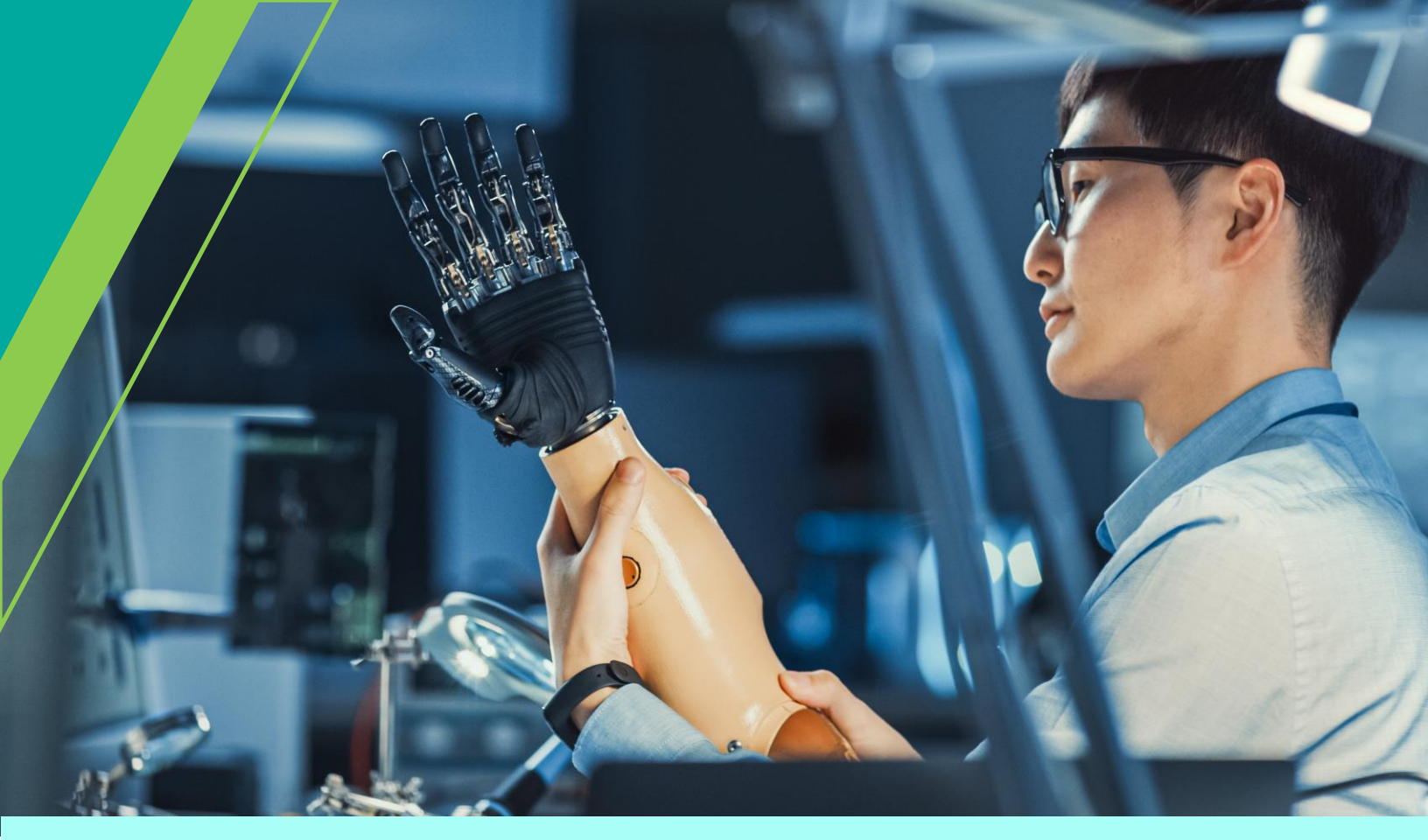

LUCINTEL INSIGHT
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FIVE TRENDS SHAPING FUTURE OF THE ROBOTIC PROSTHETIC MARKET

The technologies in the robotic prosthetic market have undergone significant changes in recent years, encompassing a range from traditional prosthetics to mind-controlled prosthetics. The rising wave of 3D printed prosthetics, microprocessor-controlled prosthetics, myoelectric prosthetics, and artificial intelligence in prosthetics is creating significant potential in applications such as prosthetic arms, prosthetic legs/knees, prosthetic feet/ankles, and prosthetic hands. The

major growth driver for this market is the increasing number of amputation around the globe due to increasing trauma, vascular disease, diabetes, limb infection, accidents and technological advancements.

