Global Supply Chain Report

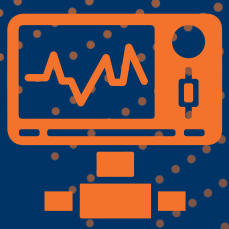
Summary

Electric Vehicle

Solar PV

Apparel

Medical Device



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The Evolving Landscape of Global Medical Devices: Supply Chain Resilience and Innovation

Executive Summary

The global medical device industry is undergoing significant transformation. Factors driving this change include demographic shifts such as the aging population, the rise of non-communicable diseases linked to lifestyle changes, increasing healthcare expenditures, rapid technological advancements, and government initiatives to promote digital medical services and healthcare infrastructure development. Manufacturers are prioritizing R&D investments and medical technology innovation to address emerging health challenges, while simultaneously focusing on collaboration to build more resilient supply chains capable of withstanding future disruptions.

In 2024, the global medical device market generated US$508.3 billion in revenue and is projected to expand to US$717.4 billion in 2030, representing a compound annual growth rate (CAGR) of 5.9%. The US remains the world largest medical device market, followed by China, Germany, and Japan. However, emerging markets are demonstrating higher growth rates than mature economies, with Asia's medical device market expected to achieve a CAGR of 7% through 2030. This faster growth in emerging markets is driven primarily by government healthcare reforms, expanded insurance coverage, and strategic investments in domestic manufacturing capabilities.

With sustained investment and government support, Chinese medical device manufacturers have been advancing up the value chain, competing not only in the budget and mid-tier segments but also increasingly in domestic and global high-end medical device markets. Leading Chinese medical device companies are actively expanding their international presence through multiple strategies, including cross-border M&A, forming strategic alliances with global partners, establishing overseas sales networks, and setting up production facilities and R&D centres in key markets. Additionally, Chinese manufacturers are proactively mitigating risks associated with tariff threats, currency fluctuations, and inflation by diversifying their supply chains and exploring alternative production locations.

To enhance medical infrastructure and attract investment in India, the Indian government announced plans for establishing multiple medical device parks. Moreover, traditional Indian conglomerates from sectors such as automotive, electronics, and textiles have increasingly diversified into medical device manufacturing, leveraging their existing technological

expertise and resources to fulfil growing domestic and global healthcare demand. These strategic moves, combined with government initiatives like the Production Linked Incentive (PLI) scheme and the National Medical Devices Policy 2023, have significantly enhanced India's R&D and production capabilities, positioning the country as an emerging global hub for medical device manufacturing and innovation.

Furthermore, the Southeast Asian medical device market is experiencing a significant growth in demand, with strong regulatory support for promoting medical tourism and attracting investment from global device manufacturers. Although these countries are net importers of medical devices, an increasing number of startups are tapping into the market and investing in R&D for cutting-edge medical devices.

Apart from supply chain disruptions brought by the COVID-19 pandemic, medical device companies have had to reassess their sourcing strategies to mitigate geopolitical risks. The US President Trump's global tariff policy in 2025 further increases supply chain uncertainties. Large device manufacturers that started reshuffling their global sourcing strategies due to the COVID-19 disruption have now adopted diversification and localization strategies to enhance supply chain resilience and mitigate uncertainties from potential tariff threats. Some have established a 'twin factory system', allowing products 'made in China' for the Chinese market and products 'made in the US/ Europe' for western markets. Others have extended their manufacturing networks from the US, Europe, and China to other countries, such as Malaysia, Vietnam, and Thailand in Asia; and Mexico, Costa Rica, the Dominican Republic, and Puerto Rico in the Americas. These nearshoring production bases in the Americas play an important role in the US medical device market, driven by geographic proximity, competitive costs, and favourable trade agreements—particularly the USMCA and the CAFTA-DR.

Global medical device makers are cautiously managing their operating and financial strategies amid rising cost pressures. Several factors are driving up total costs, including labour shortages, supply chain complexity, inflation, tariffs, and surges in raw material prices. To mitigate these cost impacts, large medical device manufacturers are reviewing their sourcing plans and operational processes. Common cost-saving strategies adopted by medical device companies include divestiture of low-return businesses, rationalizing product portfolios, renegotiating with vendors, and streamlining business processes. Moreover, global medical device companies are continuously pursuing M&A strategies to diversify operating risks and drive growth. M&A also provides a strategic pathway for acquirers to access AI-driven medical technologies and innovative solutions from target companies and expand into new markets through acquired entities.

Technological advancements in AI, robotics, and remote healthcare devices are profoundly reshaping medical device makers' location strategies globally. Advanced medical device makers prioritize factory locations with strong access to engineering talent, proximity to world-class universities, and collaboration opportunities with regulatory and clinical partners—factors that ensure rapid product development, efficient iteration, and ongoing improvement after launch.

AI-powered medical devices support diagnostics analysis, reduce administrative burdens, and boost healthcare productivity. However, AI hallucinations, medical errors, and data misuse pose significant risks to patient safety. It is crucial for regulatory bodies to establish clear frameworks and guidelines for AI governance in the healthcare sector and ensure the supply chain stakeholders comply with these requirements.

So far, the medical device industry is undergoing a significant transformation, requiring robust collaboration among governments, regulators, medical professionals, technology developers, and device manufacturers. Device makers must comply with stringent medical device regulatory requirements as well as environmental sustainability standards and data privacy regulations. At the same time, manufacturers should seize opportunities from government support programs to further develop medical device supply chains and enhance innovation capabilities.

The sector must increasingly align with environmental, social, and governance (ESG) imperatives across multiple dimensions, including carbon emissions reduction, waste management, healthcare accessibility, workforce diversity, product safety, and regulatory governance. Advancement in medical technology, including AI-powered equipment and telemedicine, are expected to help medical device companies achieve sustainability objectives and meet ESG goals. By embracing technological innovation, fortifying supply chains, and prioritizing patient-centric values, the global medical device sector is poised to set new benchmarks in healthcare delivery and environmental responsibility.

Contents

I. Introduction

The global medical device market is recovering from the COVID-19 disruption. Revenue reached US$508.3 billion in 2024, up from a trough of US$379.8 billion in 2020. The market is projected to expand further to reach US$717.4 billion in 2030, with a compound annual growth rate (CAGR) of 5.9% (See Table 1).[1]

Regionally, the Americas dominated the global medical device market with revenue of US$232.6 billion in 2024, followed by Europe and Asia. However, the Americas is not the fastest-growing region by CAGR during 2024 and 2030. Asia's medical device market is projected to reach US$173.9 billion in 2030 with the fastest CAGR at 7.0%, followed by Africa at 6.4% and the Americas at 6.1%. This reflects that the global medical device market is experiencing significant growth in multi-regions in the post-pandemic era. This paper examines the major forces reshaping the global medical device supply chain.

Table 1: Revenue of medical devices, by region (US$ billion)

	2016	2017	2018	2019	2020	2021
America	153.0	163.3	169.7	178.4	165.7	183.9
Africa	6.9	7.2	7.6	7.9	7.3	8.4
Asia	74.5	79.7	85.1	90.9	86.9	96.8
Australia & Oceania	5.3	5.8	6.1	6.2	5.8	6.8
Europe	106.6	111.7	117.4	119.5	114.1	124.6
Worldwide	346.5	367.8	385.8	402.9	379.8	420.4

	2022	2023	2024	2025 estimate	2030 estimate	CAGR (2024-30)
America	202.4	216.8	232.6	248.9	332.1	6.1%
Africa	8.7	8.8	9.2	9.6	13.3	6.4%
Asia	105.7	109.9	116.0	123.1	173.9	7.0%
Australia & Oceania	7.6	7.8	8.4	8.6	11.1	4.8%
Europe	124.6	133.9	142.2	149.6	187.0	4.7%
Worldwide	449.0	477.2	508.3	539.8	717.4	5.9%

Source: Statista

Currently, overall growth in global medical device market is mainly driven by various factors. First, rising aging populations and unhealthy lifestyle behaviours increase the demand for

1 Statista. 'Medical Devices - Worldwide.' Statista Market Forecast. Accessed July 30, 2025. https://www.statista.com/outlook/hmo/medical-technology/medical-devices/worldwide

medical treatments and surgeries, further attracting R&D investment and boosting medical device manufacturing. Mature economies, such as the US and Germany, typically have more sophisticated and progressive medical device markets.

Second, economic development and population growth always go together with healthcare expenditures. The rise of middle-income class in emerging economies, such as China and India, boosts the demand for affordable, accessible healthcare solutions, further driving order growth for medical devices from medical institutions and hospitals. Additionally, people embracing personalized healthcare delivery solutions have requested more reliable, user-friendly medical device products.

Third, rapid technological advancements, including telemedicine, AI-powered devices, remote patient monitoring solutions, robotic surgeries, and minimally invasive devices, are revolutionizing the global medical device market. Connected devices that transmit patient data to healthcare systems in real time also help optimize the productivity of frontline healthcare workers and deliver effective healthcare services.

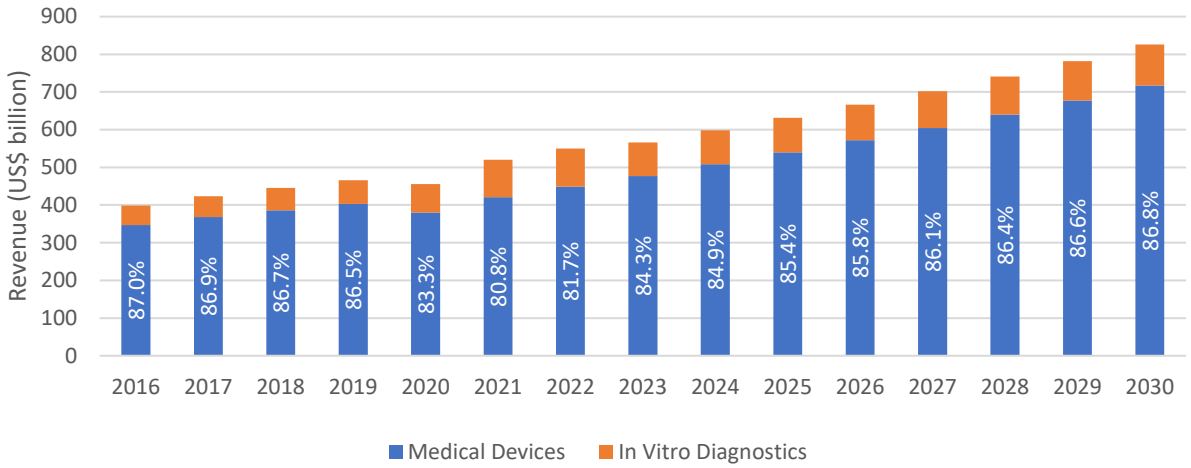
Last, countries with favourable regulations and reimbursement systems are attracting medical investments and innovative projects. Government initiatives promoting digital medical services and improving healthcare infrastructure are also accelerating device market development.

