

**Smart Textiles Market Report by Type (Passive Smart Textile, Active Smart Textile),
Functionality (Sensing, Energy Harvesting, Luminescence and Aesthetics,
Thermoelectricity, and Others), End-Use Sector (Military and Protection, Healthcare,
Sports and Fitness, Fashion and Entertainment, Transportation, Architecture, and
Others), and Region 2025-2033**

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Report description:

The global smart textiles market size reached USD 4.9 Billion in 2024. Looking forward, IMARC Group expects the market to reach USD 28.5 Billion by 2033, exhibiting a growth rate (CAGR) of 20.4% during 2025-2033. The growing popularity of the Internet of Things (IoT) devices, coupled with continuous advancements in material science, are fueling the market across the globe.

Smart textiles, also known as e-textiles, are fabrics integrated with digital components such as sensors, microcontrollers, and conductive fibers. These textiles have the ability to sense, react, and adapt to environmental conditions or stimuli from mechanical, thermal, or chemical sources. Unlike traditional fabrics, smart textiles offer interactive functionalities and can communicate data. They are increasingly being used in various sectors including healthcare, sports, military, and fashion. In healthcare, they can monitor vital signs and alert medical professionals. In sports, they can track performance metrics. Military applications include advanced camouflage and body armor with built-in communication systems. The rise of smart textiles is fueled by advancements in material science and the growing Internet of Things (IoT) ecosystem.

The increasing product demand in the healthcare sector majorly drives the market. As populations age and the incidence of chronic diseases rises, there is a growing need for constant monitoring of health metrics such as heart rate, temperature, and blood pressure. Smart textiles offer a discreet and convenient solution. Along with this, the rapid growth of the Internet of Things (IoT) is significantly contributing to the market expansion of smart textiles. As IoT devices become more ubiquitous, the need for

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seamless integration between hardware and user experience grows. Smart textiles serve as an interface for IoT applications, collecting data from various sensors and transmitting it to a centralized system for analysis. In addition, consumer electronics and wearables have become integral parts of our daily lives, and the integration with smart textiles is a natural progression. In addition, governments and regulatory bodies are increasingly recognizing the potential of smart textiles in various sectors including healthcare, defense, and public safety. As a result, there is growing support in the form of grants, tax incentives, and research funding for companies in the smart textiles space. This regulatory support can accelerate research and development activities, help small startups scale, and encourage collaborations between textile manufacturers and technology companies.

Smart Textiles Market Trends/Drivers:

Growing Importance in Sports and Fitness

The sports and fitness sector is another important market driver for smart textiles. Athletes and fitness enthusiasts are always on the lookout for ways to enhance performance and improve training outcomes. Smart textiles fit seamlessly into this quest for optimization. From shirts that monitor muscle engagement to socks that analyze gait, these textiles provide a wealth of information that can be used to tweak training regimens and prevent injuries. In addition, the data gathered can be synced to smartphones or other devices, allowing for real-time feedback that can be acted upon immediately. This level of granular data collection was previously possible only in specialized sports labs but can now be accessed by anyone, from professional athletes to casual joggers. Moreover, the growing focus on health and wellness trends globally is influencing the demand for smart textiles in sports and fitness, as they offer an easily accessible way to monitor various metrics that can contribute to a healthier and more active lifestyle.

Military and Defense Applications

The application of smart textiles in military and defense is a powerful driver for market growth. These textiles offer unique functionalities such as advanced camouflage, temperature regulation, and built-in communication systems, which are crucial for modern warfare and defense strategies. The military has always been a pioneer in adopting cutting-edge technologies, and smart textiles are no exception. Additionally, the material advancements in smart textiles can offer soldiers lighter and more durable uniforms with integrated technologies. For instance, a smart textile-based uniform could monitor a soldier's health metrics and environmental conditions, while also enabling satellite communication and navigation. This increases the effectiveness of individual soldiers and enhances the operational efficiency of the entire military force. Governments around the world are investing in research and development of advanced materials and textiles for military applications, which is a strong indicator of the sector's impact on the overall smart textiles market.