The robotic prosthetic market is divided into several segments, such as prosthetic arms, prosthetic legs/knees, prosthetic feet/ankles, and prosthetic hands. Key players in the robotic prosthetic market include Ottobock, Össur, Blatchford Group, SynTouch, Inc., and Mobius Bionics. These have been working on different strategies to drive sales using highly influential marketing approaches; however, as we examine the challenges and opportunities ahead in this market, companies can benefit from a strategy of developing mind-controlled prosthetics and 3D printed prosthetics, as well as considering the key target market trends we have identified. Lucintel predicts the global robotic prosthetic market will be valued at $1.4 billion by 2025, with an expected CAGR of approx. 5.6% between 2020 and 2025.

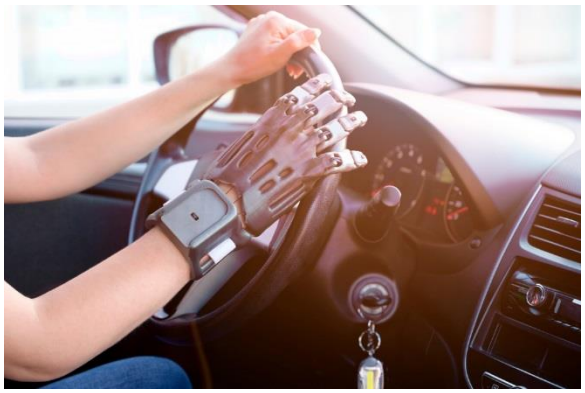
Lucintel identifies five trends set to influence the global robotic prosthetic market. Most of the industry players and experts agree that these five trends will accelerate developments in the robotic prosthetic industry in the near future. In terms of the widespread knowledge about the robotic prosthetic market already on the horizon, there is still a lack of unified perspective on the direction the industry is moving to proactively address developments. To help bring more clarity to this gap, our study aims to provide insights concerning the direction that changes are taking and how these changes will impact the robotic prosthetic market.

1. Increasing Demand for Mind-Controlled Prosthetics

With the introduction of neuroprosthetics, researchers have precipitated the rise of sophisticated mind-controlled prosthetic limbs. These are combined with electrode arrays that are placed in the brain, nerves, or muscles. These

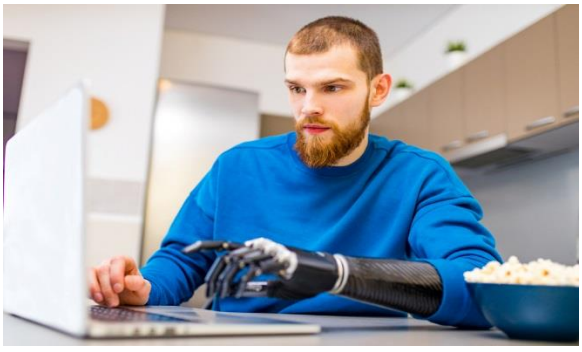
decode the messages that control movement between the brain and the limb, allowing the user's mind to power basic movement. These prosthetics feature sense of touch. Adding sensory feedback to already complex neuroprosthetics is a daunting task, but it offers the chance to radically transform the lives of amputees and people living with paralysis.

2. 3D Printed Prosthetics



3D printable prosthetics are changing the face of medicine, as engineers and physicians are able to develop prosthetics that are fully customized for the wearer. While 3D printed prosthetics allow amputees to obtain products for thousands of dollars less than traditional prosthetics, the methods and materials used are raising concerns. 3D printed prosthetics use materials such as acrylonitrile butadiene styrene (ABS) plastics, or as a stronger material, bridge nylon. 3D printers are becoming compatible with other materials like lightweight titanium, which increases durability and strength. All around the world 3D printing now allows cost-effective creation of functioning prosthetics, giving both children and adults the opportunity to utilize lightweight, futuristic limbs in everyday life.

3. Increasing Use of Myoelectric Robotic Prosthetics



A myoelectric-controlled prosthesis is an externally powered artificial limb that is controlled with the electrical signals generated naturally by the user's own muscles. Myoelectric prostheses have integrated motors and batteries that power the device movement, which is ultimately

controlled by input from electrical signals generated by muscles in the residual limb. When muscles are contracted, they give off an electrical signal. In prosthetics, electrodes sitting on the skin inside the socket detect these muscle signals and send them to a controller, which triggers movement to correspond to what the user intends. When a user wants to close a hand, for example, the user squeezes those muscles that correspond to closing, and the hand will close. Technologies now exist to make this even more intuitive for individuals enabling their control of multiple features in an arm, such as grasping patterns in a hand, and motions of wrist rotators, elbows, and even shoulders.