The next section covers an overview of the global medical device market. Section III examines the major drivers of the development of medical device supply chains. Section IV discusses the key trends reshaping the global medical device sector. Section V investigates the performance of selected medical device countries. Section VI highlights the rising role of China's medical device manufacturing in the global market in. Finally, the report concludes with a summary of key findings and the sector's outlook.

II. Market Overview

Medical devices cover a wide range of products, including cardiology devices, diagnostic devices, orthopedic devices, ophthalmic devices, and general and plastic surgery devices. Medical devices, together with in-vitro diagnostics (IVD), represent the major categories of medical technology. In 2024, medical devices generated US$508.3 billion in revenue, accounting for 85% of total worldwide medical technology sector revenue, according to Statista (See Figure 1).[2] The medical device revenue in 2025 is expected to grow by 6.2% over the previous year.

Figure 1: Market revenue of the medical technology market, by segment



Source: Statista

The US is the world's largest medical device market in 2024 with revenue of US$186 billion, followed by China (US$37 billion), Germany (US$34 billion), Japan (US$28 billion), and the UK (US$19 billion) (See Table 2).[3] The top 5 economies accounted for approximately 60% of worldwide medical device sector revenue in 2024.

In 2025, the top 5 economies are estimated to achieve significant growth. Medical device revenue in the US is projected to grow by 7.7% year-on-year (yoy). Both China and Japan are estimated to grow by 7.1% yoy, the UK at 6.6% yoy, and Germany at 3.9% yoy. In the longer term, however, the growth ranking of these top 5 markets may witness changes. The projected CAGR of medical device revenue from 2024 to 2030 for the US is 6.2%, lower than China's 7.8%, but still higher than the other three mature economies: Germany at 3.5%, Japan at 5.9%, and the UK at 5.7%.

2 Statista. 'Medical Technology - Worldwide.' Statista Market Forecast. Accessed July 30, 2025. https://www.statista.com/outlook/hmo/medical-technology/worldwide.

3 Statista. 'Medical Technology - Worldwide.' Statista Market Forecast. Accessed July 30, 2025. https://www.statista.com/outlook/hmo/medical-technology/worldwide.

Table 2: Market revenue of medical devices, by country (US$ billion)

	2019	2020	2021	2022	2023	2024	2025	2030	CAGR
Top 5 countries									
US	143.0	133.2	146.6	160.9	171.1	185.9	200.1	266.6	6.2%
China	23.7	23.0	26.2	33.5	34.8	37.2	39.8	58.4	7.8%
Germany	29.4	28.1	30.5	29.9	32.2	33.6	34.9	41.4	3.5%
Japan	29.4	27.0	28.5	27.1	27.8	28.0	30.0	39.4	5.9%
UK	14.7	14.6	16.0	15.9	17.1	18.5	19.7	25.8	5.7%
Selected European countries									
France	16.0	14.9	16.2	15.9	17.0	17.8	18.6	22.7	4.1%
Italy	10.5	10.2	11.1	11.2	12.0	12.7	13.4	16.4	4.4%
Spain	7.0	7.0	7.6	7.4	8.2	8.9	9.6	12.8	6.2%
Netherlands	4.2	3.9	4.3	4.5	4.8	5.2	5.5	6.9	4.8%
Selected American countries									
Canada	7.8	7.3	8.7	10.0	10.2	11.0	11.5	15.9	6.4%
Brazil	7.2	6.7	7.5	8.6	9.6	9.9	10.2	13.3	5.0%
Mexico	5.5	5.0	5.8	6.1	7.2	7.6	7.5	10.2	4.9%
Argentina	4.6	4.0	4.7	5.2	5.3	5.6	6.1	7.3	4.6%
Costa Rica	0.42	0.41	0.42	0.42	0.51	0.56	0.61	0.81	6.4%
Dominican Republic	0.48	0.42	0.47	0.51	0.54	0.57	0.60	0.84	6.6%
Puerto Rico	0.24	0.23	0.24	0.28	0.29	0.31	0.33	0.41	5.0%
Selected Asian countries									
India	5.0	4.7	5.2	5.8	6.3	6.6	7.1	11.0	9.0%
South Korea	5.6	5.3	6.0	6.2	6.5	6.9	7.1	10.1	6.7%
Malaysia	2.7	2.5	2.7	2.7	2.9	3.0	3.3	4.8	8.1%
Thailand	1.9	1.9	2.0	1.9	2.0	2.2	2.4	3.4	8.0%
Indonesia	1.7	1.6	1.7	1.9	2.0	2.1	2.3	3.5	8.8%
Vietnam	1.2	1.2	1.3	1.4	1.5	1.6	1.7	2.4	7.4%
Singapore	0.70	0.66	0.73	0.91	1.0	1.1	1.2	1.7	7.3%
Philippines	0.55	0.50	0.54	0.57	0.61	0.66	0.73	1.2	9.7%
… more countries									
Australia	5.2	4.8	5.6	6.4	6.6	7.1	7.3	9.4	4.7%
New Zealand	0.94	0.90	1.0	1.1	1.1	1.2	1.2	1.6	5.4%
South Africa	2.2	2.2	2.6	2.6	2.5	2.7	2.9	3.7	5.2%
Saudi Arabia	3.9	4.5	5.3	5.9	5.9	6.2	6.4	8.2	4.8%
United Arab Emirates	1.4	1.7	1.9	2.2	2.3	2.6	2.8	4.2	8.7%
Egypt	1.2	1.0	1.1	1.3	1.2	1.2	1.1	1.8	7.8%
Worldwide	**402.9**	**379.8**	**420.4**	**449.0**	**477.2**	**508.3**	**539.8**	**717.4**	**5.9%**

Source: Statista

Despite the slowdown in CAGR, the estimated proportion of medical device revenue generated by the US out of the global revenue will increase to 37.2% in 2030 from 36.6% in 2024. The remarkable growth of the medical device sector in the US is attributed to awareness of supply chain resilience after COVID-19 disruption, an aging population, and advanced medical infrastructure. President Trump's tariff policy also contributes to potential onshore investment by global medical device manufacturers. However, uncertainties over tariff arrangements pose upward pressure on raw material costs for medical devices.

In addition, the projected CAGR during 2024 and 2030 for emerging countries is generally higher than that of the mature economies. For instance, China and India have been gaining traction in the worldwide medical device market over the years. The estimated CAGR of China during this period is 7.8%, while India is projected to achieve an even higher CAGR at 9.0%. The estimated proportion of the medical device revenue generated by China and India against the worldwide revenue will increase from 8.6% (China accounted for 7.3% of total and India for 1.3%) in 2024 to 9.6% (China 8.1%, India 1.5%) in 2030. Government support and implementation of domestic healthcare reforms are essential growth drivers for the medical device sectors in both countries.

Moreover, certain Asian countries are also estimated to achieve robust growth during the same projection period: Malaysia at 8.1%, Thailand at 8.0%, Indonesia at 8.8%, Vietnam at 7.4%, Singapore at 7.3%, and the Philippines at 9.7%. The promising performance in these countries is attributed to increases in national income and healthcare expenses, and higher demand for medical tourism. Moreover, certain countries in Central and South America and the Middle East are expected to see remarkable growth in the medical device market during 2024 and 2030: Dominican Republic (6.6%), Costa Rica (6.4%), UAE (8.7%), and Egypt (7.8%).

These figures reflect that the contribution ratio of traditional mature economies and emerging economies to the global medical device market continues to evolve. It is time for medical device stakeholders to reassess their supply chain strategies to better serve domestic and overseas markets worldwide.

Among all product categories in the medical device market, cardiology devices–the largest contributor to the industry–accounted for 14.4% of total revenue, reaching US$73.4 billion in 2024 (See Table 3).[4] Since unhealthy lifestyle behaviours are commonly observed worldwide and leads to various chronic diseases, the cardiology device segment is expected to generate revenue with a remarkable year-on-year growth rate of 7.1% in 2025 and a CAGR of 6.2% through 2030.

4 Statista. 'Medical Technology - Worldwide.' Statista Market Forecast. Accessed July 30, 2025. https://www.statista.com/outlook/hmo/medical-technology/worldwide.

Orthopedic devices and diagnostic devices are the second and third largest segments in the medical device industry, both generating over US$47 billion in 2024. However, the projected CAGR through 2030 for orthopedic devices is much higher than that of diagnostic devices. This differentiation is mainly due to rising aging populations, which have a higher demand for orthopedic devices.

Table 3: Revenue of medical devices, by product category (US$ billion)

	2019	2020	2021	2022	2023	2024	2025 estimate	2030 estimate	CAGR (2024-30)
Cardiology Devices	52.7	47.7	53.9	62.6	67.8	73.4	78.6	105.3	6.2%
Orthopedic Devices	38.8	36.0	40.9	42.3	44.5	47.4	50.3	69.6	6.6%
Diagnostic Imaging Devices	42.9	39.7	42.4	43.5	45.5	47.2	49.0	60.2	4.1%
Ophthalmic Devices	31.0	28.7	31.9	37.0	39.8	42.6	45.4	58.1	5.3%
Drug Delivery Devices	25.9	25.2	28.8	31.1	32.5	34.0	35.7	46.1	5.2%
Endoscopic Devices	22.8	21.8	24.8	26.0	28.2	30.3	32.5	45.7	7.1%
Diabetes Care Devices	16.0	18.1	21.3	23.0	26.1	29.5	33.4	60.4	12.7%
General & Plastic Surgery Devices	24.6	21.3	24.7	25.4	26.6	27.8	29.3	38.9	5.7%
Dental Devices	15.9	14.1	19.6	19.3	21.0	23.0	25.1	37.1	8.3%
Other Medical Devices	132.4	127.2	132.2	138.9	145.3	153.1	160.5	196.1	4.2%

Source: Statista

Overall, the global medical device market has recovered gradually in the post-pandemic period, as more manufacturers invest in R&D and innovative medical technology and collaboratively establish resilient supply chains to fight against new diseases. Demographic shifts and government support also fuel the growth momentum of the sector. The next section further examines the key drivers of the development of medical device supply chain.

III. Key Drivers of Development of Medical Device Supply Chain

1. Post-Covid shifts

The global medical device market troughed during the COVID-19 pandemic due to barriers to medical access, postponed medical and surgery treatments, and a drop in new patients. In addition, stringent regulatory processes, geopolitical challenges, and inflated operation costs hindered the development of the industry.

