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Winning a Piece of the Medical Robotics Market: Amidst Major U.S. Investment in AI, How Innovators can Transition from Niche to Mainstream

Following his inauguration in January, U.S. President Trump's administration announced a potential $500 billion joint venture called Stargate, aimed at **advancing both the physical and virtual infrastructure of artificial intelligence.**

The project will begin with an initial $100 billion investment, with funding expected to increase over the next four years. Stargate is a collaborative effort involving OpenAI, Oracle, and SoftBank.

As part of the announcement, Oracle's Chief Technology Officer, Larry Ellison, emphasized that a major focus of the initiative will be optimizing healthcare operations with AI. One key application includes integrating AI into digital health records, enabling physicians to make more informed treatment decisions.

Ellison also highlighted AI's potential in early cancer detection through blood test analysis and how AI-driven robotics could be used to design a personalized cancer vaccine within just two days.

The U.S. FDA is also ramping up its support for artificial intelligence in healthcare. In Q1 2025, the agency released new guidelines to provide clearer regulatory pathways for AI-driven innovations seeking approval. Over 1,000 AI-enabled devices have already been approved by the FDA, and the agency is working to streamline the process for updating existing AI technologies while facilitating the entry of new ones.

Source: *AFP via Getty Images*

Suzy's Insight: With strong federal backing and increased funding, the next four years are poised to be a transformative period for AI-powered medical devices, including medical robotics.

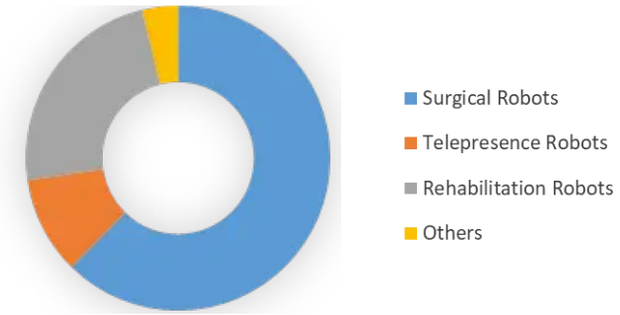
The following sections analyze the current landscape of healthcare robotics in the U.S. market and provide actionable insights for innovators looking to enter this space. A strategic approach—gaining niche traction through specialized applications first—can help lay the groundwork for long-term expansion into broader markets.

Surgical Robots Lead the Medical Robotics Market

The medical robotics market is expanding rapidly, fueled by technological advancements and the growing need for precision in surgical procedures. The market was valued at $16.6 billion in 2023 and is expected to reach $63.84 billion by 2032.

The U.S. is a leader in this space, with North America accounting for 41% of the market share, driven by strong investments in cutting-edge robotic technologies, regulatory support, and reimbursement frameworks.

The medical robotics market can be broken down into the following categories:



Surgical robots, in particular, dominate the landscape. **About 50% of surgeries in the U.S. are currently carried out using minimally invasive methods, a trend greatly enhanced by robotic technology.**

While the U.S. currently dominates the medical robotics sector, accounting for 31% of the global total and expected to retain leadership through 2033, South Korea is also making strides in areas like surgical robotics, leveraging its expertise in industrial automation (unmatched penetration of 1,012 robots per 10,000 employees).

Notable innovators include:

- **Koh Young:** After securing leadership for smart factory solutions, Koh Young is seeking U.S. FDA clearance this year for KYMERO, a neurosurgical robot to advance brain surgery.

- **Doosan Robotics:** Successfully introduced its robotic-assisted laparoscopic surgery solution in 2024. The solution is already in

use at Koo Hospital in Daegu and Min Hospital in Seoul, with expansion plans targeting the U.S. and Europe.

- **Navigantis:** Recently achieved its first successful neurovascular clinical cases using the VASCO interventional robotic platform. VASCO has the potential to revolutionize neurovascular procedures, improving patient outcomes and paving the way for robotic telesurgery in stroke care.

- **meerecompany:** Known for its Revo-i laparoscopic surgical robot, meerecompany has expanded its reach by exporting Revo-i to Paraguay, marking the beginning of a broader South American expansion strategy. The Revo-i system offers high-resolution 3D imaging and precise multi-joint instrument movements.

