Soft Robotics - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

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Report description:

The Soft Robotics Market size is estimated at USD 2.00 billion in 2025, and is expected to reach USD 8.80 billion by 2030, at a CAGR of 34.45% during the forecast period (2025-2030).

Key Highlights
- Though soft robotics is still in its early stages, with the variety of benefits offered by soft robots compared to traditional robots, the penetration of soft robots is expected to grow dramatically over the forecast period.
- Factors driving the development of the soft robotics market include the increasing demand for safety across the various end-user industries and the growing need for automation in food processing, e-commerce, etc. The ever-increasing investments/funding in research and development across multiple nations is fueling the growth of the soft robotics market.
- Exoskeletons are an emerging developing technology that has the potential to protect and save warehouse and manufacturing workers from shoulders, back pain, neck pain, and injuries related to heavy and repetitive lifting. Various researchers are developing soft, wearable robots that mimic muscle movements. In May 2021, a team of researchers at Queen's University in Canada developed an exoskeleton that reduces the metabolic cost of walking. The research is based on designing an exoskeleton that obtains over some of the brakings that occur during walking, thereby reducing the total metabolic cost of walking.
- Medical and non-medical exoskeletons are subjected to international safety regulatory requirements published by ISO (International Organization for Standardization)/IEC. For successful commercialization of these products, manufacturers must comply with these regulations. Also, the chances for approval are subjective. They can be achieved only if there is a reasonable assurance that the device is appropriate for its application. Because of these reasons and the lack of a single centralized regulatory body, the commercialization aspect is delayed, thus restraining the potential growth of the market.
- Various players have been focusing on developing soft, pneumatic-powered grippers ideal for fragile foodstuff that might be damaged by rigid robotics otherwise. Food has been a prime target for interest in automation during the pandemic due to labor

shortages and fears of disease transmission. In June 2021, Soft Robotics company cited pandemic-related demand and raised USD 10 million for research and development in its revolutionary soft grasping, 3D perception, and AI technologies.

Soft Robotics Market Trends

Medical and Surgical Applications is Anticipated to Register Highest Growth

- Soft robotic devices can assist in treating or simulating conditions like cardiovascular disease, aortic stenosis, and limb disabilities causes by diseases like ALS. They have the potential to improve targeted therapy for cardiac regeneration in ischemic heart diseases. According to the United Nations Population Fund, the number of cases of heart disease in senior citizens across India in 2050 was forecasted to be about 19.1 million. Such instances are likely to augment the demand for the studied market.
- Soft robots inherently have the advantage of being compliant with the natural tissues of humans and living organisms. Minimally invasive surgery (MIS) is one of the research areas with the big potential of adopting soft robotics. This is because it overcomes the limitation of traditional MIS methods, such as a low degree of freedom.
- The limitations of open and laparoscopic procedures and the increasing advantages of robotic surgery systems are expected to boost the adoption rates of robot-assisted surgeries worldwide. Soft-robotic surgery on a human body has been inspired by soft-bodied animals with applications specifically designed for minimally invasive surgery (MIS), opening up areas previously inaccessible to surgeons using current keyhole surgery techniques. With similar research being active across multiple researcher labs, and medtech companies innovating new soft robots will likely shape how physicians perform surgeries.
- According to a study conducted on Soft Robot-Assisted Minimally Invasive Surgery (RAMIS) and Interventions by IEEE in May 2022, with the arrival of laparoscopic surgery, which is performed through narrow incisions, the surgical community saw a rapid move away from traditional open surgery. Switching from handheld instruments to RAMIS was the next logical step. Surgeons could easily perform complex surgical procedures with the help of robots and an intuitive user interface, partially replicating the easily accessible situation of open surgery.
- Furthermore, biocompatible soft materials, super elastic materials, and 3D-printed soft plastics such as silicone elastomers allow for greater safety during surgeries. These allow changes in robotic shape and mechanical properties in response to touch, thus enhancing their greater intrinsic safety. Such developments are likely to expand the scope of soft robotics and become relevant to procedures in minimally invasive surgery, such as laparoscopy, single port laparoscopy, etc.
- In January 2022, Benchmark announced a manufacturing and supply agreement with Titan Medical to manufacture patient carts for Titan's Enos robotic workstations and single-port surgical systems. The company was selected for its experience and vertical integration in designing, manufacturing, and assembling complex medical devices and its ability to scale production to meet demand. The company has integrated its manufacturing solutions with Titan's cameras and articulated instruments to help achieve its goal of manufacturing surgical workstations and patient carts for use in human studies scheduled to begin in 2023.
- The robotic surgery market is expected to benefit from the growing incidence of chronic diseases such as urology, gynecology, orthopedic, and other chronic disorders worldwide. According to the latest World Health Organization (WHO) report, non-communicable diseases (NCDs), such as cardiovascular disease, cancer, diabetes, and chronic respiratory diseases, are responsible for almost 71% of global deaths. It accounts for 41 million people dying each year of these NCDs.