On the other hand, many countries suffered from shortages of medical supplies and equipment due to COVID-19 lockdowns in 2020-2021. Policymakers, manufacturers, and healthcare institutions learned valuable lessons and proactively enhanced supply chain resilience by re-evaluating and diversifying their production locations.

Some policymakers emphasize the importance of resiliency and risk mitigation. For instance, in July 2025, the European Commission announced to prepare for medical emergencies by launching the EU Stockpiling and Medical Countermeasures Strategies, proposing a detailed priority list of medical equipment to be stockpiled in Europe, such as vaccines, therapeutics, diagnostics, and personal protective equipment. Additionally, the Commission will double its investment in the Health Emergency Preparedness and Response Authority (HERA) up to 200 million euros to help small and medium-sized companies to develop medical technologies.[5]

In addition, medical device manufacturers are reassessing their business strategies to address supply chain vulnerabilities, navigate complex regulatory requirements, and adopt sustainable practices to remain competitive in a shifting global landscape. They not only remain cautious about cost management but also explore opportunities brought by advanced medical technology, aiming to increase supply chain visibility and enhance their products' capabilities and functionalities. Spieske et al. (2022)[6] summarized some common supply chain strategies adopted by healthcare stakeholders, such as pursuing multiple sourcing, optimizing safety stock, applying product modularity/ interchangeability, forming strategic partnerships and purchasing alliances, increasing supply chain visibility, and embracing market proximity.

At the same time, healthcare institutions have increasingly adopted telemedicine and remote healthcare services against a backdrop of tight frontline healthcare staff supply,

5 Chiappa, Claudia. 'EU Plans to Stockpile Drugs, Vaccines, PPE for Next Health Threat.' Politico, July 7, 2025. https://www.politico.eu/article/eu-plan-stockpile-drugs-vaccines-ppe-next-health-threat/

6 Spieske, Alexander, Maximilian Gebhardt, Matthias Kopyto, and Hendrik Birkel. 'Improving Resilience of the Healthcare Supply Chain in a Pandemic: Evidence from Europe During the COVID-19 Crisis.' Journal of Purchasing and Supply Management 28, no. 5 (2022): 100748. https://doi.org/10.1016/j.pursup.2022.100748.

rising demand for personalized healthcare services, and the need for alternative medical solutions in the post COVID-19 era. This emerging demand for remote and personalized services in the post-pandemic era also reforms the design and manufacturing processes of medical devices.

2. Technological advancement in medical devices

Technological advancement is profoundly reshaping medical device makers' location strategies across the globe. Advanced medical device makers prioritize factory locations with strong access to engineering workforces, proximity to world-class universities, and access to regulatory and clinical partners, ensuring rapid product development, efficient iteration, and ongoing improvement after launch. For instance, top device makers including Boston Scientific, Medtronic, and Johnson & Johnson established significant manufacturing and R&D presences in county Galway in Ireland, because of its proximity to universities, clinical trial hubs, and EU regulators.[7]

From the supply side, with the aid of digital manufacturing, automation, and real-time data connectivity, advanced medical device makers can adopt a location strategy that balances market proximity, supply chain resilience, and R&D capability.

From the demand side, demand for artificial intelligence (AI), robotic technology, and telemedicine in the medical device sector is substantially increasing (See below for more advanced technology applications in medical devices). Manufacturing requires greater integration with digital engineering, software development, precision assembly, and cybersecurity measures.

2.1 AI technology

AI applications are gaining attention in many sectors, especially after the launch of generative AI (Gen AI), which is easy to use and does not require special training. Many medical devices and healthcare solutions have incorporated AI technology, which is mostly used for diagnosis, patient treatments, and clinical administrative works.

In 2024, the global market value of AI-enabled healthcare services was US$27.1 billion, according to Maximize Market Research. The market is projected to reach US$347.3 billion in 2032, with a CAGR of 37.6%.[8] North America, holding 51.3% of market share by 2024, led the AI healthcare market and achieved a CAGR of 36.4% between 2019 and 2024. This

7 McKernan, David, and Olivia McDermott. 'Industrial Clusters: Creating a Strategy for Continued Success.' Heliyon, 2024. https://doi.org/10.1016/j.heliyon.2024.e29220

8 Maximize Market Research. 2025. 'Artificial Intelligence in Healthcare Market – Global Industry Analysis and Forecast (2025-2032) by Offering, Technology, Application, End User and Region.' Accessed April 5, 2025. https://www.maximizemarketresearch.com/market-report/global-artificial-intelligence-ai-healthcare-market/21261/

dominance is driven by advanced healthcare infrastructure, widespread adoption of AI technologies, and increasing demand for personalized treatments.

The US is a major player in AI healthcare sector, with an adoption rate of 91.1% in 2024. The American Medical Association conducted a survey with 1,200 physicians about their sentiments toward AI during the period between summer 2023 and fall 2024.[9] 66% of physicians reported using AI in healthcare services in 2024, increased from 38% in 2023. Overall, 57% of physicians believe AI helps reduce administrative burdens through automation.

The World Health Organization (WHO) acknowledges that AI offers numerous benefits to healthcare systems, enhancing service quality and improving public health.[10] The advantages of using AI-powered medical devices include strengthening patients' benefits, enhancing productivity of doctors and clinical staff, reducing costs, and supporting communities with limited healthcare resources. The merits of using AI have been illustrated with three cases in the boxes below.

Box 1: ML algorithms for sepsis diagnosis

Sepsis ImmunoScore,[11] developed by Prenosis, a US-based diagnostic company, is a machine learning-based software designed to identify suspected cases of sepsis. When a patient is admitted to hospital or emergency room and is at risk of having or developing sepsis within 24 hours, the software generates a risk score for the patient. It analyses up to 22 predetermined inputs from the patient's electronic health record (EHR) and other laboratory and clinical assessments, helping to alert healthcare providers to the patient's status and minimize missing cases.

Box 2: Prediction of breast cancer risk

According to the WHO, there were 2.3 million new cases of breast cancer worldwide in 2022. Most of the patients have no family cancer history.

The first computer-aided breast cancer detection system was approved in 1998. Since then, various breast cancer detection tools have been introduced. However, most of the tools are used for detection, rather than prediction.

With AI technological breakthroughs, Clairity[12], a Boston-based startup, has secured authorization from the Food and Drug Administration (FDA) and will launch the first AI predictive tool for breast cancer in selected healthcare centres in 2025. The AI tool is

9 Diaz, Nicole. 'AI Use Among Physicians Nearly Doubles: Survey.' Becker's Health IT, February 26, 2025. https://www.beckershospitalreview.com/ai/ai-use-among-physicians-nearly-doubles-survey.html

10 World Health Organization. 'Ethics and Governance of Artificial Intelligence for Health: Guidance on Large Multi-Modal Models.' Accessed April 5, 2025. https://www.who.int/publications/i/item/9789240084759

11 U.S. Food & Drug Administration. 'Software Device to Aid in the Prediction or Diagnosis of Sepsis.' Regulation No. 21 CFR 880.6316, April 2, 2024. https://www.accessdata.fda.gov/cdrh_docs/pdf23/DEN230036.pdf

12 Reuter, Elise. 'Clairity Receives FDA OK for Breast Cancer Risk Prediction Tool.' MedTech Dive, June 3, 2025. https://www.medtechdive.com/news/clairity-de-novo-ai-breast-cancer-risk-prediction/749697/

designed for predicting a patient's five-year risk of developing breast cancer by using data from routine mammogram results.

Box 3: Deepseek's applications in healthcare

Deepseek,[13] an open-source AI model, is revolutionizing the traditional AI landscape, which was dominated by a few tech giants. By eliminating high licensing fees, Deepseek allows hospitals to access AI technology at lower cost, fostering faster innovation and greater customization.

Its design reduces computing power requirements, enabling hospitals to deploy AI without capital-intensive hardware upgrades. AI adoption helps transform traditional hospitals into smart hospitals in an economically feasible way.

Deepseek offers a wide range of healthcare applications, including diagnosis support, medical imaging analysis, health monitoring, and hospital operations. It enhances diagnostic accuracy, improves patient care, and optimizes hospital resource management.

Moreover, Deepseek can be operated in local machines. Patient data will be stored within local hospital systems with relatively lower risks of data leakage.

Since the launch of Deepseek in early 2025, Kunshan First People's Hospital in Suzhou, China, has implemented Deepseek in its biomedical big data lab. By integrating Deepseek into its research and operations, the hospital is accelerating medical innovation and developing smart healthcare solutions.

2.2 Robotic technology

Medical robotics play a vital role in transforming the healthcare sector in recent years. For on-site operations, robots help speed up diagnoses, facilitate minimally invasive surgeries, increase surgery precision, and support rehabilitation. For remote healthcare services, telepresence robots, wearable devices, and elderly-assisted robots are gaining attention.[14]

The market size of global medical robotics was US$16.6 billion in 2023 and is projected to reach US$63.8 billion by 2032.[15] In 2023, North America was the largest medical robotics market, accounting for over 40% of total revenue worldwide. The widespread deployment of medical robotics in North America is driven by advancement of healthcare infrastructure, huge investment in robotics technology, high usage in surgical and rehabilitation robotics, an

13 Mingzhe 明哲. 'Yīyuàn rúhé jiànshè zìjǐ de Deepseek dà móxíng' 医院如何建设自己的 Deepseek 大模型 [How do hospitals build their own Deepseek large language model]. Chuangjian Shuzi Jiankang 创见数字健康, February 7, 2025. https://mp.weixin.qq.com/s/WwZ1dffpr1vae3wqjIMWyg & Mingzhe 明哲. Duō jiā yīyuàn yǐ bùshǔ Deepseek dà móxíng, AI dà móxíng zài yīyuàn yìngyòng chǎngjǐng pōuxī 多家医院已部署 Deepseek 大模型，AI 大模型在医院应用场景剖析 [Multiple hospitals have deployed Deepseek large language models: analysis of AI large model applications in hospital scenarios]. Chuangjian Shuzi Jiankang 创见数字健康, February 10, 2025. https://mp.weixin.qq.com/s/RGpuw_L3bRZwgdp7JPOOaA

14 Francis, Gareth. '6 Ways That Robotics Are Transforming Healthcare.' World Economic Forum, June 12, 2025. https://www.weforum.org/stories/2025/06/robots-medical-industry-healthcare/

15 SNS Insider. 'Medical Robotics Market.' January 2025. https://www.snsinsider.com/reports/medical-robotics-market-5580

aging population, and strong government support. Well-known robotics makers in North America include Intuitive Surgical, Stryker, Medtronic, Becton Dickinson, and Omnicell.