- **LN Robotics, Inc.:** Specializing in cardiovascular interventional robots, LN Robotics integrates AI to assist in life-saving procedures like Percutaneous Coronary Intervention, reducing radiation exposure and improving surgical efficiency.

- **CUREXO, Inc.:** A pioneer in robotics for joint replacement, CUREXO enhances orthopedic surgical workflows, making procedures more precise and efficient.

- **EROP Co., Ltd.:** Focused on practical robotic solutions, EROP designs surgical robots that address real-world challenges in operating rooms, including bone fracture reduction.

Although the surgical robots market has experienced the most growth of the medical robotics market (particularly for laparoscopy), gaps still exist in terms of both the need for technology advancement and applications for additional patient conditions.

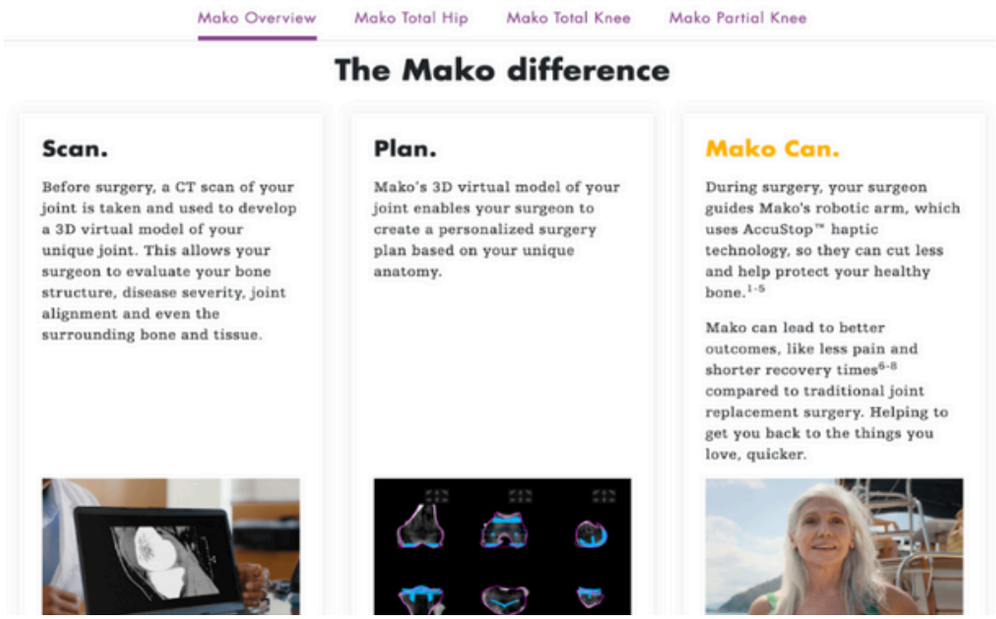
As the leading segment of the medical robotics market, this report focuses on **analyzing strategies by early and emerging surgical robotics leaders to move from niche applications to securing broader market share. Similar approaches can be utilized across various areas of the medical robotics field.**

Obtaining Market Leadership Over 18 Years: How did Mako do it?

Stryker is currently one of the leaders of the global surgical robotics market, largely driven by the success of the Mako product line, which **has been utilized in** over 500,000+ procedures for applications including knee, hip, spine, and shoulder surgeries. Mako's strong portfolio and rise to market leadership were not created overnight.

During initial market entry, Mako focused on penetrating the local Florida market first, partnering with surgeons, engaging different types of stakeholders through local event participation, and influencing government officials to demo the technology themselves.

After generating market acceptance for partial knee replacement, applications expanded to hip surgery and total knee replacements, utilizing similar approaches on a larger scale. Mako created local launch and post-launch events around major national trade shows to **educate and directly engage surgeons. The experience was highly successful and was replicated for an additional four years.** By 2021, Mako held approximately a 70% share of the 1,700 installed orthopedic robots in the U.S., further showcasing the success of these efforts.



