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Photonic Design Automation Market Size and Forecasts (2020 - 2030), Global and Regional Share, Trends, and Growth Opportunity Analysis Report Coverage: By Component (Solution and Service), Deployment (On-Premise and Cloud), Organization Size (SMEs and Large Enterprises), and Application (Academic Research and Industrial Research & Manufacturing)

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Abstracts

The Photonic design automation market size was valued at US$ 1.39 billion in 2022 and is expected to reach US$ 3.90 billion by 2030; it is estimated to record a CAGR of 13.8% from 2022 to 2030.

The integration of photonics into electronic design automation (EDA) tools is a significant trend in the photonic design automation market. Established EDA vendors recognize the potential of the emerging photonic design automation market and incorporate photonics-specific features and capabilities into their existing tools. This integration enables designers to seamlessly incorporate photonics components into their designs, streamlining the design process and optimizing the performance and functionality of photonic devices. By integrating photonics into EDA tools, designers can leverage familiar design environments and workflows, reducing the learning curve associated with specialized photonic design tools. The integration of photonics into EDA tools also facilitates the convergence of electronics and photonics, enabling the development of integrated electronic-photonic circuits. This convergence is crucial for the advancement of technologies such as silicon photonics, where the sharing of tools, processes, and simulation models between photonics and IC design accelerates the

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development of photonic design automation market. Overall, the integration of photonics into EDA tools reflects the industry's recognition of the growing importance of photonics and the need for efficient design processes and optimization techniques in the photonic field. It enables designers to harness the potential of photonics and seamlessly incorporate it into their electronic designs.

Advancements in compact modeling and simulation tools are expected to have a significant impact on the photonic design automation market. These tools play a crucial role in the convergence of electronics and photonics, enabling faster and more efficient design processes. Compact modeling refers to the development of simplified mathematical models that precisely denote the behavior of complex photonic devices. These models allow designers to simulate and analyze the performance of photonic components without the need for expensive and time-consuming device-level simulations. By incorporating compact modeling into design automation tools, designers can streamline the design process and optimize the performance of integrated electronic-photonic circuits. These tools facilitate the transition from electronic-photonic co-design to the development of fully integrated circuits, enabling designers to achieve high performance and efficiency. Such advantages enable higher applications and promote photonic design automation market growth.

The integration of compact modeling and simulation tools into the photonic design automation workflow enables designers to explore different design options, evaluate the impact of various parameters, and make informed decisions. This leads to faster design iterations, reduced time-to-market, and improved overall design quality. The importance of compact modeling and simulation tools offered by photonic design automation market players is recognized by both industry and academia. Established electronic design automation vendors are incorporating photonics-specific features and capabilities into their existing tools, allowing designers to integrate photonics components into their designs seamlessly.

The solution segment of the photonic design automation market encompasses a variety of software and tools that facilitate the design, simulation, and verification of photonic integrated circuits (PICs) and other photonic devices. These solutions are purpose-built to address the distinctive challenges and needs of the photonics industry. Photonic design automation (PDA) tools are instrumental in expediting the development and enhancement of photonic devices by equipping designers with advanced capabilities for simulation, modeling, and analysis. These tools enable designers to effectively create and validate intricate photonic circuits, optimize performance, and ensure efficient production processes. Software tools that enable designers to create and lay out

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photonic circuits have components such as waveguides, modulators, detectors, and filters. These tools often provide a user-friendly interface and advanced design capabilities to streamline the design process. The photonic design automation market growth is driven by the growing demand for photonic devices in various applications, including telecommunications, data centers, healthcare, sensing, and imaging. As the photonics industry continues to evolve and expand, the need for efficient and reliable design tools becomes increasingly important.

The academic research segment of the photonic design automation market refers to the involvement of universities, research institutions, and academic professionals in conducting research and development activities related to photonic design and associated services. This segment plays a crucial role in advancing the field of photonics and driving innovation in design methodologies, algorithms, and tools. Academic institutions and research organizations actively engage in research and development activities to explore new concepts, algorithms, and techniques. They thus avail the different solutions offered by photonic design automation market players. They focus on developing innovative solutions to address the challenges and limitations in the design of photonic components, systems, and integrated circuits, by utilizing such solutions. This research contributes to the advancement of the field and provides valuable insights for industry practitioners. Academic researchers often collaborate with industry experts, other academic institutions, and research consortia to share knowledge, exchange ideas, and collaborate on joint research projects. These collaborations foster interdisciplinary approaches and enable the integration of diverse perspectives in photonic design automation. The academic research segment plays a vital role in facilitating collaboration and knowledge sharing within the photonics industry. For instance, the University of Texas Design Automation Laboratory (UTDA) focuses on the R&D of design automation algorithms, methodologies, and tools for optics/photonics, electronics, and emerging technologies in the photonic design automation market.

Industrial research and manufacturing companies develop and utilize design automation tools specifically tailored for the photonics industry. These tools enable designers to automate various stages of the design process, such as layout generation, simulation, verification, and optimization. By leveraging these tools, companies can accelerate the design cycle, improve design quality, and reduce time-to-market for photonic products. The industrial research and manufacturing segment focuses on optimizing the manufacturing processes for photonic devices. This includes developing advanced fabrication techniques, process control methodologies, and yield enhancement strategies. By improving manufacturing efficiency and yield rates, companies can

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achieve cost-effective production of high-quality photonic components and systems. Photonic design automation market players often collaborate with photonic manufacturers to enhance and promote their products. For instance, in March 2022, Cadence Design Systems collaborated with GlobalFoundries for accelerating silicon photonics IC development for hyperscale computing, 5G communications, and aerospace systems among others. Such collaborations greatly enhance the awareness regarding such products, and also promote photonic design automation market growth.

The global photonic design automation market is segmented based on component, deployment, organization size, and application. Based on component, the photonic design automation market is divided into solutions and services. In terms of deployment, the photonic design automation market is bifurcated into on-premise and cloud. By organization size, the photonic design automation market is bifurcated into SMEs and large enterprises. Based on application, the photonic design automation market is divided into academic research and industrial research & manufacturing. By geography, the photonic design automation market is segmented into North America, Europe, Asia Pacific (APAC), and Rest of the World (RoW). AIM Photonics Inc, Ansys Inc, Cadence Design Systems Inc, LioniX International BV, Luceda Photonics, Optiwave Systems Inc, Siemens AG, Synopsys Inc, SystemLab Inc, and VPIphotonics GmbH are among the prominent photonic design automation market players.

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