Moreover, Asia Pacific is expected to become the fastest growing region for medical robotics, with a projected CAGR of 18.1% from 2024 to 2032. The strong growth is attributed to rising demand for minimally invasive surgeries, increasing healthcare expenditure, government incentives to boost medical tourism and advanced medical solutions, improving healthcare infrastructure, and an aging population.

2.3 Remote healthcare services

The markets for telemedicine and remote patient monitoring technologies, including mobile health applications and wearable devices with innovative sensors, are significantly expanding. According to Intuitionlabs,[16] around 500 million Americans are using remote healthcare monitoring devices in various forms. In 2024, the US remote patient monitoring market reached approximately US$15 billion, with a projection to nearly double to US$30 billion by 2030.

Major solution providers include device makers, software designers, and remote monitoring solution providers. For example, Biofourmis, a Boston-based digital company, launched an AI-driven wearable called Biofourmis Care to provide healthcare monitoring services for high-risk chronic patients. The wearable biosensor captures vital signs of the patients and feeds the information into algorithms via a platform for digital therapeutics. This technology helps detect early deterioration of patients, reducing 30-day hospital re-admissions by 70% and costs by 38%.[17]

Another remote monitoring solution provider, Align Technology, launched Invisalign Virtual Care Solution and My Invisalign app to enable remote monitoring services connecting Invisalign doctors and their orthodontic patients. The tool serves as an end-to-end digital platform for orthodontic treatment. This service has been deployed in 12 markets in Asia Pacific.[18]

Besides, Apple announced an AI-driven healthcare initiative named Project Mulberry, expected to be launched in 2026. Apple aims to integrate the user information collected from various Apple devices of an individual and offer customized healthcare recommendations. The project's core is an AI agent and large language model that will analyse individuals' healthcare data, such as heart rate, sleep patterns, activity records,

16 ntuitionLabs. 'Remote Patient Monitoring in the United States: 2025 Landscape Report.' April 26, 2025. https://intuitionlabs.ai/pdfs/remote-patient-monitoring-in-the-united-states-2025-landscape-report.pdf

17 ntuitionLabs. 'Remote Patient Monitoring in the United States: 2025 Landscape Report.' April 26, 2025. https://intuitionlabs.ai/pdfs/remote-patient-monitoring-in-the-united-states-2025-landscape-report.pdf

18 AlignTech. 'Align Technology Introduces Virtual Solutions to Connect Doctors & Existing Invisalign Patients for Continuity of Care.' May 7, 2020. https://investor.aligntech.com/news-releases/news-release-details/align-technology-introduces-virtual-solutions-connect-doctors/

blood oxygen levels, and food tracking, and provide advice on enhancing users' wellness. In the future, Apple will further enhance its AI healthcare ecosystem by providing video content of health trends and potential insurance services by partnering with medical experts and insurance companies.[19]

In sum, these remote healthcare tools, which are cost-effective alternatives to hospital utilization, allow patients to transmit vital health information to healthcare professionals in real-time and facilitate personalized care delivery and experience. The breakthrough in remote healthcare technology will revolutionize the entire medical device landscape and the corresponding supply chains.

3. Stringent regulatory environment

With the rise in advanced technologies, device manufacturers, especially advanced medical device makers, increasingly invest in digitally enabled, high-tech R&D facilities rather than conventional mass production sites. Regulatory requirements, such as regional compliance and digital health standards, reinforce considerations for manufacturing locations near to design labs in leading markets.

Obtaining regulatory approval for groundbreaking medical devices in new markets commonly takes considerable time and needs compliance with stringent requirements. The typical approval pathway for high-risk, implantable, life-supporting devices is around 3 to 7 years, including feasibility and pivotal trials, premarket approval, and post-market surveillance.[20] The lengthy approval path, involving investment and efforts from medical device companies and their suppliers, features stringent evaluations, stepwise clinical expansion, and compliance with rapidly evolving international device standards.

Take the journey of Carmat's Aeson® artificial heart as a case in point. Carmat, a Paris-based medical device company, has spent years developing the Aeson® Total Artificial Heart (hereafter as Aeson®) to offer a life-saving solution for patients with advanced biventricular heart failure. Aeson® received initial Conformité Européenne (CE) mark in Europe in December 2020[21] and started both commercial sales and clinical use in the EU. To extend its sales in the US market, the company commenced navigating the FDA's multi-phase approval pathway.

19 Price, Lloyd. 'Project Mulberry: Apple's Secret AI-Powered Health Coach.' Nelson Advisors, April 16, 2025. https://www.healthcare.digital/single-post/project-mulberry-apple-s-secret-ai-powered-health-coach

20 Nextern Marketing. 'A Look at the Medical Device Approval Process.' February 10, 2023. https://nextern.com/2023/02/10/a-look-at-the-medical-device-approval-process/

21 Pedersen, Amanda. 'Artificial Heart Takes Major Step Towards US Market.' MD+DI, April 14, 2025. https://www.mddionline.com/cardiovascular/artificial-heart-takes-major-step-towards-us-market. & Business Wire. 'CARMAT Receives MDR CE Marking for Its Aeson® Artificial Heart.' July 28, 2025. https://www.businesswire.com/news/home/20250728242996/en/CARMAT-Receives-MDR-CE-Marking-for-Its-Aeson-Artificial-Heart

The initial cohort of the early feasibility study began in 2021 with three patients in the US. Since then, the company has made device enhancements based on feedback and submitted improvements for FDA review, a process that can take months or even years as regulators scrutinize safety and efficacy data. In 2025, Carmat received conditional approval from the FDA to initiate its second study cohort, involving seven additional heart transplant candidates. The conditional approval is not only a milestone for Carmat but also exemplifies how developing truly innovative therapies requires sustained clinical evidence, iterative device improvements, and collaboration across engineering and manufacturing. According to the company's CEO, a potential commercial launch of Aeson® in the US could be achieved by 2028, subject to the clinical results.[22]

Overall, Carmat's journey reflects the protracted timelines and high entry barriers posed by regulators like the US FDA and EU Medical Device Regulation (MDR), who require continuous documentation, patient follow-up, and stringent review. For medical device innovators, such hurdles are both necessary safeguards and significant challenges, often dictating the pace and timing of commercialization in the most tightly regulated healthcare markets. For medical device companies that have obtained regulatory approval, they still need to prepare supplemental approvals and reviews required for significant changes in device upgrades, materials, and manufacturing processes and facilities, if any.[23] Thus, when planning supply chain networks, medical device companies must evaluate the costs related to regulatory compliance.

22 Euronext. 'CARMAT Receives FDA Conditional Approval to Initiate Second Cohort of the EFS Study in the United States.' April 14, 2025. https://live.euronext.com/en/products/equities/company-news/2025-04-14-carmat-receives-fda-conditional-approval-initiate-second

23 U.S. Food & Drug Administration. 'PMA Supplements and Amendments.' Access August 15, 2025. https://www.fda.gov/medical-devices/premarket-approval-pma/pma-supplements-and-amendments

IV. Major Trends in the Global Medical Device Supply Chain

1. Mitigating geopolitical risks

The prolonged Russia-Ukraine war and the Middle East war have disrupted raw material supply and transportation of medical goods and raised cybersecurity concerns about medical equipment. US President Trump's global tariff policy further increases supply chain uncertainties. Medical device companies have to reassess their sourcing strategies to mitigate supply chain risks.

The global tariff policy and trade protectionism aim to encourage onshore manufacturing. However, the American Hospital Association (AHA) is concerned that the new changes would lead to shortages of critical medical supplies in daily hospital operations, since the US healthcare system relies heavily on global supplies.[24]

From the perspective of US hospital operations, medical devices from China may not be easily replaced by onshore manufacturers. According to the AHA, China is an essential source of various single-use devices and tools, including needles, syringes, pulse oximeters, anesthesia devices, gowns, gloves, respirators, face masks and other protective equipment.[25] Even if factories relocate to the US, China may still be the vital source of components for making medical devices, such as aluminum, steel, monitor display screens.[26] Also, onshoring production may struggle with labour cost differentials between the US and offshore manufacturing bases.

From the perspective of medical device manufacturing, some large device manufacturers started reshuffling their global sourcing strategies due to COVID-19 disruption. Now, they have adopted diversification and localization strategies to enhance supply chain resilience and mitigate uncertainties brought by potential tariff threats.

Some have extended their manufacturing networks from the US, Europe, and China to other countries, such as Malaysia, Vietnam, and Thailand in Asia; and Mexico, Costa Rica, Dominican Republic, and Puerto Rico in the Americas (See Table 4). Also, some have set up a 'twin factory system', allowing products 'made in China' for China's market and products 'made in the US/Europe' for the US market.[27]

24 Taylor, Nick Paul. 'AHA Joins Call for Trump to Exempt Devices from Import Tariffs.' MedTech Dive, February 6, 2025. https://www.medtechdive.com/news/aha-hospital-exempt-devices-import-tariffs/739390/

25 Taylor, Nick Paul. 'AHA Joins Call for Trump to Exempt Devices from Import Tariffs.' MedTech Dive, February 6, 2025. https://www.medtechdive.com/news/aha-hospital-exempt-devices-import-tariffs/739390/

26 Kelly, Susan. 'How Trump's Trade Fight Could Impact the Medtech Industry.' MedTech Dive, February 12, 2025. https://www.medtechdive.com/news/Tariffs-Trump-impact-medical-devices-manufacturing/739906/

27 Reuter, Elise. 'Medtech Firms Have Little to Say on Trump Tariffs.' MedTech Dive, February 19, 2025. https://www.medtechdive.com/news/medtech-companies-tariffs-earnings/740338/

Table 4: Manufacturing expansion projects of selected large-size companies

Company	Headquarter	Expansion projects in 2025
Intuitive Surgical	US	The company used to produce 80% of its surgical instruments and accessories in Mexico and planned to further increase its production capabilities in the country At the same time, the company set up two factories in California and one in Georgia The company also planned to establish new facilities in Germany and Bulgaria
Boston Scientific	US	The company opened a new plant in Georgia early this year. The company planned to increase manufacturing investments in Minnesota and Malaysia
Abbott Laboratories	US	The company planned to increase manufacturing and R&D investments in Illinois and Texas
Siemens Healthineers	Germany	The company announced plan to expand manufacturing in the US, including a relocation project from Mexico to California, with an investment sum of US$150 million
Roche Diagnostics	Switzerland	The company announced plans to expand manufacturing in Indianapolis, with an investment sum of US$550 million

Source: Kelly (2025, May 22)

However, for small companies, relocation is unlikely to be a feasible option. Relocating manufacturing facilities may involve roughly 24 months for construction and significant investment.[28] Besides, as mentioned in section III.3, some location shifts may potentially require a new round of FDA approval, which may further prolong the production resumption project in new locations, extend the payback period, and increase the risk of running out of cash.

