

Photonic Sensors - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2024 - 2029)

<https://marketpublishers.com/r/PBCF9DA37623EN.html>

Date: July 2024

Pages: 150

Price: US\$ 4,750.00 (Single User License)

ID: PBCF9DA37623EN

Abstracts

The Photonic Sensors Market size is estimated at USD 29.66 billion in 2024, and is expected to reach USD 50.72 billion by 2029, growing at a CAGR of 11.30% during the forecast period (2024-2029).

Photonic sensors are crucial in industrial processes and are used in devices like fiber optic communication systems, laser-based medical instruments, environmental sensors, and optical detectors.

Key Highlights

These sensors offer advantages, including high sensitivity, fast response times, and immunity to electromagnetic interference. They also enable non-contact measurements, have a wide dynamic range, and are suitable for various applications, from telecommunications to medical imaging and environmental monitoring. Additionally, photonics sensors often exhibit lower power consumption and can function in harsh environments, making them versatile and efficient in diverse fields.

With the growing adoption of autonomous cars, precision metrology has gained significant importance with advancements in the global positioning system (GPS), which relies on precision timing. Photonic sensors are being viewed as a suitable technology for GPS and can benefit the budding autonomous car industry, thereby creating significant demand over the forecast period.

Increasing requirements for security and safety drive the demand for photonics sensors primarily due to their ability to provide high precision, rapid detection, and non-intrusive monitoring in various applications, including aerospace and defense, transportation,

manufacturing, healthcare, energy and power, and many others.

Photonic sensors are slowly witnessing commercial acceptance. However, there are few established standards for their operation. Photonic sensors also use numerous technologies, such as laser, fiber optics, and biophotonic. These technologies are distinct from each other and lack compatibility. Lack of awareness, less acceptability, and the unjustifiable image quality offered by the sensors may also hinder market growth. The imbalance between image quality and price has led to increased competition and peer pressure regarding optimal pricing.

The U.S. and China dispute has prompted a shift in investments, with countries like India and select Southeast Asian nations emerging as attractive destinations for manufacturing and industrial ventures. This shift is mainly due to Chinese companies seeking to broaden their manufacturing footprint. These evolving dynamics are poised to create new avenues within the studied market. Furthermore, heightened expenditures in end-user industries are set to bolster the growth of photonic sensors in the coming years. IHME projects a significant increase in global health spending, estimated to reach USD 1,515 (2.050 PPP dollars) per person by 2050.

Photonic Sensor Market Trends

Consumer Electronics to be the Largest End-user Industry

Photonic sensors play a crucial role in the consumer electronics industry, offering a wide range of applications that enhance user experience and improve device functionality. These sensors enable touchscreens, ambient light sensors, and proximity sensors in smartphones, tablets, and laptops, enhancing user interaction and display performance. They play a key role in digital cameras, smartphones, and drones, enabling high-resolution imaging, autofocus, and low-light photography.

In consumer electronics like smartphones and wearables, iris scanning and fingerprint sensing are used for secure and convenient authentication. The increasing adoption of smartphones is likely to aid the market's growth, which has been studied significantly. For instance, according to Ericsson, the number of smartphone mobile network subscriptions globally reached almost 6.4 billion in 2022. It is forecasted to exceed 7.7 billion by 2028. China, India, and the United States have the highest smartphone mobile network subscriptions.

Photonic sensors support heart rate monitoring, pulse oximetry, and blood glucose

measurement in wearable devices, providing valuable health data to users. Increasing spending on consumer electronic products is also stimulating the growth of wearable devices. Further, the growing population's increasing urbanization and changing lifestyle have raised its health and safety awareness. This has been a major factor in stimulating the growth of wearable devices, such as fitness trackers, earwear, and smartwatches. There has been a significant increase in the number of wearable devices sold over the past few years.

Consumer electronics like smart home devices use photonic sensors to detect ambient light, temperature, and humidity, enabling adaptive display brightness and smart climate control. These sensors are also used in touchless gesture recognition in gaming consoles, smart TVs, and home automation systems.

Asia-Pacific to Hold Major Market Share

Asia-Pacific is expected to witness a significant growth rate over the forecast period, primarily due to the increasing defense/military spending in China and India and the industrial automation trend in these nations. For instance, the Chinese government offers considerable military budgets for incorporating modern technology, owing to reforms by the Chinese Communist Party.

According to the official source, the Ministry of Defence has set a target of achieving a turnover of USD 26 billion in aerospace and defense manufacturing by 2025, which includes USD 5 billion in exports. The expansion of India's defense industry and its emphasis on indigenization and modernization have driven the demand for these sensors to meet the country's evolving security and technological needs. The above factors will expand the market maturation across the region in the upcoming years.

