SYNOPSYS®

2025 TECHNOLOGY INNOVATION LEADER

Enhancing Customer Impact Through Powerful Technology Integration

RECOGNIZED FOR BEST PRACTICES IN THE GLOBAL ANALOG IN-MEMORY COMPUTING INDUSTRY

FROST & SULLIVAN

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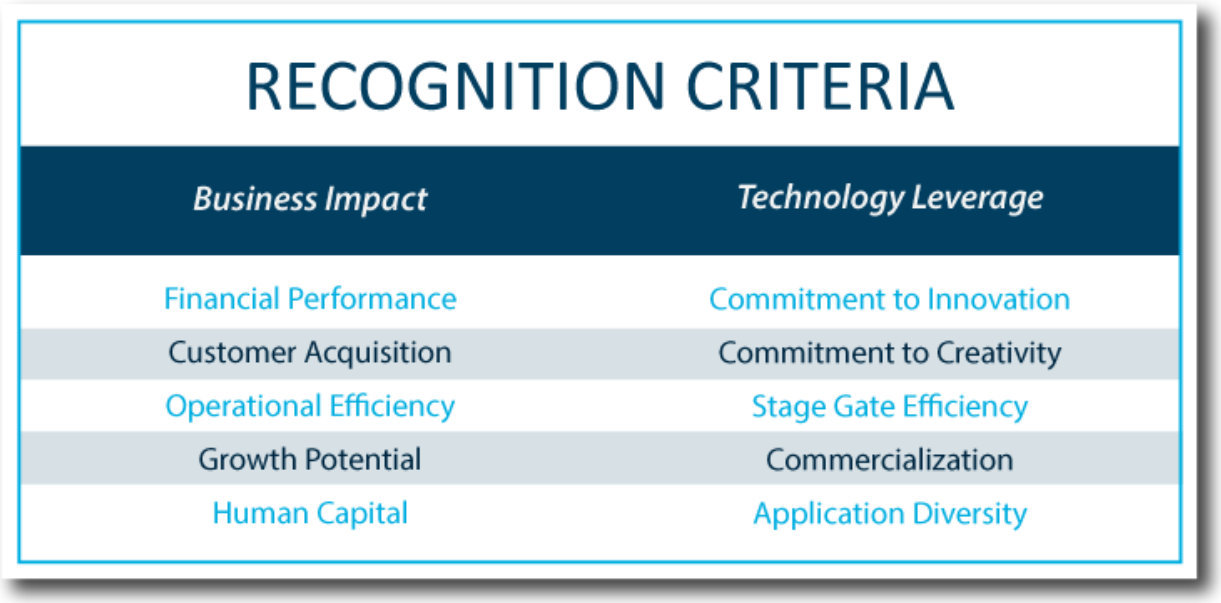
Best Practices Criteria for World-class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each recognition category before determining the final recognition recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Synopsys excels in many of the criteria in the analog in-memory computing space.



Driving AI Chip Design

Founded in 1986 and headquartered in Sunnyvale, California, Synopsys is an industry-leading provider of electronic design automation (EDA) tools and semiconductor intellectual property (IP). The company empowers next-generation computing architecture to meet the evolving demands of artificial intelligence (AI), edge computing, and data-intensive applications. Its advanced, end-to-end EDA solutions enable chip designers to accelerate the development of emerging architectures, such as analog in-memory computing (AIMC) systems, which enhance computational efficiency and reduce energy consumption by performing operations directly in memory.

Traditional computing architectures, based on the von Neumann model, separate memory and processing units, requiring data to move between them for computations, creating performance bottlenecks and consuming significant energy. AIMC addresses these challenges by integrating memory and computation within a single device, enabling data processing directly in memory cells. This revolutionary computing architecture leverages analog circuits, where information is encoded and processed using continuous voltage or current levels rather than conventional discrete digital signals (0s and 1s). By utilizing the physical properties of memory devices (e.g., resistance, current, or voltage) to represent and process data, AIMC enables mathematical operations execution directly within the memory array. In addition, AIMC's ability to perform analog operations simultaneously across entire rows or columns of a memory array offers significant potential for energy efficiency, high throughput, and speed, making it ideal for AI, machine learning (ML), and high-performance computing.

Creativity and Innovation Fuel Technology Leadership

Synopsys offers a complete analog design flow with its comprehensive EDA suite that enables engineers to design, simulate, verify, and optimize critical analog components and circuits on one platform. As one of the few providers of an end-to-end analog and mixed-signal design solution, the company enables a seamless development process and accelerates time-to-market to meet the rapidly growing demand for high-performance, energy-efficient AI-driven computing systems. Its powerful toolset eliminates reliance on multiple vendors for specific design phases while reducing the need for in-house infrastructure and teams, ultimately lowering costs and speeding up development cycles.

