

## **Li-Fi - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029**

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### **Report description:**

The Li-Fi Market size is estimated at USD 1.72 billion in 2024, and is expected to reach USD 19.79 billion by 2029, growing at a CAGR of 62.90% during the forecast period (2024-2029).

Light Fidelity (Li-Fi) is a wireless optical networking technology that transmits data through light-emitting diodes (LEDs). A new wireless connection uses light sources instead of microwaves to transmit data. The technology works by modulating the light emitted by LEDs to transmit data, which is then received by a sensor that interprets the modulations as data.

#### Key Highlights

- Li-Fi can achieve data transmission speeds that are about 100 times faster than those achievable by Wi-Fi. Light travels extremely fast, allowing almost instantaneous connections and faster data transmissions. Li-Fi uses highly efficient LED bulbs, resulting in lower energy consumption than other technologies. This can lead to cost savings in terms of energy usage.
- Li-Fi also offers military-grade security by default. Since light does not penetrate walls or leak through materials, it can be contained within a space, eliminating the ability for man-in-the-middle attacks outside the coverage area. This ensures privacy and security for users- li-fi experiences less interference compared to other wireless communication technologies. Li-Fi uses light frequencies, which are less prone to interference from other devices or signals. Li-Fi can work effectively in dense regions with congested or limited Wi-Fi signals. This makes it a suitable technology for environments with a high concentration of devices or users.
- Li-Fi is a wireless communication technology that uses the infrared and visible light spectrum for high-speed data communication. Li-Fi technology transmits data at a very high speed and is capable of delivering 224 GB of data per second. The emergence of LED as a viable solution has further simplified the use of Li-Fi, enabling high-speed networks. LED bulbs are semiconductor devices in which the current can be modulated to affect different intensities of light. A photo-detector is used on devices to

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capture the LED light and demodulate the data encoded in it. The system works similarly to how infrared communication works between devices, such as a remote control and a TV or a remote-controlled car. Due to the high intensities of LED lights, they can be used to send high-speed data across the light spectrum to any device with a photo-detector. The LED lights work as normal, and the modulation process is not visible to the human eye.

-LEDs are energy efficient and may serve for a longer period, which makes them more cost-effective for use in indoor and outdoor lighting. Smart lighting and color-changing capabilities that mobile devices can control have added to the demand from commercial spaces across the region. According to the US Department of Energy, LED lights typically use about 25% to 80% less energy than traditional incandescent bulbs. LEDs are also directional light sources, which means they can emit light in a specific direction, allowing them to use light and energy more efficiently.

-Adopting the Li-Fi solution has certain constraints, such as the need for more technology awareness, restricted range, and connectivity. In addition, LiFi has a limited coverage area compared to traditional wireless technologies, as the signal is confined to the line of sight between the transmitter and receiver. This means LiFi signals cannot penetrate walls or other physical obstacles, limiting their range and coverage. In contrast, Wi-Fi and cellular networks offer much broader coverage areas and can transmit data over longer distances.

-The COVID-19 outbreak and lockdown restrictions worldwide severely affected industrial activities. The effects of the lockdown include labor shortages, disruptions in the supply chain, lack of availability of raw materials utilized in the manufacturing process, fluctuating prices that could force the production of the final product to increase and go beyond budget, shipping problems, etc. The COVID-19 pandemic expedited and re-emphasized the requirement for automation worldwide. The adoption of bots for process discovery, intelligent data capture, and cloud-native bots across the automation sector is growing.

## Li-Fi Market Trends

### Automotive and Transportation to be the Fastest Growing End-user Industry

- In recent years, there has been a substantial increase in the use of Light Fidelity (Li-Fi)/Visible Light Communication (VLC) technologies in automotive communication and connected automobiles. As the automotive sector embraces digitalization and connection, there is an increasing demand for efficient and dependable wireless communication solutions within cars as well as between vehicles and the surrounding infrastructure.

- As there is a paradigm change in road transport with the introduction of AI-enabled, network-connected electric vehicles and road safety standards, there is a rising demand to reduce road accidents. Li-Fi technology can help reduce accidents by transmitting data between numerous vehicles and between the vehicle and road infrastructure without any lag, thereby enhancing the situational awareness of the vehicles.

