

Digital Surgery Technology Trailblazers: Top Start-ups Rapidly Gaining Mindshare in the Digital Surgery Technology Market

December 2023: Complimentary Abstract / Table of Contents



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Introduction

- Digital surgery refers to the integration of advanced digital technologies, including Artificial Intelligence (AI), advanced imaging, connectivity, and data analytics, with robotic surgical systems. This collaboration between digital technology and robots allows for highly precise minimally invasive procedures. The objective of digital surgery is to provide a better experience to both patients and surgeons across the surgery life cycle by bringing data together at one place and deploying digital technology across use cases, the most prominent ones being pre-surgery planning, remote collaboration, and post-surgery evaluation
- Initially, prominent medical device enterprises invested heavily in surgical robots, with an aim to acquire pure-play surgical capabilities through partnerships or acquisitions. However, to scale the level of adoption of robots across the space of surgery, enterprises need to overcome the challenge of fragmented surgeon acceptance, limited training, and technological complexity. Hence, they have now expanded the scope of their capabilities and are now developing solutions to enhance the efficiency and usage of robotic surgery, by investing in complementing digital solutions leveraging technologies such as AR/VR, imaging, data and analytics, and AI
- Recognizing this opportunity, multiple start-ups with a focus on digital surgery technologies have started to gain traction. These start-ups, with a niche area of focus and verticalized expertise, aim to bridge the gap between surgeons and robots by providing a variety of technological solutions enabling surgical training, pre-operative planning, real-time patient monitoring, etc.
- In this research, we present an assessment of start-ups that offer proprietary digital surgery solution, primarily focusing on their core capabilities and market impact. We present an assessment and detailed profiles of leading digital surgery start-ups. The assessment is based on both primary and secondary research and Everest Group's ongoing tracking of emerging technology ecosystem in the medical devices industry

Scope of this report



Geography
Global



Industry
Medical devices































Technology
Digital surgery



Trailblazers
Seven leading start-ups in
the digital surgery industry

This study offers distinct chapters providing a deep dive into key aspects of digital surgery technology market; below are four charts to illustrate the depth of the report