To further penetration, Mako also utilized patient-oriented campaigns. A national D2C (direct to consumer) to drive patient awareness of the benefits of the system for partial knee, total knee, and total hip replacement surgery was launched in 2023. The omnichannel “Scan. Plan. Mako Can.” campaign came to life through different assets and various media channels, including linear TV, streaming TV, social media, YouTube, programmatic/endemic and paid search. Utilizing multiple online destinations, Mako encouraged patients to be proactive about their joint care while outlining how different Mako solutions support patients, focusing on ensuring quality outcomes and emphasizing that surgeons remain in control of surgery.

Suzy's Insight: *By starting with a niche target, leveraging local geographic penetration efforts, and implementing educational market initiatives, Mako gradually scaled its efforts as market share was secured. This structured market expansion roadmap enabled Mako to achieve its long-term vision over 18 years.*

Mako's success demonstrates that securing niche market leadership isn't just about being first—it's about being strategic. Instead of aiming for rapid, broad adoption from the outset, Mako leveraged local educational initiatives, media relations, and hands-on surgeon engagement to build credibility and refine its messaging. By prioritizing targeted geographic penetration and creating high-touch experiences, such as training programs, local case studies, and interactive demonstrations, Mako addressed skepticism, established trust, and accelerated adoption.

Patient-oriented campaigns also played a key role in preparing patients for Mako-assisted surgery, supporting surgeons in offering the procedure and contributing to Mako's leading procedure rates today.

This market-driven approach allowed Mako to secure leadership in one category at a time before expanding into additional surgical applications, reinforcing its credibility and technological advantage.

Sustainable market expansion is about sequencing. Winning locally first creates the foundation for scaling systematically, driving faster adoption, and ensuring long-term category leadership.

INTERVIEW

Interview with with a Surgeon Driving Robotics Adoption Across Different U.S. Healthcare Facilities with Knightscope - Security Robots

To explore how robotics innovators can successfully enter niche surgical markets and leverage early success to drive long-term portfolio expansion, we interviewed Dr. John Lazar. He currently serves as the Chief of Thoracic Surgery and Director of Thoracic Oncology at Saint Thomas Health in Nashville and as an Associate Professor at the University of Tennessee.

Dr. John Lazar

Chief of Thoracic Surgery & Director of Thoracic Oncology at Saint Thomas Health

PROVING THE ADVANTAGES OF ROBOTICS TO OVERCOME INITIAL NEGATIVE PERCEPTION

Suzy: Although your clinical focus is on thoracic oncology, you have experience supporting the adoption of robots across various fields. Can you summarize how you first became interested in robotics and how you have helped influence adoption in the U.S. healthcare industry?

Dr. Lazar: I attended medical school in the U.S. for general surgery and was always interested in robotics. **During my residency, we had one of the first da Vinci systems.**

I continued to follow the field and later trained at Memorial Sloan Kettering during my general surgery residency, working with Dr. Bernie Park, **one of the first general thoracic surgeons to use robotics.** After completing my training, I had the opportunity to work with a leading thoracic surgeon in New York City, who **was pioneering robotic techniques** and pushing the field forward. From there, I built on my expertise, **expanding my focus to the business side of robotics, program development, and education for both surgeons and residents.**

In 2018, I joined Georgetown and MedStar to standardize robotics, demonstrate its financial benefits, and advocate for its value in oncology. **Many administrators initially saw it as a gimmick, but we proved its advantages —better staging, more complex resections, and improved surgical outcomes.** This experience placed me in front of high-level decision-makers, honed my leadership skills, and led to the establishment of the Center for Surgical Innovation at MedStar (now called MedStar Georgetown Surgical Outcomes Center).

I also trained myself to know a broad spectrum of surgery and wrote a textbook on robotic surgery. As our work gained recognition, **numerous companies began approaching us, seeking insights on robotics in various fields —neurosurgery, orthopedics, digital surgery, and emerging surgical platforms.** Now, having moved on to St. Thomas and the University of Tennessee, **my focus has shifted more toward innovation within clinical practice**.