Technological Advancements in Material Science

The proliferation of smart textiles is intrinsically linked to breakthroughs in material science. Researchers and scientists are continually pushing the boundaries of what textiles can do by incorporating nano-materials, conductive polymers, and other advanced materials into traditional fabrics. These innovations offer unprecedented characteristics like electrical conductivity, durability, and the ability to interact with the surrounding environment. For instance, textiles infused with temperature-responsive materials can automatically adapt to external thermal conditions, providing improved comfort and functionality. These advancements in material science enable the creation of textiles with highly specialized capabilities that can be customized for specific applications, from military to consumer electronics. As research continues and new materials are developed, the versatility and functionality of smart textiles expand, making them increasingly attractive for a broad range of applications. This creates a virtuous cycle where technological advancements drive demand, which in turn fuels further research and development.

Smart Textiles Market Segmentation:

IMARC Group provides an analysis of the key trends in each segment of the market, along with smart textiles market forecasts at

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the global, regional, and country levels for 2025-2033. Our report has categorized the market based on the type, functionality and end-use sector.

Breakup by Type:

Passive Smart Textile

Active Smart Textile

Active holds the largest market share

The report has provided a detailed breakup and analysis of the market based on the type. This includes passive and active. According to the report, active accounted for the largest market share.

Active smart textiles represent a subcategory within the smart textiles industry that senses and responds to external conditions or stimuli. One of the key market drivers for active smart textiles is their wide array of applications across diverse sectors, from healthcare and sports to automotive and aerospace. In healthcare, active smart textiles can be designed to release medications or change their structure to aid in wound healing, offering a more dynamic form of treatment. In the automotive sector, they can be integrated into seats or steering wheels to adapt to driver behavior, improving safety measures. The military is also a significant adopter of active smart textiles, utilizing them for advanced camouflage techniques or for garments that can adapt to extreme environmental conditions. Furthermore, consumer demand for interactive and adaptive wearable technology is fueling market growth. With advancements in sensor technology and data analytics, active smart textiles are becoming more sophisticated in their functionalities, making them increasingly appealing for both individual consumers and industrial applications. Government grants and increased funding for research in material science and IoT further accelerate the growth in this market, solidifying the importance of active smart textiles.

Breakup by Functionality:

Sensing

Energy Harvesting

Luminescence and Aesthetics

Thermoelectricity

Others

Energy harvesting accounts for the majority of the market share

A detailed breakup and analysis of the market based on the functionality has also been provided in the report. This includes sensing, energy harvesting, luminescence and aesthetics, thermoelectricity, and others. According to the report, energy harvesting accounted for the largest market share.

Energy harvesting functionality in smart textiles is gaining considerable attention as a significant market driver, largely due to the growing emphasis on sustainability and the efficient use of resources. These textiles have the capability to capture and store energy from various sources like solar, thermal, and mechanical energy. For instance, a jacket with solar-absorbing fibers can charge electronic devices on the go, reducing the need for traditional power sources. This has a particularly compelling application in remote or off-grid areas where conventional energy sources are scarce. Industries, such as healthcare see the benefit of energy-harvesting textiles for powering medical sensors without the need for frequent battery replacements. In the military sector, uniforms equipped with energy-harvesting capabilities can power communication devices, GPS systems, and other essential gadgets, thus improving operational efficiency. The trend toward the adoption of Internet of Things (IoT) devices, which

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require constant power, further fuels the demand for self-sufficient, energy-harvesting smart textiles. As consumers and industries continue to prioritize eco-friendly and sustainable options, the market for smart textiles with energy harvesting functionalities is expected to witness significant growth.

Breakup by End-Use Sector:

- Military and Protection
- Healthcare
- Sports and Fitness
- Fashion and Entertainment
- Transportation
- Architecture
- Others

Military and protection hold the largest market share

The report has provided a detailed breakup and analysis of the market based on the end-use sector. This includes military and protection, healthcare, sports and fitness, fashion and entertainment, transportation, architecture, and others. According to the report, military and protection accounted for the largest market share.

The military and protection segment is a significant market driver for the smart textiles industry, driven by the critical need for enhanced performance, safety, and communication among defense personnel. Smart textiles offer an array of functionalities tailored for military applications, such as advanced camouflage, body temperature regulation, and integrated communication systems. These specialized textiles are particularly useful in modern warfare conditions where technological advantage can be a decisive factor. For instance, uniforms equipped with sensors can monitor soldiers' vital signs, hydration levels, and fatigue, thereby enabling timely medical interventions. Similarly, textiles with built-in GPS and communication systems can improve team coordination and situational awareness. Governments and defense agencies are increasingly investing in R&D initiatives to integrate smart textiles into military equipment, providing a robust financial stimulus for market growth. Moreover, these textiles are not limited to combat scenarios; they also find applications in training simulations, search and rescue missions, and disaster relief operations. The multifaceted utility of smart textiles in the military sector, backed by substantial investment and a focus on innovation, ensures sustained growth in this market segment.