All in all, these strategic realignments, while necessary for risk mitigation, require substantial capital and time, creating different pathways for large manufacturers with resources for diversification versus smaller companies facing more constrained options. Ultimately, navigating these geopolitical complexities has become integral to supply chain planning across the medical device sector, with increased costs likely to be passed on to patients through higher device prices and insurance premiums.

28 Reuter, Elise. 'Medtech Firms Have Little to Say on Trump Tariffs.' MedTech Dive, February 19, 2025. https://www.medtechdive.com/news/medtech-companies-tariffs-earnings/740338/

2. AI-driven race

AI-powered technology is reshaping the medical device landscape. With promising outlooks and rapid technological breakthroughs, increasing number of companies are tapping into the AI-driven medical device sector. Boxes 4 & 5 illustrate how AI applications transform specific medical products and service segments and stir up competitions.

Box 4: AI-powered medical transcription services

The global AI transcription market was US$4.5 billion in 2024 and projected to exceed US$19 billion in 2034. Medical segment is one of the largest verticals of the entire AI transcription market, accounting for 34.7% of the total AI transcription market in 2024.[29]

The AI transcription services range from transcribing patient-doctor interactions, analysing the context by using Natural Language Processing (NLP) algorithms, capturing the key messages, and integrating the messages into EHR systems.

The AI-assisted speech-recognition solution provides a time- and cost-effective alternative to human dictation, coming with the benefit of minimizing human errors and releasing manpower for other medical tasks.

Various tech giants, such as Microsoft/ Nuance and Amazon Transcribe Medical, are the first movers of the market. By leveraging innovative Gen-AI technologies, a wave of start-ups, such as Augmedix, DeepScribe, and Abridge,[30] are tapping into the market and offering unique design and functions.

With the AI technological breakthrough, real-time and automated transcription services will further accelerate the development of telemedicine and multi-site operations across the world. More investments in advanced analytics and enhancement in data accuracy, security, and interoperability among devices and systems are expected.

Box 5: Hearing aids[31]

For decades, the global hearing aid market has been dominated by various incumbents in the US and Europe, such as Sonova from Switzerland, Starkey from the US, and Demant from Denmark. The market leaders captured over 90% of global market sales, with mild improvements in product performance over the years. Standard devices often perform unreliably in noisy environments. Many users, especially elderly, abandon using unhelpful hearing aids.

In recent years, many traditional hearing aids makers and startups have turned to AI, particularly deep neural networks (DNNs), to tackle the limitations of the traditional hearing aids. DNN-powered devices learn from real-world sounds, adapt to dynamic

29 Market.us. 'Global AI Transcription Market.' Accessed September 8, 2025. https://market.us/report/ai-transcription-market/

30 Salmon, Natalia. 'Top 5 Alternatives for Abridge in 2025.' ScribeHealth.ai. A. February 2, 2025. https://www.scribehealth.ai/blog/top-5-alternatives-for-abridge-in-2025

31 Hu Xiangyun 胡香赟. Wàiguó rén lǒngduàn de gāoduān zhùtīngqì, Zhōngguó qǐyè zhèng kào AI fānpán 外国人垄断的高端助听器，中国企业正靠 AI 翻盘 [Foreigners monopolize high-end hearing aids, Chinese companies are turning the tables with AI]. 36 ke po 36 氪 Pro, March 27, 2025. https://mp.weixin.qq.com/s/KJTH35yHhEUUjyXv6pss4A

environments, and significantly improve speech recognition. For instance, the incumbent, Sonova, introduces a hearing aid powered by DNNs, achieving noise reduction up to 10dB, well above the industry average of 4-6dB. Starkey's Genesis AI hearing aids can simulate human brain's central auditory system and automatically detect surroundings.

New entrants also fixed their eyes on the market. For instance, United Imaging Healthcare from China deploys proprietary chips with on-device neural processing. Tingsheng, a startup from China, invests in R&D on AI algorithms. Moreover, tech giants like Apple, Tencent, and iFlytek also enter the market with affordable over-the-counter models, lowering barriers to purchase and fitting of the devices.

This wave of AI integration demonstrates how highly consolidated medical device sectors can be reshaped, through accelerating innovation, intensifying competition, and even drawing in disruptors from non-medical fields.

There were increasing numbers of investment initiatives in various AI healthcare segments. For instance, Johnson & Johnson (J&J) enhances its collaboration with Nvidia and Amazon Web services to use AI in surgery in 2025.[32] Through the Polyphonic AI Fund for Surgery established in 2024, the three companies support the development of surgical software and provide funding to the applications related to AI model development, engineering, management, and data governance. J&J is particularly interested in AI applications in surgery projects related to colorectal, bariatric, thoracic, urology, gynecology, and general surgery.

Furthermore, academia is another crucial driving force in boosting development of the AI medical device sector, contributing various proof-of-concept projects and initiatives. For instance, in 2025, Hong Kong University of Science and Technology (HKUST)[33] developed three AI-powered medical devices that assist physicians in offering medical treatments and diagnostics, revamp medical processes, and improve efficiency. The three devices are an AI hand-centric tactile interaction system, portable wireless spirometer devices, and the world's smallest multifunctional surgical robot, aiming at health monitoring, surgical support, and rehabilitation.

It is foreseeable that more innovative academic projects empowered by AI will pursue clinical trials and commercialization, further accelerating the competition in the medical device market. More medical device makers are expected to strategically relocate their operations closer to universities and clinical centres for easier access to R&D resources and skilled talents.

32 Taylor, Nick Paul. 'J&J Teams with Nvidia, Amazon on Fund for AI Surgery Solutions.' MedTech Dive, June 26, 2025. https://www.medtechdive.com/news/jnj-nvidia-amazon-fund-ai-surgery-solutions/751693/

33 HKUST. 'HKUST Develops Multiple Smart Devices to Advance Medical Innovation.' Accessed April 10, 2025. https://hkust.edu.hk/news/hkust-develops-multiple-smart-devices-advance-medical-innovation

3. Data governance is gaining traction

AI-powered medical devices help boost productivity of the healthcare sector, while the black box nature of AI raises concerns. Users generally understand the inputs and outputs of AI. However, the working process of complex AI algorithms remains a mystery. Patients may not have full confidence in AI-generated diagnoses. Stakeholders also worry about data quality, medical errors, patient privacy, and outcome accountability, etc.[34]

3.1 Data quality

Currently, holistic standards and regulatory requirements for AI-generated healthcare documents are not universally available. Hallucination, which is the so-called 'facts' and assumptions 'invented' by AI, is one of the most common and serious problems. A grave medical error could endanger lives.

Moreover, AI generated solutions sometimes led to bias and worsen healthcare inequities.[35] For instance, AI algorithm training often leans on accessible information from certain subgroups of the population, such as selected races and demographic groups with specific socioeconomic status. When model development and evaluation are dominant by certain datasets, algorithm bias will be generated. The biased output may under- or overestimate the need for all patients.

Furthermore, existing regulations often lack clarity on accountability. The liability for medical errors resulting from algorithm errors, misinterpretations, or inadequate training is ambiguous. Additionally, rapid technological breakthroughs outpace the development of regulatory frameworks, complicating the establishment of effective accountability measures on the design and usage of AI-powered medical devices.

3.2 Data privacy and ownership

According to the World Health Organization (WHO), health data is categorized as 'sensitive personal data' or 'personally identifiable information',[36] which is now massively used for training AI algorithms. However, some patients are concerned about their data privacy and

34 Mesko, Bertalan, and Eric J. Topol. 'The Imperative for Regulatory Oversight of Large Language Models (or Generative AI) in Healthcare.' Npj Digital Medicine, July 6, 2023. https://www.nature.com/articles/s41746-023-00873-0. El Fassi, Sammy Chouffani, Adonis Abdullah, Ying Fang, Sarabesh Natarajan, Awab Bin Masroor, Naya Kayali, Simran Prakash, and Gail E. Henderson. 'Not all AI health tools with regulatory authorization are clinically validated.' Nature Medicine, August 26, 2024. https://www.nature.com/articles/s41591-024-03203-3.; & Kosinski, Matthew. 'What is black box AI?' IBM, October 29, 2024. https://www.ibm.com/think/topics/black-box-ai

35 Mittermaier, Mirja, Marium M. Raza, and Joseph C. Kvedar. 'Bias in AI-Based Models for Medical Applications: Challenges and Mitigation Strategies.' NPJ Digital Medicine 6, no. 1: 113. 2023. https://doi.org/10.1038/s41746-023-00858-z

36 World Health Organization. Global Strategy on Digital Health (2020–2025). Geneva: World Health Organization. 2021. https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf

data leakage. For AI training purposes, the data should be fully anonymized and encrypted to avoid the impact of potential data leakage.[37]

Also, the ownership of AI-generated results based on patient data is often unclear. Personal health data originates from patients, while AI research results are supposed to be owned by device developers, clinical organizations and/ or other research entities. Data ownership and intellectual property issues of AI-powered medical devices should be clearly defined and regulated.

In general, AI-powered medical devices support diagnostic analysis and reduce administrative burdens, while hallucinations, medical errors and misuse of data endanger patient health. It is crucial for regulatory bodies to establish clear regulations and guidelines for AI governance in the healthcare sector and ensure supply chain stakeholders comply with the requirements.

4. Cybersecurity demands immediate attention

The healthcare sector is particularly susceptible to data disruption. Cyber-attacks can lead to data breaches and block data owners from accessing their databases. Hospitals may struggle to access patient records or medical devices, leading to delays in treatments. Patient data could potentially be 'kidnapped' for ransom. According to IBM,[38] the healthcare sector remains the top target for malicious attackers in 2024, with an average breach cost of US$9.8 million.

Nowadays, investment in cybersecurity for medical institutions is a must. Both hackers and cybersecurity teams use AI to win cyber battles, which are bot-to-bot 'warfare'. According to Universal Health Services (UHS), a Pennsylvania-based hospital and healthcare service provider, they received 7 million cyber-hack attempts on its 29-hospital system on a daily average.[39] To cope with this challenge, medical device companies must enhance the level of cybersecurity of their devices, started from the product design stage, and provide regular system upgrades.

5. Cost burden raises concerns

Global medical device makers cautiously manage their financial strategies these days. Apart from fighting against cost surges led by COVID-19 disruptions, several factors drive up the total costs, such as labour shortages, supply chain complexity, inflation, tariffs, and surges in raw material prices.