POTENTIAL OF FUTURE SYSTEM APPLICATIONS IS A KEY SELLING POINT FOR ROBOTICS, BUT SOME MARKET PLAYERS HAVE FAILED TO DELIVER

Suzy: When you worked at MedStar, how did that compare to where you are now? How were different robots introduced for specific conditions, and how did they expand? What was the process?

Dr. Lazar: At MedStar, we were one of the first to purchase an endoscopic navigational bronchoscopy platform designed to be a significant improvement over traditional methods. **The broader vision was that this would be an endoscopic robot, with bronchoscopy as just the starting point.** Within six months to a year, the plan was to expand into percutaneous nephrolithotomy (PCNL), an endoscopic procedure for kidney stones.

The idea was that the robot would use one arm to insert a ureteroscope, while the other arm would enter through a port inside the kidney, allowing them to meet and ablate the obstruction—an outpatient procedure. At the time, I was the program director for robotic surgery but primarily a thoracic surgeon.

I saw the potential for a multi-specialty approach: we could use the bronchoscopy feature two or three days a week, while urologists could utilize it for the remaining days.

When I pitched it to the hospital president, I emphasized that this could be a true five-day-a-week robotic system—maximizing its use across departments. **I even envisioned future applications for esophageal and colorectal surgery, making it a highly sought-after tool among surgeons.** The company's leadership, including a surgeon as its president, understood the clinical benefits.

However, after the company was acquired by a larger medtech leader amidst COVID-19**, the project lost momentum.** The technology itself had incredible potential, but for various reasons, it never fully realized its goals. **From an outsider's perspective, I suspect it was a combination of timing, company restructuring, and market challenges.**

CONNECTING INNOVATORS WITH STRONG NETWORK OF SURGICAL KOLS TO SUPPORT PRODUCT LAUNCHES

Suzy: How do you work with innovators to connect them with different robotics ecosystem stakeholders as part of their expansion efforts?

Dr. Lazar: I work with **five other thoracic robotic surgeons, all of whom are also academic and key opinion leaders (KOLs)** in their respective fields across different parts of the country.

We serve as course directors for the Society of Robotic Surgery and ISMICS (International Society for Minimally Invasive Cardiothoracic Surgery.) **These organizations connect us with innovations from Europe and Asia, where regulatory landscapes differ from the U.S., providing valuable global insights.**

We are highly collaborative, engaging with startups and major innovators at various levels. Many surgeons, including those I know, **have served as advisory board members to assist with these launches.**

COVID SETBACKS STILL ARE PROMINENT, ADDING TO COMPLEX PROCESS OF BRINGING NEW SYSTEMS TO MARKET

Suzy: What are some of the biggest challenges in bringing new robotics to the U.S. market?

Dr. Lazar: COVID is still a major setback. Many engineers, particularly in California, were unable to work, which significantly delayed development. Additionally, **the sheer number of patents, FDA regulations, and safety concerns make this a long-term effort—often taking 10 years or more to bring a new system to market.** Unlike other industries, these robots interact directly with human patients, making safety and reliability critical.

For comparison, there is one leading surgical robot innovator that has been around for 25 years, **refining its technology through slow and steady innovation.** They are just now releasing their first new robot in over a decade—the previous model launched in 2014. **This gradual progress highlights the complexity of advancing surgical robotics.**

STARTING NICHE AND THE POWER OF PATENTS TO PROTECT LONG-TERM SURGICAL APPLICATION EXPANSION GOALS

Suzy: What advice would you give to international innovators seeking to introduce surgical robot technologies in the U.S.?

Dr. Lazar: First, you need to clearly define your product's niche. It's not enough to say, "I want to change surgery." **Instead, specify what you're aiming to change—whether it's retinal surgery or spinal repairs.** Having a patent that differentiates your product is essential.

Leading companies have successfully kept competitors at bay with strong patent protections, often claiming potential patent violations. While they're not invincible, **they've created an integrated ecosystem within hospitals** that's difficult to penetrate.