4. Artificial Intelligence in Robotic Prosthetics

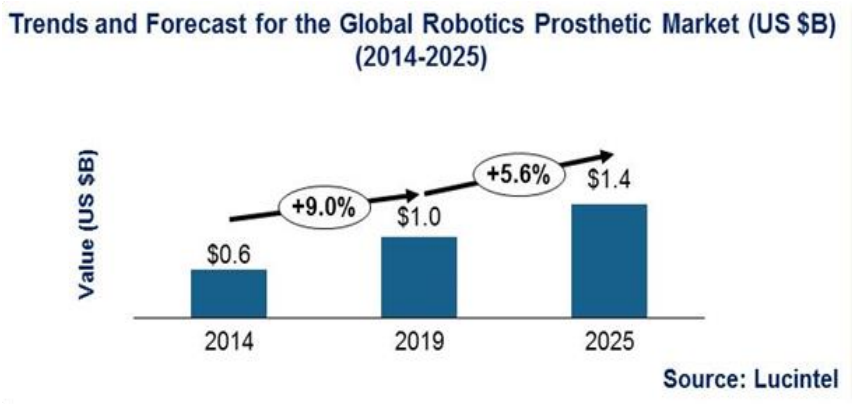
The basic principle behind incorporating artificial intelligence in robotic prostheses is that the algorithm interprets nerve signals from the patient's muscles, allowing the prosthesis to be controlled more precisely. Scientists from the University of Utah designed an AI-powered prosthetic limb that adjusts itself according to the movements of the user's hip and residual limb. It provides a smoother and easier way to avoid obstacles. The artificial intelligence in an upper-extremity prosthesis is used for direct control, as well as providing indirect control from the neural network with various signals, sensors, controllers, and algorithms. The artificial intelligence used in the lower extremity within an intelligent prosthesis such as a knee joint replaces the hydraulic mechanism with a combination of microprocessor-controlled and a hydraulic or pneumatic actuator.

5. Adoption of User-Centric Prosthetics

User-centered development (UCD) is an active involvement of the user for a clear understanding of the user's needs. User-centric prostheses are being developed to help improve amputees' quality of life. The enhancement of, for example, changing the speed of a user's gait within the use of a prostheses may help amputees to feel more confident and natural when walking.

Strategic Considerations for Key Players in the Robotic Prosthetic Market

The robotic prosthetic industry is dynamic and ever-changing. Successful industry players are necessarily masters of innovation, change and adaptation. To retain this status, they need to be attentive to current trends. We believe there will be promising opportunities for robotic prosthetics in the prosthetic arm, prosthetic leg/knee, prosthetic foot/ankle, and prosthetic hand markets. As per Lucintel's latest market research report (Source: https://www.lucintel.com/robotics-prosthetic-technology-market.aspx), the robotic prosthetic market is expected to grow with a CAGR of approx. 5.6% between 2020 and 2025, and reach $1.4 billion by 2025. This market is primarily driven by the increasing number of amputations around the globe due to increasing trauma, vascular disease, diabetes, limb infection, accidents and technological advancements such as mind-controlled prosthetics and 3D printed prosthetics.



Whether you are new to the robotic prosthetic market or an experienced player, it is important to understand the trends that impact the development process, as these trends as listed above will lead players to create long-term strategy formulation that will allow them to remain competitive and successful in the long run. For example, to capture growth, some of the strategic considerations for players in the robotic prosthetic market are as follows:

- Robotic prosthetic market players can increase their capabilities to develop mind-controlled prosthetics.
- Players can focus on artificial intelligence-powered prosthetics which are expected to lead future trends.
- Investment to increase competencies for the production of 3D printed prosthetics, as 3D printing represents cost-effective creation of well-functioning prosthetics
- Research and development activities for development of low-cost robotic prosthetics

Note: In order to gain better understanding, and learn more about the scope, benefits, and companies researched, as well as other details in the robotic prosthetic market report from Lucintel, click on https://www.lucintel.com/robotics-prosthetic-technology-market.aspx. This comprehensive report provides you with in-depth analysis on market trends and forecast, segment analysis, regional analysis, competitive benchmarking and company profiling of key players. In addition, we also offer **strategic growth consulting** to meet your customized needs. We have worked with many PE firms and corporate customers in the process of their market

entry and M & A initiatives.

Lucintel - At a Glance

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