

Peer Review

Review of: "Optimizing Semiconductor Manufacturing for Small and Medium Enterprises: A System-Dynamics and Machine Learning Approach"

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This paper presents a well-thought-out and **practical approach** to improving semiconductor manufacturing for **small and medium enterprises (SMEs)**. The study introduces an **optimization framework** that uses **system-dynamics modeling, machine learning, and linear programming** to help SMEs improve production efficiency, reduce costs, and streamline supply chains. Given the challenges that smaller semiconductor manufacturers face, such as **high production costs, supply chain disruptions, and difficulty competing with large-scale manufacturers**, this paper offers a **fresh and much-needed perspective** on how technology can help smaller businesses operate more efficiently.

The research is **technically sound and well-structured**. The paper clearly explains the **mathematical models, data-driven simulations, and machine learning techniques** used to optimize production processes. The use of **Python-based simulations and predictive analytics** is particularly useful because it allows for **real-time decision-making and cost reduction**. However, a discussion on **real-world implementation challenges**, such as **the complexity of setting up machine learning models, the cost of adopting such technology, and data privacy concerns**, would add even more depth to the study.

One of the strong points of this paper is its **clear and logical presentation**. The introduction lays out the **importance of semiconductor optimization for SMEs**, and the methodology section explains the technical framework in a structured way. The authors effectively use **graphs, tables, and mathematical models** to support their arguments, making the study **both comprehensive and data-**

driven. However, a **workflow diagram** summarizing the framework in **simple terms** would make it **more accessible** to non-technical readers.

The references used in this study are **relevant and up to date**, covering topics such as **supply chain management, semiconductor production, and AI-driven manufacturing processes**. The study provides a good mix of **theoretical background and practical application**, making it suitable for **both researchers and industry professionals**. That said, adding **real-world examples or case studies from companies that have successfully implemented similar approaches** would help **bridge the gap between theory and practice**.

Final Thoughts and Suggestions for Improvement

This is a **valuable and insightful paper** that contributes to the **ongoing discussion on AI-driven manufacturing in the semiconductor industry**. It provides a **solid foundation for future research** and has **clear practical applications for SMEs**. To make it even stronger, the authors should consider:

1. **Discussing real-world implementation challenges, such as cost, scalability, and industry adoption barriers.**
2. **Including real-world case studies to show how similar techniques have been successfully used in practice.**
3. **Adding a simplified workflow diagram to help non-technical readers understand the optimization process.**

Overall, this study presents a **well-researched and innovative solution** to an important problem in the semiconductor industry. With **minor improvements**, it will be **even more impactful**. **Great work!**

Declarations

Potential competing interests: No potential competing interests to declare.