The region is home to significant manufacturing hubs and is witnessing a surge in industrial automation. Photonics sensors, including optical encoders, vision systems, and laser sensors, are crucial for precision manufacturing, quality control, and robotic automation. According to the National Bureau of Statistics of China, the manufacturing revenue in China will amount to USD 885.68 billion by 2025.

According to IBEF, India may export goods worth USD 1 trillion by 2030 and is on the route to becoming a prominent global manufacturing hub. With 17% of the country's GDP and over 27.3 million workers, manufacturing plays a significant role in the Indian

economy. By implementing different programs and policies, the Government of India expects 25% of the economy's output to come from manufacturing by 2025.

Photonic Sensor Industry Overview

The photonic sensors market is semi-consolidated, and the major players have used various strategies, such as joint ventures, new product launches, partnerships, and others, to increase their footprints in this market to sustain in the long run. Some of the key market players are Banner Engineering Corp., Baumer Holding AG, STMicroelectronics NV, Hamamatsu Photonics KK, and Omron Corporation.

February 2024 - Sick announced the "world's first" photoelectric sensor equipped with a touchscreen. The Sick W10 is a "world-first" photoelectronically powered sensor with an integrated touchscreen display. Designed for "universal use and ease of deployment," the W10 offers "unrivaled precision detection technology" and "unmatched versatility" for hundreds of food and beverage (F&B) applications. The photoelectronically-powered W10 uses smart onboard algorithms built on the knowledge gained from the industry's most common applications to deliver "high reproducibility across the board."

January 2024 - STMicroelectronics (ST) collaborated with Sphere Entertainment Co. to develop the world's largest image sensor, the 316-megapixel Big Sky camera sensor for Sphere's Big Sky system. ST collaborated with Sphere Studios to develop an 18K sensor, the first of its kind, capable of producing images at the resolution and fidelity needed for Sphere's display. The 316-megapixel resolution of the Big Sky is nearly 7x larger than a full-frame sensor and 40x more resolution than full-frame commercial cameras. The die is 9.92 cm x 8.31 cm², which is twice the size of a wallet-size photograph. Only four full die fits on a 300 mm wafer.

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Contents

1 INTRODUCTION

- 1.1 Study Assumptions and Market Definition
- 1.2 Scope of the Study

2 RESEARCH METHODOLOGY

3 EXECUTIVE SUMMARY

4 MARKET INSIGHTS

- 4.1 Market Overview
- 4.2 Industry Value Chain Analysis
- 4.3 Industry Attractiveness - Porter's Five Forces Analysis
 - 4.3.1 Bargaining Power of Suppliers
 - 4.3.2 Bargaining Power of Buyers
 - 4.3.3 Threat of New Entrants
 - 4.3.4 Threat of Substitutes
 - 4.3.5 Intensity of Competitive Rivalry
- 4.4 Impact of COVID-19 Aftereffects and Other Macroeconomic Factors on the Market

5 MARKET DYNAMICS

- 5.1 Market Drivers
 - 5.1.1 Growing Automation Demand in Manufacturing Industry
 - 5.1.2 Increasing Requirement for Security and Safety
 - 5.1.3 Increasing Investment in Fiber Optic Communications
- 5.2 Market Restraints
 - 5.2.1 Lack of Industry Standards
 - 5.2.2 High Initial Cost

6 MARKET SEGMENTATION

- 6.1 By Product Type
 - 6.1.1 Fiber Optic Sensors
 - 6.1.2 Image Sensors
 - 6.1.3 Biophotonic Sensors

- 6.1.4 Other Product Types
- 6.2 By End-user Industry
 - 6.2.1 Aerospace and Defense
 - 6.2.2 Automotive
 - 6.2.3 Industrial
 - 6.2.4 Healthcare
 - 6.2.5 Energy and Power
 - 6.2.6 Consumer Electronics
 - 6.2.7 Other End-user Industries
- 6.3 By Geography
 - 6.3.1 North America
 - 6.3.2 Europe
 - 6.3.3 Asia
 - 6.3.4 Australia and New Zealand
 - 6.3.5 Latin America
 - 6.3.6 Middle East and Africa

7 COMPETITIVE LANDSCAPE

- 7.1 Vendor Positioning Analysis
- 7.2 Company Profiles*
 - 7.2.1 Banner Engineering Corp.
 - 7.2.2 Baumer Holding AG
 - 7.2.3 STMicroelectronics NV
 - 7.2.4 Hamamatsu Photonics KK
 - 7.2.5 Omron Corporation
 - 7.2.6 Sick AG
 - 7.2.7 Keyence Corporation
 - 7.2.8 Pepperl+Fuchs GmbH
 - 7.2.9 Rockwell Automation Inc.
 - 7.2.10 Autonics Corporation

8 INVESTMENT ANALYSIS

9 FUTURE TRENDS

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