37 Mesko, Bertalan, and Eric J. Topol. 'The Imperative for Regulatory Oversight of Large Language Models (or Generative AI) in Healthcare.' NPJ Digital Medicine, July 6, 2023. https://www.nature.com/articles/s41746-023-00873-0

38 IBM and Ponemon Institute. Cost of a Data Breach Report 2024. 2024. https://www.ibm.com/reports/data-breach

39 Grant Bruce, 'UHS Fends Off 7M Cyber Threats Daily,' Becker's Health IT, June 12, 2025. https://www.beckershospitalreview.com/healthcare-information-technology/cybersecurity/uhs-fends-off-7m-cyber-threats-daily

First, aging problems in device production sites affect labour supply. Medical device manufacturers have to adjust compensation packages to retain skilled workers.

Second, the medical device supply chain is facing a challenging time amid economic uncertainties, alongside inflation and currency fluctuations. Also, more stringent regulatory requirements and increased freight costs due to geopolitical tensions and port congestion make the situation worse.

Last, tariff further alters the cost structure of medical device manufacturing. For instance, tariffs on raw materials for making medical devices, such as plastics, steel, and other materials, will drive up the sourcing costs of manufacturers. Also, the ongoing US Commerce Department's Section 232 investigation into semiconductors will potentially create additional costs for producing medical devices, especially for chip-intensive devices such as AI-powered diagnostic devices, CT scanners, implantable equipment, and imaging devices.[40]

To mitigate the cost impacts, large medical device manufacturers are reviewing their sourcing plans. For instance, GE Healthcare, Philips, and Abbott Laboratories tried to adopt location diversification strategies and explore sourcing countries with lower tariffs across the world; Medtronic and Baxter International applied nearshoring approach in Latin America, despite ongoing tariff threats from the US; and Stryker and Zimmer Biomet may take onshoring approaches and explore local sourcing bases within the country (See Table 5).[41] In addition, other common cost-saving strategies adopted by medical device companies include divestiture of low-return businesses, optimizing market portfolios, renegotiating with vendors, and business process reengineering.[42]

Table 5: Potential sourcing strategies of selected medical device companies

Company	Selected production lines	Cost management strategies	Challenges
GE Healthcare and Philips	High-end diagnostic equipment, such as CT scanners	Diversification: exploring more sourcing bases in Europe	High sourcing costs

40 Kelly, Susan. 'US Semiconductor Import Probe Looms Over Medtech Industry.' MedTech Dive, May 6, 2025. https://www.medtechdive.com/news/Medical-device-manufacturers-Section-232-semiconductor-investigation-tariffs/747187/

41 Kanhere, Manjiri. 'The Healthcare Supply Chain Under Tariff Pressure: 2025 Challenges for Medical Device Manufacturers and Researchers.' Cognitive Market Research, May 2, 2025. https://www.cognitivemarketresearch.com/blog/the-healthcare-supply-chain-under-tariff-pressure-2025-challenges-for-medical-device-manufacturers-and-researchers

42 Delphine Nain Zurkiya, Gerti Pellumbi, Peter Pfeiffer, and Tommy Reid. 'Value Creation Priorities Shaping Medtech.' McKinsey. October 16, 2024. https://www.mckinsey.com/industries/life-sciences/our-insights/value-creation-priorities-shaping-medtech

Company	Selected production lines	Cost management strategies	Challenges
Medtronic and Baxter International	Medical consumables, such as bandages and gloves	Nearshoring: exploring sourcing bases in Latin America with lower tariffs	Potential tariff threats and rising costs
Stryker and Zimmer Biomet	Implants and surgical devices	Onshoring: exploring sourcing bases in the US	Huge investments and time cost
Fitbit and Abbott Laboratories	Wearable devices, such as glucose monitors and heart rate monitors	Diversification: exploring more sourcing bases with lower tariffs	Strike a balance between higher sourcing costs and lower tariffs

Source: Kanhere (2025)

6. Investment and M&A activities

In 2024, investments in the medical technology sector recorded a mild growth over the previous year, while a decline in the number of funding rounds was observed. As of 9 December 2024, the sector attracted US$19.1 billion year-to-date from 691 funding rounds covering various segments, including diagnostic devices, therapeutic digital tools, and other medical technology equipment.[43] Due to economic headwinds and difficult business environments, investors in the medical sector cautiously invest in high-value assets and advanced technology.

On the contrary, the number of merger and acquisition (M&A) activities jumped to 305 transactions with a total value exceeding US$63.1 billion in 2024, whereas only 134 M&A deals were recorded amounting to US$50.4 billion in 2023, according to J.P. Morgan.

Through M&A, medical device companies gain access to cutting-edge technology. For instance, Johnson and Johnson's acquisition of Shockwave Medical with a transaction sum of US$13.1 billion was one of the major deals in medical device sector in 2024. The acquirer is expected to extend its leadership in cardiovascular areas by collaborating with the acquiree's intravascular lithotripsy technology.[44] Similarly, Stryker's US$4.9 billion acquisition of Inari Medical in February 2025 demonstrated a win-win strategic move in market expansion. By

43 J.P.Morgan. '2024 Medtech Industry Insights: Investment Trends, M&A Activity, and Market Dynamics.' January 2025. https://www.jpmorgan.com/content/dam/jpmorgan/documents/cb/insights/outlook/jpm-medtech-deck-q4-2024-final-ada.pdf

44 Johhson & Johnson. 'Johnson & Johnson Completes Acquisition of Shockwave Medical.' May 31, 2024. https://www.jnj.com/media-center/press-releases/johnson-johnson-completes-acquisition-of-shockwave-medical

accessing Inari's innovative solutions in thrombectomy, Stryker expected an expansion of its presence in the neurovascular, cardiovascular, and peripheral vascular markets.[45]

Moreover, some companies aim at market expansion by inking M&A deals. Arterex, an Arizona-based medical device contract manufacturing solution service provider, acquired Phoenix S.r.l., an Italian disposable device manufacturer, in January 2025. The deal is expected to help Arterex extend its market networks from the US to Europe, as Phoenix obtained regulatory approval from the EU's Medical Device Regulation (MDR). The acquisition will enable Arterex to offer comprehensive services such as engineering, compounding, extrusion, molding, tooling, assembling, and packaging under one roof.[46]

Besides, cross-sector M&A can unlock significant strategic value by integrating complementary capabilities and innovative technologies that allow companies to diversify their businesses and accelerate entry into new markets. For instance, Nvidia, the world's computer chip giant, announced the acquisition of VinBrain, an affiliate of Vingroup, in early December 2024. The acquisition helps Nvidia leverage VinBrain's expertise in medical AI applications and gain access to Vietnam's medical market. Currently, VinBrain provides innovative AI-powered equipment for 182 hospitals in Vietnam, the US, India, Australia, and other locations.[47]

These M&A transactions reflect a strategic shift in the medical device sector, where companies increasingly seek to acquire technologies rather than develop them internally amid mounting time and regulatory pressures. Though facing significant economic headwinds and uncertainties, the sustained M&A momentum signals industry confidence in consolidation as a pathway to technological advancement and market expansion, particularly in high-growth segments such as cardiovascular interventions, neurovascular solutions, and AI-powered medical applications.

7. ESG practices

To fulfil regulatory requirements and social expectations, medical device companies are proactively addressing various environmental, social, and governance (ESG) initiatives,

45 McKenzie, Dustin K., and Shai Kalansky. 'Key Developments in MedTech M&A: Momentum Despite Macroeconomic Uncertainty.' July 14, 2025. https://lifesciences.mofo.com/topics/key-developments-in-medtech-m-a-momentum-despite-macroeconomic-uncertainty and Stryker. 'Stryker Completes Acquisition of Inari Medical, Inc., Providing Entry into the High-Growth Peripheral Vascular Segment.' February 19, 2025. https://investors.stryker.com/press-releases/news-details/2025/Stryker-completes-acquisition-of-Inari-Medical-Inc.-providing-entry-into-the-high-growth-peripheral-vascular-segment/default.aspx

46 Arterex Medical. 'Arterex Announces Acquisition of Phoenix S.r.l., a Leading Italian Medical Device Solution Provider.' January 21, 2025. https://arterexmedical.com/arterex-announces-acquisition-of-phoenix/

47 Samar, Wara. 'NVIDIA Acquires VinBrain: A Strategic Move to Boost AI in Healthcare.' December 12, 2024. https://med-tech.world/news/nvidia-acquires-vinbrain-accelerating-ai-healthcare/

including carbon emissions, waste management, healthcare accessibility, workforce diversity, product safety, and regulatory governance.

7.1 Environmental initiatives

The medical device manufacturing industry faces significant pressure to minimize its environmental impact. Over the years, medical products, including disposables and devices, contribute one-third of healthcare's carbon emissions and most of the waste generation.[48] Currently, it is voluntary for companies to report on their ESG performance. However, the requirement is becoming mandatory in phases between 2025 and 2029, depending on markets and company sizes. Many governments are rolling out Scope 1, 2, and 3 greenhouse gas (GHG) emissions mandated reporting,[49] which will significantly affect medical device manufacturers in terms of their operations and cost management.

Leading medical device makers have committed to reducing GHG emissions and announced plans on using green technologies, energy efficiency, sustainable sourcing, and waste reduction. For example, Medtronic has committed to meeting the net-zero emission goals across Scope 1, 2, and 3 by 2045. The company partners with its suppliers to improve energy efficiency and purpose recycling practices. According to the Medtronic 2024 Impact Report, the company invested in low-carbon energy and renewable electricity systems. In 2024, Medtronic achieved a 52% reduction in GHG emissions intensity compared to 2020, already surpassing its target of a 50% reduction set for 2025.[50] In 2024, the company reduced waste by 19% compared to 2020 by repurposing and recycling materials. Medtronic also collaborated with other industrial stakeholders on sustainable product packaging solutions.

7.2 Social initiatives

The COVID-19 pandemic highlighted critical social gaps in healthcare equity, workforce safety, and community engagement. In the post-COVID era, people have increased attention on healthcare accessibility and equity and emphasize work-life balance, diversity, and equity in the workforce. Medical device companies are expected to address community needs during emergencies through provision of local health facilities support and equipment donation.

