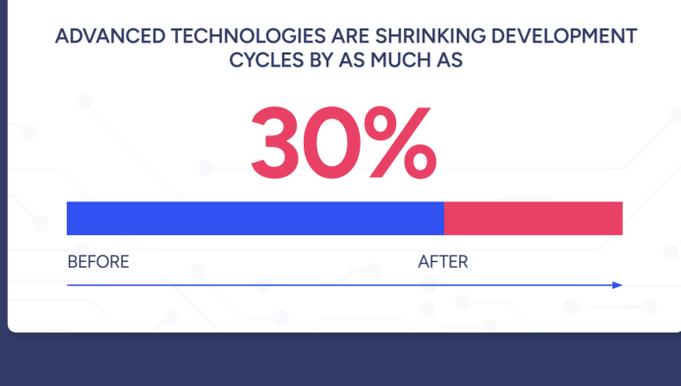
### Semiconductor manufacturing predictive maintenance market



Source: [Global Growth Insights, Semiconductor Manufacturing Predictive Maintenance Market 2024](#)

### Rapid market demands

The semiconductor industry is moving toward more rapid innovation cycles and shorter time-to-market, with advanced technologies such as digital twins potentially shortening development cycles by up to 30%, calling for quick analysis and rapid decision-making.<sup>8</sup>



## How visual data science solves these challenges



**AI-driven insights for increased data value:** Spotfire® provides an AI-powered recommendation engine to suggest the most insightful visualizations, enabling users to uncover hidden patterns in data.



**Predictive analytics for equipment maintenance:** Integrate real-time sensor data with advanced machine learning models to early detect potential equipment failures, reducing downtime and increasing efficiency.



**Interactive dashboards for capacity planning:** A powerful assistant that suggests the most insightful visualizations to interpret complex datasets, uncover hidden trends, and provide a deeper understanding of your data.

## Why Spotfire is the ultimate solution



**Drag-and-drop data exploration:** Spotfire simplifies complex data analysis and allows users to explore the data, uncover hidden patterns, and discover insights to help them drive continuous improvement.



**Real-time dashboards:** Powerful visualizations, constantly updated with current data, keep teams informed and allow for proactive decision-making. That enables production leaders to spot potential bottlenecks or quality issues as soon as they appear, intervening and fixing them before they have a chance to escalate.



**AI-powered recommendations:** Predictive insights and suggested actions serve as powerful assistants to on-site experts, aiding them in optimizing overall performance.



**Seamless integration with R, Python, & advanced analytics:** Spotfire seamlessly connects with existing systems, offering embedded analytics for users to toggle from one application to another. This helps teams continuously assess situations, identify areas requiring attention, and act swiftly.

Visual data science empowers semiconductor manufacturers to explore, discover, align, and act with confidence. Ready to unlock the power of your data?

Discover visual data science with **Spotfire**.

### Sources:

1. SIA, State of the U.S. Semiconductor Industry, 2024.
2. WSTS, Semiconductor Market Forecast Fall, 2024.
3. Deloitte, 2025 Global Semiconductor Industry Outlook, 2025.
4. Forbes, Reasons Why Generative AI Pilots Fail to Move Into Production, January 2024.
5. McKinsey, Need to Boost Semiconductor Fab Efficiency? Look to Maintenance, 2023.
6. McKinsey, Need to Boost Semiconductor Fab Efficiency? Look to Maintenance, 2023.
7. Global Growth Insights, Semiconductor Manufacturing Predictive Maintenance Market, 2024.
8. Smart Industry, Case Study: Digital twin shortens design process by 30%, May, 2023.