> *"Unlike traditional methods where software adapts to fixed hardware, Synopsys enables hardware to be optimized for software needs from the start. It ensures chips are fine-tuned for real-world applications. This co-design approach enhances power efficiency, performance, and scalability and accelerates time-to-market."*
>
> ***- Jabez Mendelson***
> ***Research Manager***

Synopsys' EDA toolchain, built on patented technologies, drives significant performance improvements and efficiency across the design workflow. For example, its Custom Compiler™ uses proprietary AI-driven automation to streamline workflows and reduce the manual effort required for resource-intensive tasks like analog design optimization andlayout design. By accelerating layout generation, it helps designers boost productivity by two to three times.[1] Meanwhile, Synopsys' simulation tool, PrimeSim™, utilizes advanced Graphics Processing Unit (GPU) acceleration technology, enabling efficient scaling. When scaling simulation infrastructure with GPU computing, it delivers significant speedups (i.e., 7X faster with four GPUs and 10X faster with eight GPUs). As a result, tasks that take months can be completed in just a fraction of the time. By reducing simulation time by 10X, PrimeSim™ boosts overall turnaround efficiency, accelerating design cycles and productivity.[2]

With its industry-leading tools, Synopsys helps designers ensure components meet stringent precision, reliability, and performance requirements across operating conditions. The company's tools incorporate advanced variability analysis to mitigate performance variations, enhance circuit robustness, and ensure the long-term stability of AIMC architectures. For example, Synopsys' analysis tool, PrimeWave™ ensures the chip meets specifications under all real-world conditions and extreme environments. It rigorously tests performance across a broad range of temperature and voltage conditions to verify seamless operation. Leveraging ML, PrimeWave™ efficiently analyzes billions of process, voltage, and temperature (PVT) variations with a smaller yet optimized dataset, accelerating verification. The ML-driven approach enables designers to validate chips quickly while maintaining high performance and reliability standards.

[1] Frost & Sullivan Interview with Synopsys (December 2024)
[2] Ibid.

Additionally, Synopsys' Integrated Circuit Validator (ICV) and StarRC fully verify chip design before it goes to the foundry for manufacturing. These tools check for design rule violations that can cause issues, such as signal interference when wires are placed too close together. If not corrected, this mistake can lead to errors where signals are misread, affecting the chip's functionality. By running physical verification and signoff, ICV and StarRC help designers catch and fix these issues early, avoiding costly rework.

> *"Synopsys Cloud's unprecedented flexibility removes licensing constraints, enabling more efficient design workflows and accelerating innovation. It also allows customers to dynamically scale their licenses and computing power, expanding to hundreds or thousands of licenses during peak design phases and scaling back when demand decreases, ensuring operational efficiency and cost optimization throughout the chip design process.*
>
> ***- Rubini Kamal***
> ***Best Practices Research Analyst***

With its advanced EDA, Synopsys redefines silicon software solutions by shifting from rigid hardware constraints to a software-driven design approach. Unlike traditional methods where software adapts to fixed hardware, Synopsys enables hardware to be optimized for software needs from the start. It ensures chips are fine-tuned for real-world applications. This co-design approach enhances power efficiency, performance, and scalability and accelerates time-to-market.

Synopsys' comprehensive EDA suite and enhanced capabilities empower researchers and companies to drive innovation in AIMC, enabling transformative applications, such as AI inference accelerators, edge computing devices, and low-power Internet of Things systems. Notably, AIMC plays a vital role in neuromorphic computing systems that mimic the human brain's efficiency in processing information.[3] By streamlining the design and validation process, Synopsys drives next-generation computing breakthroughs, advancing performance, efficiency, and scalability for future-ready applications.

Meeting Real-world Client and Market Needs

Synopsys enhances accessibility to its EDA solutions by providing a user-friendly design environment through Synopsys Cloud. With a built-in license management automation system, the solution offers customers the convenience of on-demand EDA tool access, enabling seamless purchases and instant activation of EDA software licenses. Notably, Synopsys introduced a flexible pay-per-use model, allowing users to pay for licenses by the minute, based on actual usage. This revolutionary approach provides unlimited licenses to accommodate peak demands without requiring upfront commitments or fixed pass quantities, ensuring cost efficiency and scalability. For example, customers can instantly access hundreds of PrimeSim™ licenses, an analog circuit simulator, for a few hours or days to accelerate their workflow. Such capability is especially valuable when running billions of PVT combinations, where traditional licensing models could extend simulation times to months.

[3] https://www.synopsys.com/blogs/chip-design/ai-soc-memory-architecture.html

With unlimited, on-demand licensing, customers can run thousands of parallel simulations, cutting turnaround time to a month, and significantly boosting productivity. Synopsys Cloud's unprecedented flexibility removes licensing constraints, enabling more efficient design workflows and accelerating innovation. It also allows customers to dynamically scale their licenses and computing power, expanding to hundreds or thousands of licenses during peak design phases and scaling back when demand decreases, ensuring efficiency and cost optimization throughout the chip design process.