Asia Pacific is Expected to Register the Fastest Growth During the Forecast Period

- Soft robots are systems constructed from materials that have mechanical properties comparable to those of living tissues. These robots are intrinsically assumed to be more innovative than conventional robots. The Asia Pacific region is witnessing several advanced innovations in the studied market.

- For instance, in January 2023, the Smart Polymer Materials Group led by Prof. CHEN Tao at the Ningbo Institute of Materials Technology and Engineering of the Chinese Academy of Sciences, in cooperation with Prof. ZHENG Yinfei at Zhejiang University, developed a hydrogel-based soft robot with adaptive deformation, realizing multi-dimensional off-road locomotion on natural terrains. Its creators expect that the glove would help people with finger or hand injuries by aiding the movement of finger muscles, helping them feel the grasp of holding with one's hands.
- Asia-Pacific is one of the fastest-growing markets for soft robotics mainly due to the massive adoption of the technology with increasing domestic production in the market. The regional vendors also play a significant role in the innovation and development in the soft robotics field. In May 2023, a team of MIT researchers took a step towards developing SoftZoo, a bio-inspired platform that allows engineers to study soft robot co-design. The framework optimizes algorithms that consist of design, which determines what the robot would look like, and control, or the system that allows robotic motion, enhancing how users automatically generate outlines for potential machines.
- In September 2022, a Chinese research team created a powerful micro robot, a shape-shifting device driven by a magnetic force that is able to travel within the human body and help address an array of health conditions. The high-performance soft robot, which is just a millimeter long, is claimed to be able to bounce or squirm within blood vessels to treat cardiovascular disease, among other potential applications.
- Food assembly is a potentially big market in the Asia Pacific region. The researchers from the Singapore University of Technology and Design saw an opportunity to use soft robotics to improve the efficiency of manufacturing and assembly operations - where tasks of this nature tend to be repetitive. In March 2023, with funding support from A*STAR's National Robotics Programme, the researchers came up with a reconfigurable workspace soft (RWS) robotic gripper. The robotic hand-optimized machine vision adapts to the 'workspace' configured in the system, so the RWS robotic gripper is equipped with the ability to scoop and grasp a wide range of items.
- Additionally, in Japan, the government is collaborating with universities and companies to develop a robotic surgery system that allows doctors to operate more accurately and simultaneously monitor MRI readings and data from other devices. Further, in October 2022, a team of researchers at the University of Tsukuba in Japan developed a soft robot that patients can interact with to decrease their stress and fear when undergoing painful or uncomfortable medical procedures.

Soft Robotics Industry Overview

The Soft Robotics Market has seen huge investments in the technical front, and new entrants are expected to emerge in the market. Currently, soft robot manufacturers have very specific solutions, and the market is moderately competitive. However, with the advent of big players in the robotics market, venturing into soft robotics is expected to increase the competition.

- February 2024 - RightHand Robotics, one of the leaders in autonomous AI robotic picking solutions for order completion, announces a multi-year agreement with Staples Inc., one of the Americas leaders in workspace products and solutions. The agreement allows Staples to deploy and install the RightPick item-handling system to automate operations for higher service levels and Next-Day Delivery to over 98% of the United States.
- December 2023 - ReWalk Robotics, Ltd., one of the leading providers of innovative technologies that enable mobility and wellness in rehabilitation and daily life for individuals with neurological conditions, announced the successful demonstration of a proof-of-concept next-generation exoskeleton.

Additional Benefits:

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

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