CORE PRODUCT DISCOVERY VENUES INCLUDE MULTIPLE CONTENT DESTINATIONS, HELPING TO BUILD WORD-OF-MOUTH REFERRALS

Suzy: Do you actively look for new technologies out there? How do you find out about new solutions like robotics and start interacting with innovators?

Dr. Lazar: It's a mixture of approaches. LinkedIn is particularly useful for discovering new technologies, as it's filled with promotional content and industry updates. I also read blogs, use a work-related Facebook group, **follow newsletters**, and keep an eye on reputable journals, like The International Journal of Robotics Research.

As I explore these resources, **I often find connections between different inventors and innovations. Word of mouth is another valuable resource** and industry organizations can be great for networking. **I find that some of the best innovations come from Asian innovators because they often face fewer regulatory hurdles and operate under different financial constraints than we do in the U.S.**

The landscape for robotics in the U.S. tends to be quite homogenous, although it's starting to diversify. **Orthopedics, for example, has a growing number of robotic applications, and fields like ophthalmology and neurosurgery are expanding into robotics as well.**

CRITICAL NEED FOR INNOVATORS TO HAVE A SURGICAL CHAMPION TO HELP FACILITATE PARTNERSHIPS WITH ECOSYSTEM LEADERS

Suzy: You recently supported a technology innovator in securing a partnership with a leading surgical robot innovator. Could you share more about how that collaboration happened and how innovators can enter the market?

Dr. Lazar: The core concept behind this innovation wasn't new, but advancements in camera technology have now made it far more practical. **I had been following this work for the past decade, and it always made sense.**

However, I only decided to become an early adopter when the drug associated with this technology showed curative potential—I knew it could be effective immediately. I reached out to the company, and they **asked me to advocate on their behalf to a leading surgical robotics company.** More recently, they've also asked me to introduce the technology to other surgeons and to support the development of core patient resources.

The key takeaway here is the critical need for a surgical champion when introducing an innovation into the field. Companies looking to integrate into this space must have a respected advocate, who has influence within their professional community, to bring the credibility and voice needed to drive widespread adoption.

INTERVIEW

Interview with a Well-Connected Surgeon Experienced with Various Discovery Venues, Leading to Procurement & Promotion for Technology Innovations

To illustrate how niche robotics innovators can leverage regional market penetration for national adoption, we spoke with Dr. Joseph Cambio. He is a Physician Partner and Urologist for Urologic Specialists of New England LLC and the Chief of Surgery/Chief Urologist of Landmark Hospital.

Dr. Joseph Cambio

Chief of Surgery/Chief Urologist of Landmark Hospital and one of the Physician Partners for Urologic Specialists of New England LLC

MOST EXPERIENCED SINGLE SURGEON IN NEW ENGLAND DRIVES REGIONAL ADOPTION OF NEW SURGICAL TECHNOLOGY

Suzy: Can you share your experience in driving the regional adoption of new surgical technologies? How have you worked to integrate advanced surgical technologies like robots into healthcare facilities across multiple states?

Dr. Cambio: I'm part of a private group and have been practicing in Rhode Island for about 12 years. Our group primarily focuses on general urology, but each physician has their own area of specialization. **Together, we've built a practice that values innovation and technological advancement.** We operate our own surgery center, allowing us to provide comprehensive care.

One of my personal interests is bringing cutting-edge technology into clinical practice.

For example, I was the first in Rhode Island to use UroLift and the first in the state to introduce the PROCEPT platform for Aquablation. To date, **I have performed approximately 175 Aquablation cases, making me the most experienced single surgeon in New England for this procedure.**