Catering to diverse customer needs, Synopsys also offers a software-as-a-service solution that provides integrated access to compute and storage infrastructure. For time-sensitive companies, such as venture-backed startups with lean teams, Synopsys Cloud serves as a one-stop, browser-based environment with seamless access to high-performance compute and GPUs, storage, its full suite of EDA tools, and preconfigured EDA flows, all with pay-per-use licensing flexibility. This cloud-based setup eliminates resource management complexities and installation requirements, enabling customers to start the chip design process within hours instead of days or weeks. One key customer example is TetraMem, a Silicon Valley-based startup that leveraged Synopsys' analog solutions and Synopsys Cloud to accelerate the tape-out of its AI accelerator chip featuring AIMC. By utilizing the flexibility of pay-per-use licensing and the scalability of cloud computing, TetraMam expedited development and achieved faster results.

"We were able to achieve a very fast infrastructure setup on the Synopsys Cloud EDA environment within days. The vast selection of EDA tools and IP available on the cloud enabled us to start the design, verification, and backend flow very quickly. The flexibility of using as many licenses as we needed enabled us to obtain fast turnarounds on simulation, verification, and backend flow, which significantly reduced the engineering hours spent on those compute-intensive tasks. The ease of global access provided a single environment for our global R&D team with seamless access."

Wenbo Yin, Vice President of IC Design at TetraMem [4]

With its advanced EDA suite, Synopsys is accelerating AI chip innovation and solidifying its presence in the rapidly growing AI chip startup ecosystem. Synopsys enables chipmakers to co-design hardware with customers, ensuring optimal alignment with software requirements. This software-driven hardware evolution cements Synopsys' leadership in next-generation AI chip development.

[4] https://www.synopsys.com/content/dam/synopsys/cloud/success-story/tetramem-success-story.pdf

Conclusion

Technology is a critical success factor for the analog in-memory computing industry. With many options available, market stakeholders need to leverage the most appropriate and best technology-based solutions to optimize their market impact. Synopsys provides a complete end-to-end analog and mixed-signal design flow, streamlining development with a comprehensive electronic design automation (EDA) suite that accelerates time-to-market for high-performance, energy-efficient AI-driven systems while reducing costs and reliance on multiple vendors. The company stands out from competitors by enabling a software-driven design approach that optimizes hardware for real-world applications. In addition, Synopsys enhances EDA accessibility through Synopsys Cloud, delivering a user-friendly environment, automated license management, and a flexible pay-per-use model, enabling on-demand access, scalability, and cost efficiency.

With its strong overall performance, Synopsys earns Frost & Sullivan's 2025 Global Technology Innovation Leadership Recognition in the analog in-memory computing industry.

What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Recognition is its top honor and recognizes the market participant that exemplifies visionary innovation, market-leading performance, and unmatched customer care.

Best Practices Recognition Analysis

For the Technology Innovation Leadership Recognition, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Business Impact

Financial Performance: Strong overall business performance is achieved in terms of revenue, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Leveraging innovative technology characterizes the company culture, which enhances employee morale and retention

Best Practices Recognition Analytics Methodology

Inspire the World to Support True Leaders

This long-term process spans 12 months, beginning with the prioritization of the sector. It involves a rigorous approach that includes comprehensive scanning and analytics to identify key best practice trends. A dedicated team of analysts, advisors, coaches, and experts collaborates closely, ensuring thorough review and input. The goal is to maximize the company's long-term value by leveraging unique perspectives to support each Best Practice Recognition and identify meaningful transformation and impact.

		VALUE IMPACT	
STEP		WHAT	WHY
1	**Opportunity Universe**	Identify Sectors with the Greatest Impact on the Global Economy	Value to Economic Development
2	**Transformational Model**	Analyze Strategic Imperatives That Drive Transformation	Understand and Create a Winning Strategy
3	**Ecosystem**	Map Critical Value Chains	Comprehensive Community that Shapes the Sector
4	**Growth Generator**	Data Foundation That Provides Decision Support System	Spark Opportunities and Accelerate Decision-making
5	**Growth Opportunities**	Identify Opportunities Generated by Companies	Drive the Transformation of the Industry
6	**Frost Radar**	Benchmark Companies on Future Growth Potential	Identify Most Powerful Companies to Action
7	**Best Practices**	Identify Companies Achieving Best Practices in All Critical Perspectives	Inspire the World
8	**Companies to Action**	Tell Your Story to the World (BICEP*)	Ecosystem Community Supporting Future Success

*Board of Directors, Investors, Customers, Employees, Partners

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at http://www.frost.com.

The Growth Pipeline Generator™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

Learn more.

Key Impacts:

- **Growth Pipeline:** *Continuous Flow of Growth Opportunities*
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- Megatrend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)