48 Wurzer, Charline, Erik Surtevall, Elia Tziambazis, John Goldader, Elizabeth Millman Hardin, Gotz Gerecke, Shruti Nayak, and Laura Hansmann. 'Medtech's Path to a Circular Future.' BCG, March 22, 2024. https://www.bcg.com/publications/2024/medtech-path-to-circular-future

49 Scope 1 refers to direct emissions from the medical device company; Scope 2 refers to indirect emissions through purchasing energy by the company; and Scope 3 refers to other indirect emissions along the value chain, such as supplier activities, product use, and end-of-life disposal.
Aligned Incentives. 'Navigating Mandatory Scope 3 Emissions Reporting in the EU, US, and Beyond.' April 26, 2024. https://alignedincentives.com/mandatory-scope-3-emissions-reporting-eu-us-uk-international/

50 Medtronic. Medtronic releases 2024 Impact Report. 2024. https://www.medtronic.com/content/dam/medtronic-wide/public/brand-corporate-assets/resources/2024-impact-report_corpmark_mdt.pdf

Mindray, China's largest medical device manufacturer, focuses on global healthcare access, community education, and wellness. According to their 2024 Sustainability Report,[51] the company is keen on improving healthcare accessibility through R&D innovation, facilitating high-quality medical resources to underserved populations, while also maintaining comprehensive wellness programs for its staff and stakeholders. The company's social initiatives include:

- Promoting the use of AEDs worldwide, donating 1,365 AEDs to its partners in 2024, and providing first aid training to over 2 million individuals in three years
- Partnering with international NGOs to donate medical devices to African children in Malawi for cleft lip/ palate treatments
- Setting up remote ultrasound diagnostic centres in Jiexiu, Shanxi and providing telemedicine solutions in Indonesia
- Launching rural revitalization projects in Dangshan, Anhui, including establishing a medical technology industrial park, setting up a new campus for talent training, and supporting local wastewater treatment plants and infrastructure enhancement
- Uplifting medical standards in rural China by launching the 'Mindray Standardized Laboratory Hundred Cities Action' project to boost disease screening
- Investing RMB 14.4 million in occupational health and safety to ensure a safe workplace
- Establishing a Construction Specification School for contractors to enhance their safety capabilities

7.3 Governance initiatives

Governance is significantly important due to the highly regulated, patient safety-sensitive, and innovative nature of the medical device industry. It is indispensable for medical device makers to build trust with stakeholders and communities by implementing solid governance strategies, such as ethical business practices, regulatory compliance, risk mitigation, and operational transparency.

For instance, Intuitive Surgical, founded in 1995 and manufacturing innovative, robotic-assisted systems, is the largest surgical robotics company in the US and globally.[52] The company conducted a global Double Materiality Assessment in 2024 to govern critical ESG risks and opportunities and enhance transparency and accountability of ESG disclosure. Intuitive emphasizes integrity in business operations, fosters a culture of humility and

51 Mindray. 2024 Sustainability Report. 2024. https://www.mindray.com/content/dam/xpace/en/investor-relations/2024/mindray-2024-esg-report-en.pdf

52 iData Research. 'Top 8 Robotic Surgery Companines in the United States'. October 7, 2024. https://idataresearch.com/top-robotic-surgery-companies-in-the-united-states/ & Standard Bots. 'Top 8 surgical robotics companies in 2025'. August 13, 2025. https://standardbots.com/blog/surgical-robotics-companies

continuous learning, commits to quality, ensures data privacy and security, and aligns with ESG goals.[53]

Overall, strong ESG performance is increasingly seen as a competitive advantage for medical device companies. By enhancing operational transparency and promoting a sustainable business environment, medical device companies deliver timely and sophisticated medical solutions with cost effectiveness. At the same time, they also strengthen patient care outcomes, appealing to customers, talents, partners, and investors. It is expected that advancement in medical technology, including AI-powered equipment and telemedicine, will further help medical device companies operate sustainably and align with ESG goals in the long term.

53 Intuitive. 2024 Environmental, Social, and Governance Report. 2024. https://www.intuitive.com/en-us/-/media/ISI/Intuitive/Pdf/2024-Intuitive-ESG-Report-Revised.pdf

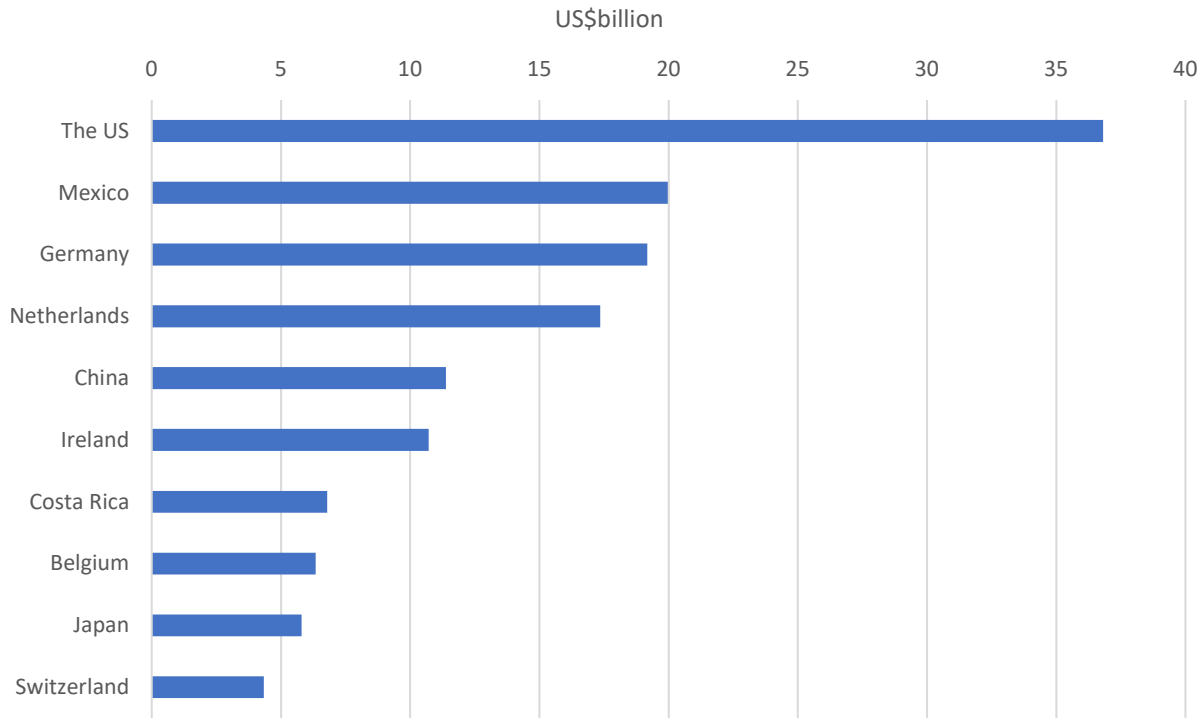
V. Medical Device Sector by Country

1. Global leading countries

1.1 The US

In 2024, the US remains the largest exporter of health equipment in the world with an export value of US$36.8 billion (See Figure 2).[54] The US has long dominated the high-end medical device sector, driven by its advanced healthcare infrastructure, strong healthcare spending, and heavy investment in innovative medical technologies. Table 6 lists the leading medical device companies in the US. Medtronic, ranking as the world's largest medical device maker, generated revenue of US$33.6 billion in fiscal year 2025, up from US$32.4 billion in fiscal year 2024.[55] The company not only serves the US domestic market but also ships high-end medical device exports to more than 150 countries around the world.

Figure 2: Major exporters of health equipment in the world in 2024, US$ billion



Source: Statista (2025)

54 Statista. 'Leading exporters of health equipment worldwide in 2024.' Accessed September 9, 2025. https://www.statista.com/statistics/1462761/health-equipment-exports-by-country-worldwide/

55 Medtronic. Annual Report. 2025. https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=319434355&type=PDF&symbol=MDT&cdn=f3efe99b3d2c4f03ac9f8b473ef48be2&companyName=Medtronic+plc.&formType=ARS&dateFiled=2025-09-04

Table 6: Major medical device companies based in the US

Company	Financial Performance US$ billion	Major Product Categories	Location of Production Sites
Medtronic[56]	Revenue in fiscal 2025: US$33.6 billion	Cardiac devices, diabetes care, neuroscience, surgical tools	21 tax jurisdictions: US, Australia, Brazil, Canada, China, Costa Rica, Dominican Republic, France, Germany, India, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Puerto Rico, Singapore, Switzerland, and UK Business network in over 150 countries across the world
Becton Dickinson[57]	Revenue in fiscal 2024: US$20.2 billion	Diagnostic equipment, biosciences	US, Bosnia and Herzegovina, Brazil, Canada, China, Dominican Republic, France, Germany, Hungary, India, Ireland, Israel, Italy, Japan, Malaysia, Mexico, the Netherlands, Singapore, Spain, and UK
GE Healthcare[58]	Revenue in fiscal 2024: US$19.7 billion	Diagnostic imaging, ultrasound, life care solutions	US, Austria, Brazil, China, Denmark, Finland, France, Germany, India, Ireland, Israel, Japan, Mexico, the Netherlands, Norway, Sweden, and South Korea
Johnson & Johnson[59]	Sales in fiscal 2024: US$31.9 billion (including medical devices)	Cardiovascular, orthopedics, surgery, and vision categories	US, 7 locations in America, 13 in Africa, Asia and Pacific, and 21 in Europe
Abbott Laboratories[60]	Sales in fiscal 2024: US$28.3 billion (including diagnostic products and medical devices)	Diagnostics, vascular devices, diabetes care, nutrition, pharmaceutical products	US, Costa Rica, Colombia, Ireland, Mexico, etc.