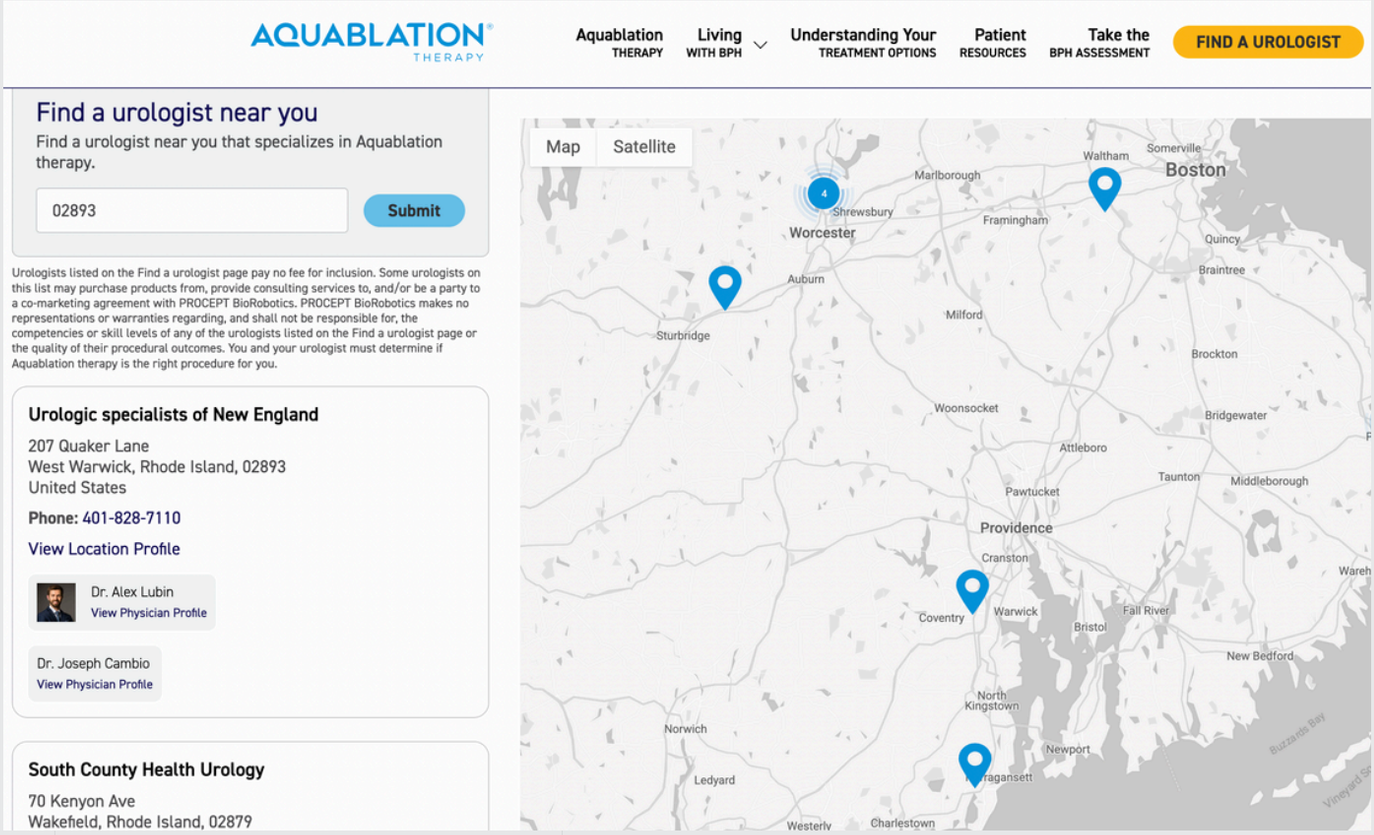
When I started practicing in Rhode Island, the region was significantly behind in surgical advancements. **At the time, there was only one da Vinci robot in the entire state.** By 2012, I worked to establish a da Vinci robotics program at Kent Hospital, and a year later, we launched another at Landmark Hospital. **These initiatives significantly improved patient access to robotic surgery across Southern New England.**

PROCTORING SITE PARTNERS INFLUENCE THE LOCAL ADOPTION OF CUTTING-EDGE SYSTEMS

Suzy: PROCEPT is a great case to demonstrate how an innovator can start a niche and secure a solid local footprint before further expansion. Can you provide more detail about your role in influencing the adoption of PROCEPT by local healthcare facilities?

Dr. Cambio: I was one of the first surgeons in the state to perform the Aquablation procedure. **I launched the program over two years ago at one of our local hospitals.**

Recently, I became a proctor for PROCEPT, meaning physicians from various states come to our hospital to learn the Aquablation technique from me. I conduct case observations, roundtable discussions with physicians, and in-person training sessions, each of which is structured differently based on the type of engagement. During case observations, other physicians watch me perform the procedure and learn per case.