- The use of LiFi for smart traffic management can be done in two ways: Vehicle-to-vehicle (V2V) communication and Vehicle-to-infrastructure (V2I) communication. In vehicle-to-vehicle communication, data transmission occurs between vehicles via the front and rear lights. Information such as the vehicle's braking distance, speed, obstacles in front of the lead vehicle, or other information like loss of vehicle stability can be passed on to the tailing vehicles or other nearby vehicles. This helps enhance the situational awareness of autonomous vehicles and can be used to maintain adequate distance between them. As the communication between vehicles is improved, with zero delay in data transmission, it can reduce road accidents.

- To improve the safety of an autonomous vehicle network, even the existing road infrastructure requires to be upgraded to smart infrastructure. Becoming smart will involve modifying components, such as road signage, pavement, traffic, and streetlights. The usage of LiFi for smart traffic control for vehicle-to-infrastructure communication is expected to include bidirectional communication between vehicles and road elements. Like V2I communication, V2V communication with LiFi will also help enhance road safety by allowing quick data transmission.

- Moreover, Li-Fi technology can be used to develop a smart highway navigation system. This technology can be utilized by employing visible light communication to exchange data between vehicles and infrastructure. Also, executing Li-Fi technology for

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highway navigation can contribute to a more efficient, connected, and safer transportation system by leveraging the advantages of high-speed, low-latency communication through visible light.

- Increasing the automotive industry in regions like Europe may further increase the demand for automation in the area, such as robots and cobots, among others, thereby driving the demand for the studied market. According to ACEA, In June 2023, passenger car sales in the European Union increased year-on-year at 17.8 percent. Customers in the European market purchased around 1.27 million units in total, and all but one of the countries experienced positive growth. At some 280,100 units, Germany remained the leading market for passenger car sales in Europe that month.

#### North America Holds Significant Market Share

- The region significantly contributes to the growth of the market studied. With the rising number of cybersecurity challenges faced while operating wi-fi over radio frequencies, the need for high-speed, reliable, and safe li-fi networks has witnessed a remarkable uptick in demand. According to IBM, as of 2023, the average data breach cost in the United States amounted to USD 9.48 million, up from USD 9.44 million in the previous year.

- In addition, the region is constantly investing in the defense industry, which may further propel the demand for Li-Fi technologies. According to the U.S. Congressional Budget Office, defense spending in the United States is predicted to increase yearly until 2033. Defense outlays in the United States amounted to USD 746 billion in 2023. The forecast predicts an increase in defense outlays up to USD 1.1 trillion in 2033.

- Moreover, the United States is a substantial market for vendors offering Industry 4.0 to grow significantly over the forecast period, owing to the early adoption of factory automation. The United States is on the verge of the fourth industrial revolution, where data is being used on a large scale for production while integrating the data with various manufacturing systems throughout the supply chain. This is fueling the adoption of Industry 4.0 and, thereby, the growth studied in the market.

- The Federal Government and the private sector in the United States are investing in Industry 4.0 IoT technologies to increase the American industrial base, which China and other low-labor-cost countries have taken over. The formation of the "Advanced Manufacturing Partnership (AMP)" is an initiative undertaken to make the industry, various universities, and the federal government invest in emerging automation technologies.

- According to the Government of Canada, the country's automotive suppliers export parts globally and are integral to Canada's automotive sector, which accounts for over USD 34 billion in sales annually. Automotive manufacturing has been one of the largest revenue generators for the country in the manufacturing sector. Ontario's automotive sector primarily relies on mixed technologies such as AI, ML, and wearable intelligent robots that assist humans in manufacturing.

#### Li-Fi Industry Overview

The Li-Fi market is highly fragmented due to the presence of both global players and small and medium-sized enterprises. Some of the major players in the market are adopting strategies such as partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

- September 2023 - To Be Srl has organized a conference on the Rome Future Week with the patronage of Sapienza - University of Rome and leading partner Signify; it represented a critical moment of meeting and discussion in the evolution path of LiFi technology, providing a snapshot of the Punctual and complete state of the art. The testimonies of the main stakeholders operating within the national panorama are valuable in scientific dissemination and the adoption of LiFi technology in vital and strategic sectors ranging from cultural heritage to healthcare, retail to offices, and schools to defense.

- July 2023 - pureLiFi and Fraunhofer HHI welcomed the release of the IEEE 802.11 bb global light communications standard, a

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significant development for the wireless communications industry. According to the two technology companies, the newly released IEEE 802.11 bb standard and the well-established IEEE 802.11 WiFi standards provide a globally recognized framework for deploying LiFi technology.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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