Everest Group's view of a digital surgery ecosystem	Everest Group's view of digital surgery supply landscape
<p style="text-align: center;">Stakeholders</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Healthcare providers </div> <div style="text-align: center;">  Surgeons and healthcare professionals Surgery life cycle </div> <div style="text-align: center;">  Patients Level of adoption: Low Medium High </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;"> <p style="text-align: center;">Pre-operative</p> <p>Surgeon education and training through interactive simulations</p> <p>Pre-operative surgery planning</p> <p>Pre-operative remote patient monitoring</p> <p>3D anatomization of patient implants</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Peri-operative</p> <p>Peri-surgery virtual proctoring and support</p> <p>Real time imaging data to support surgical interventions</p> <p>Speech recognition to operate surgical robots</p> <p>Remote surgery</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Post-operative</p> <p>Post-surgery evaluation and video recordings</p> <p>Post-operative remote patient monitoring</p> </div> </div> <p style="text-align: center; margin-top: 10px;">Technology enablers</p> <div style="display: flex; justify-content: space-around; font-size: small;">  IoT  Security  AR/VR  Mobility  Big data analytics and AI/ML  5G </div>	<div style="display: flex; justify-content: space-between; font-size: small;"> <div style="width: 30%;"> <p style="text-align: center;">Medical device enterprises</p> <p>Overview of offerings</p> <p>The area of focus lies in developing robotic and planning solutions (surgical navigation, 3D anatomization) leveraging in-house innovation for the pre- and peri-operative part of the surgical interventions</p> </div> <div style="width: 30%; border: 2px dashed orange; padding: 5px;"> <p style="text-align: center; color: orange;">Technology providers</p> <p>The area of focus lies across the stages of surgical intervention, ranging from solutions to digitize the robot, enabling better planning, training, workflow management, and post-surgical evaluation tools</p> </div> <div style="width: 30%;"> <p style="text-align: center;">Service providers</p> <p>Provides consulting and implementation services for establishing end-to-end digital surgery platforms, undertakes co-development initiatives to develop digital counterparts (AR- enabled training programs, surgical intelligence systems), and enable a seamless and secure flow of data across the stages of surgical interventions</p> </div> </div> <hr style="border-top: 1px dashed gray;"/> <div style="display: flex; justify-content: space-between; font-size: small;"> <div style="width: 30%;"> <p>Key customers</p> <p>Healthcare providers</p> </div> <div style="width: 30%;"> <p>Healthcare providers and medical device enterprises</p> </div> <div style="width: 30%;"> <p>Healthcare providers, medical device enterprises, and technology providers</p> </div> </div> <hr style="border-top: 1px dashed gray;"/> <p>Logos</p> <div style="display: flex; justify-content: space-around; font-size: x-small;"> <div style="text-align: center;">   </div> <div style="text-align: center;">   </div> <div style="text-align: center;">   </div> <div style="text-align: center;">   </div> <div style="text-align: center;">   </div> <div style="text-align: center;">  </div> </div>
Digital surgery trailblazers assessment framework	Gen AI in digital surgery
<div style="display: flex; justify-content: space-between; font-size: small;"> <div style="width: 22%;">  Range of capabilities <ul style="list-style-type: none"> What stages of the operative procedure are being targeted by the start-up What all use cases are being targeted by the start-up across different operative stages What are the key technologies being leveraged by the start-up in its portfolio of offerings How are start-ups bringing innovation in their offerings through development of IPs and partnerships </div> <div style="width: 22%;">  Market buzz <ul style="list-style-type: none"> How is the investor confidence? How much value has the start-up gained based the different rounds of funding? What kind of awards and recognitions has the start-up and its leadership received? </div> <div style="width: 22%;">  Scale and maturity <ul style="list-style-type: none"> What growth rate has the start-up experienced with respect to its revenue, client portfolio, and number of employees? What categories of clients are being addressed by the start-ups (healthcare providers, medical device enterprises)? </div> <div style="width: 22%;">  Leadership and talent <ul style="list-style-type: none"> How large and geographically diverse is the workforce? How strong and relevant is the leadership cohort (in terms of digital surgery and from a technology experience standpoint)? What are the recent hiring trends of the start-up? </div> </div>	<div style="display: flex; justify-content: space-between; font-size: small;"> <div style="width: 22%;">  Risk assessment <p>Generative AI has unleashed robotics to be further scaled to real-world deployments with continuous learning and personalized interactions with users. However, it poses risks such as negligence of vital information, and generation of content from unlicensed or proprietary sources leading to data piracy. Consequently, to mitigate risks, MedTechs need to ensure clear data ownership and set responsible guardrails while leveraging generative AI</p> </div> <div style="width: 22%;">  Talent upskilling <p>As generative AI solutions take hold, MedTechs should address fundamental questions about operating models, including the composition of use case design and implementation teams and how generative AI tools will affect the surgical interventions to core processes, building a talent pool that can identify, develop, launch, and maintain generative AI solutions will necessitate training and upskilling.</p> </div> <div style="width: 22%;">  Tech stack remodeling <p>Medical device enterprises must navigate both model and data complexities, such as how to select and train models on regulated data, how to manage access, and how to validate model output across the areas of pre-surgical planning, peri-surgery analytics, and post-surgical evaluation results. Generative AI needs strong technology for data management, risk assessment, and accelerated experimentation and delivery</p> </div> <div style="width: 22%;">  Compliance to regulations <p>Digital surgery due to its patient specific nature is emerging as an area, prone to high government scrutiny. Governments across the US, EU, and China are indulging in active legislations, protecting health, safety, and data protection. MedTechs should be cognizant of both global and regional implications while integrating generative AI in their existing set of digital surgery solutions</p> </div> </div>

Research calendar

Life Sciences Information Technology

Published Planned Current release

Reports title	Release date
Decentralized Clinical Trial Platforms PEAK Matrix® Assessment 2023	November 2022
Decentralized Clinical Trial Platforms Provider Compendium 2023	December 2022
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