Source: Aquablation Therapy - Find a Urologist

I have also led adoption efforts with our affiliated hospitals. For example, South County Hospital initially referred patients to me for Aquablation when their existing technology wasn't sufficient. After seeing strong clinical results, their team approached me about bringing the platform to their facility. **I worked closely with them to navigate financing, reimbursement, and implementation, making the case for how the technology's outcomes and reimbursement structure justified the investment.**

Now, South County has its own unit, which I use monthly.

PROVIDING LOCAL TRAINING EVENTS LIKE LUNCH & LEARNS IS KEY IN INCREASING TARGET AWARENESS AND ENGAGEMENT WITH A NEW SYSTEM THROUGH A WELL CONNECTED NETWORK

Suzy: How do you learn about new technology on the market? How do you use local events to help companies expand in niche areas first for long-term success? Are you interested in discovery venues like Lunch & Learns?

Dr. Cambio: Absolutely. If there were a Lunch & Learns on the East Coast—particularly in Rhode Island—that would be ideal. Rhode Island is one of six states in the New England area, in which I am well connected, and can serve as a great destination for an event like this.

I've traveled extensively for training, including to Florida and Atlanta, but I prefer staying in the same time zone when possible. Having vendors come to us makes scheduling easier since it avoids the need to cancel patient days for travel. For example, PROCEPT is something I picked up through company training—observing cases, attending courses, and completing certification programs. **Local events also help me tap into my own local network to further discuss new technology applications.**

Rhode Island is a great location for this type of training. Everything is compact— TF Green Airport is just 10 minutes from here, from Providence, and from the hospital. **Compared to sites like NYU in Manhattan, where travel logistics and hospital approval processes can be complex**,

Rhode Island is much more streamlined. This ease of access is a major selling point for visiting physicians. Many don't want to deal with extensive paperwork or long travel times just to observe new technology.

I've played a key role in bringing various new technologies into the state and have a strong network of urologists, including those at Brown and South County. We work well together, which makes Rhode Island an excellent place to introduce new innovations.

DIFFERENT PROCUREMENT DYNAMICS BETWEEN SPECIALITY GROUPS AND AFFILIATED HOSPITALS

Suzy: If you saw a robot that you'd really like to use, how would your practice go about procuring it?

Dr. Cambio: For hospital-based procurements, I usually start by discussing it with the OR manager and the purchasing person at the hospital.

Sometimes, we can arrange for a demo to utilize the equipment, but that's not always possible. It also depends on whether it's a capital purchase or a smaller one.

For capital purchases, it has to go through upper management, which can take some time. **Even after approval, it can sometimes take three to four months to get the new equipment approved by the hospital.**

We can usually make these decisions faster than the hospital can. If I want to bring in a piece of equipment, I could have it here within a week from when we decide whether to proceed.

We conduct a cost analysis to determine if investing in the equipment is beneficial. We also consider whether it's a purchase or a lease and how much it will cost per case, including disposables, compared to our reimbursement for each case.
Sometimes, we'll conduct a short demo and then track those cases to see if we get reimbursed as expected.

If you are interested in potential partnerships and long-term relationships with the companies mentioned in this article or others in the U.S./ S. Korea, contact Suzy at sim@bdmtglobal.com.

Suzy Im

BDMT Global
TRANSFORM AND DRIVE DEMAND

As the head of BDMT Global in Boston, Im focuses on accelerating the innovative transformation of global companies. She is a Professor of Marketing and a member of the Advisory Board at Emerson College. Im is co-founder of 'Sponsors of the Future,' a non-profit organization that leads corporate social responsibilities. Well-known business development marketing strategist in the global field for over 20 years. After merging the two critical global business functions of Business Development (BD) and Marketing Transformation (MT) for the first time, she was recognized for her innovative business model and contribution and received five consecutive awards in the U.S. including the North American Business Awards and TITAN Business Award 2022 in Biotechnology.