Breakup by Region:

- North America
 - United States
 - Canada
- Asia Pacific
 - China
 - Japan
 - India
 - South Korea
 - Australia
 - Indonesia
 - Others
- Europe
 - Germany

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France
United Kingdom
Italy
Spain
Russia
Others
Latin America
Brazil
Mexico
Others
Middle East and Africa

North America exhibits a clear dominance, accounting for the largest smart textiles market share

The market research report has also provided a comprehensive analysis of all the major regional markets, which include North America (the United States and Canada); Asia Pacific (China, Japan, India, South Korea, Australia, Indonesia, and others); Europe (Germany, France, the United Kingdom, Italy, Spain, Russia, and others); Latin America (Brazil, Mexico, and others); and the Middle East and Africa. According to the report, North America exhibited the largest segment.

The North America region stands as a robust market driver for the smart textiles industry due to a confluence of factors such as technological innovation, consumer demand, and strong institutional support. Home to a large number of tech companies, research institutions, and startups, North America is a hub for advancements in material science and sensor technologies that are critical for smart textiles. The region also benefits from a consumer base that is quick to adopt new technologies, thereby creating a receptive market for smart textiles in sectors, such as healthcare, sports, and consumer electronics. Government backing in the form of grants and R&D funding, especially in the healthcare and defense sectors, provides additional impetus for growth.

Besides this, the well-established Internet of Things (IoT) ecosystem in North America complements the smart textiles industry by providing a framework for data collection and analysis, essential for many smart textile applications. Regulatory frameworks around safety and data protection also instill consumer confidence, thus encouraging market growth. All these elements together make North America a fertile ground for the development and adoption of smart textiles, sustaining its influence as a key market driver.

Competitive Landscape:

The key players are integrating sensors, conductive materials, and microelectronics into fabrics. Along with this, companies are concentrating on creating wearable tech products such as smart clothing, fitness trackers, and health monitoring garments. These innovations often involve monitoring vital signs, tracking physical activity, and providing real-time data to users. In addition, smart textiles are being developed for healthcare purposes, including remote patient monitoring, wound care, and smart compression garments. These textiles have the potential to enhance patient comfort and improve medical outcomes. Additionally, smart textiles are used in automotive interiors to enhance comfort and safety. Companies are developing fabrics that can regulate temperature, provide lumbar support, and even detect driver fatigue. Furthermore, brands are working on sustainable smart textiles by incorporating eco-friendly materials and manufacturing processes. This aligns with the growing demand for environmentally responsible products.

The market research report has provided a comprehensive analysis of the competitive landscape in the market. Detailed profiles of all major companies have also been provided. Some of the key players in the market include:

Adidas AG

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AiQ Smart Clothing Inc.
Clothing+
Dupont De Nemours Inc.
Gentherm Incorporated
Google LLC
Interactive Wear AG
Ohmatex A/S
Schoeller Textil AG
Sensoria Inc.
Texas Instruments Incorporated
Textronics
Vista Medical Ltd.

Recent Developments:

In January 2023, Texas Instruments Incorporated established a partnership with TDK Corporation to create the world's first sensor module with embedded edge AI and wireless mesh networking, the i3 Micro Module.

In October 2020, Adidas AG developed a brand-new technology called Strung, which is the first textile technology to convert athlete data into dynamic performance material. It is the first totally athlete data-coded shoe on the market and combines the high-resolution creation technologies Adidas 4D and Strung.

In January 2020, Schoeller Textil AG introduced a line of heatable capsules. With the Heatable Capsule line, Telekom contributes its technology elements, while Schoeller created the heating technologies and materials in addition to the electronic parts. AlphaTauri designed the line.

Key Questions Answered in This Report

1. What was the size of the global smart textiles market in 2024?
2. What is the expected growth rate of the global smart textiles market during 2025-2033?
3. What are the key factors driving the global smart textiles market?
4. What has been the impact of COVID-19 on the global smart textiles market?
5. What is the breakup of the global smart textiles market based on the type?
6. What is the breakup of the global smart textiles market based on the functionality?
7. What is the breakup of the global smart textiles market based on the end-use sector?
8. What are the key regions in the global smart textiles market?
9. Who are the key players/companies in the global smart textiles market?

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