56 Medtronic. Annual Report. 2025. https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=319434355&type=PDF&symbol=MDT&cdn=f3efe99b3d2c4f03ac9f8b473ef48be2&companyName=Medtronic+plc.&formType=ARS&dateFiled=2025-09-04

57 Becton Dickinson. Form 10-K. 2024. https://investors.bd.com/sec-filings/all-sec-filings/content/0000010795-24-000084/bdx-20240930.htm#i27a448c89cec45ef9e3877c9734386ff_16

58 GE Healthcare. Form 10-K. 2024.https://investor.gehealthcare.com/static-files/2a3d2d9c-3cf7-4fa5-9acc-4b90570b9330

59 Johnson & Johnson. Annual Report. 2024.https://www.jnj.com/download/johnson-johnson-2024-annual-report

60 Abbott Laboratories. Annual Report. 2025. https://www.abbottinvestor.com/static-files/61441b9a-bf14-49fa-9748-50188e3aac5c

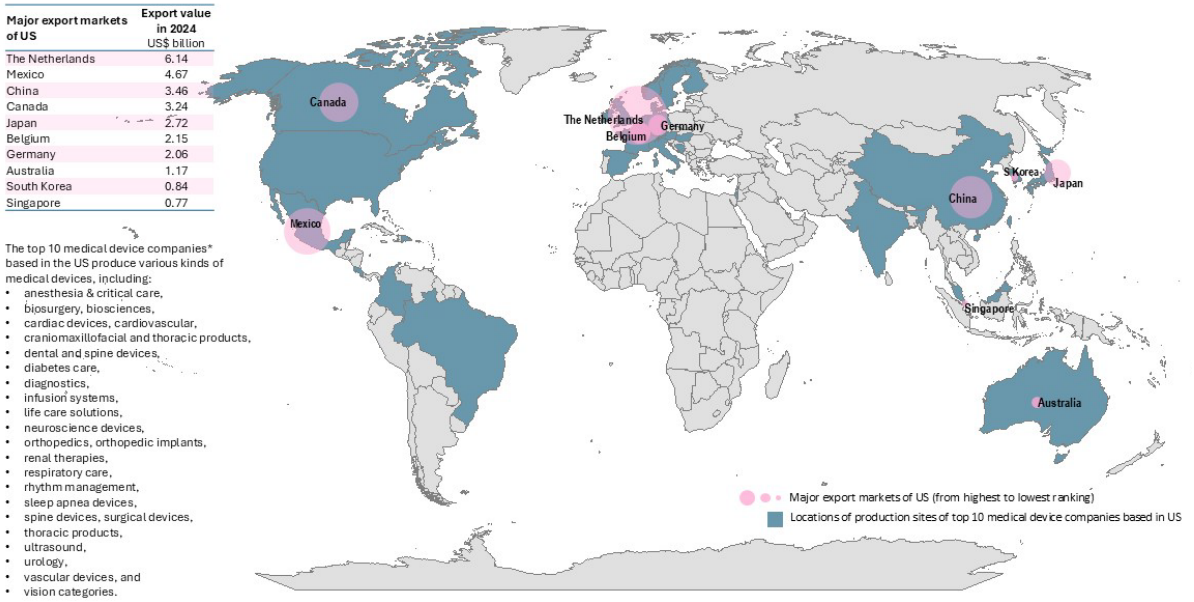
Company	Financial Performance US$ billion	Major Product Categories	Location of Production Sites
Stryker Corporation[61]	Sales in fiscal 2024: US$22.6 billion	Orthopedics, surgical equipment, neurotechnology	Operational sites, including factories: US, Australia, China, France, Germany, Mexico, the Netherlands, Switzerland, UK
Boston Scientific[62]	Net Sales in fiscal 2024: US$16.7 billion	Cardiovascular, rhythm management, urology, neuromodulation	US, Brazil, China, Costa Rica, Ireland, Malaysia, Puerto Rico
Baxter International[63]	Net Sales in fiscal 2024: US$8.2 billion (excluding pharmaceuticals)	Anesthesia & Critical Care; BioSurgery; Infusion Systems; Nutrition; Renal Therapies	Operational sites, including factories: US, Australia, Belgium, Brazil, Canada, China, Colombia, Costa Rica, Dominican Republic, France, Germany, Israel, Malta, Mexico, the Netherlands, Puerto Rico, Spain, Sweden, Switzerland, UK
Zimmer Biomet[64]	Net Sales in fiscal 2024: US$7.7 billion	Orthopedic implants, dental and spine devices, craniomaxillofacial and thoracic products, surgical products	US, China, Ireland, Puerto Rico, Switzerland, etc.
ResMed[65]	Net revenue in fiscal 2025: US$5.1 billion	Respiratory care, sleep apnea devices	US, Australia, China, France, Malaysia, and Singapore

Source: companies' website

At the same time, the US is the world's largest importer of health equipment with an import value of US$41.5 billion. The largest imported category was diagnostic imaging device, followed by consumables, orthopedics and prosthetics equipment, patient aids, and dental goods.[66] Overall, the country is a net importer of health equipment, mainly imported from Mexico (around 30% of total), Germany (~11%), and Costa Rica (~10%) (See Figure 3).[67]

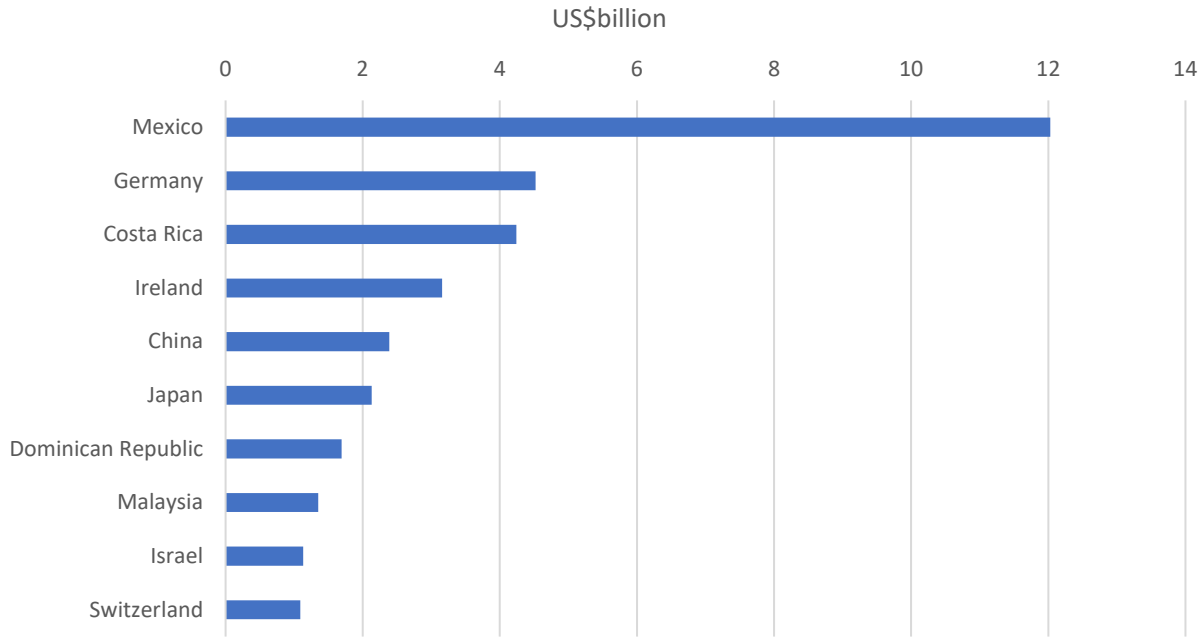
61 Stryker. Comprehensive Report. 2024. https://s22.q4cdn.com/857738142/files/doc_financials/2024/ar/SYK-2024-CR_.pdf
62 Boston Scientific. Annual Report and Form 10-K. 2024. https://investors.bostonscientific.com/~/media/Files/B/Boston-Scientific-IR-V3/annual-reports-proxy-statements/2025/bsc-2024-annual-report-and-10-k.pdf
63 Baxter International. Form 10-K. 2024.https://s22.q4cdn.com/911189824/files/doc_financials/2024/ar/BAX-2024-Form-10-K.pdf
64 Zimmer Biomet. Annual Report. 2024. https://investor.zimmerbiomet.com/~/media/Files/Z/ZimmerBiomet-IR/documents/annual-reports/2024-annual-report.pdf
65 ResMed. Form 10-K. 2025. https://investor.resmed.com/sec-filings/all-sec-filings/content/0000943819-25-000035/rmd-20250630.htm#i12a12641041043a9978dbf1b6961a4a2_16
66 Florida International Medical Expo. U.S. Medical Devices: Imports and Exports, the Role of Tariffs and of the FDA. 2020. https://www.fimeshow.com/content/dam/Informa/fimeshow/en/downloads/FIME20-US-medical-device-report-eng.pdf
67 Statista. 'Main import partners of health equipment into the United States as of 2024.' Accessed September 9, 2025. https://www.statista.com/statistics/1608016/united-states-health-equipment-import-partners/

Map 1. Major export markets of US's health equipment, 2024



* Note: For the company list, please refer to Table 6
Source: Statista, company websites

Figure 3: Major exporters of health equipment to the US in 2024, US$ billion



Source: Statista (2025)

Since President Donald Trump's return to the White House in January 2025, his administration has initiated rounds of tariff negotiation with global trade partners, introducing the so-called 'reciprocal' tariff rates. Obviously, rising tariffs have negative impacts on the recovering medical device market, while some advocates believe that the tariff policy helps reshoring in medical device manufacturing and enhancing local supply

chain resiliency. However, the medical device supply chain of the US highly involves stakeholders around the world. US medical device makers import 50%-80% of components for manufacturing final goods.[68] It is expected the price of both final products and components will be affected by the new tariff policies.

According to a survey of 200 medical professionals conducted by Black Book Research in February 2025, the cost of hospitals and health systems would be increased by at least 15% due to the rise of tariff. 90% of hospital finance executives surveyed commented that the increased costs would be shifted to insurers and patients, through uplift in medical service fees.[69] Major medical device companies faced substantial cost projections, with Johnson & Johnson anticipating approximately US$400 million in tariff-related expenses in April 2025, and Boston Scientific projecting roughly US$200 million in additional costs.[70] However, following the Trump administration's suspension of certain tariffs, both companies revised their estimates downward in July 2025—Johnson & Johnson to US$200 million and Boston Scientific to US$100 million.[71]

Apart from the tariff policy, Trump's administration reduced resources for developing the US healthcare sector. In April 2025, 3,500 FDA employees, 2,400 CDC employees, 300 CMS employees, and 1,200 NIH employees were laid off.[72] Given the reduction of FDA staff, the processes for information requests, approval applications, and reviews for new medical devices, especially those in early development stages, have slowed down. Delays in launching innovative medical devices to market may make companies with expiring patents or funding constraints more vulnerable to acquisition.[73]

Another factor affecting the development of the medical device sector in the US is the One Big Beautiful Bill Act signed by President Trump in July 2025. Under the new law, Medicaid spending on health insurance would be trimmed by roughly US$1 trillion. It is projected that

68 Zölfl, René. 'Tariffs on Medical Devices: Global Trade Disruptions in MedTech.' August 2025. https://www.ptc.com/en/blogs/medtech/tariffs-on-medical-devices

69 Reuter, Elise. 'Medtech Firms Have Little to Say on Trump Tariffs.' MedtechDive, February 19, 2025. https://www.medtechdive.com/news/medtech-companies-tariffs-earnings/740338/

70 Zipp, Ricky. 'J&J expects tariff charge of $400M this year'. MedtechDive. April 15, 2025. https://www.medtechdive.com/news/jnj-tariff-costs-400-million-2025/745357/

Zipp, Ricky. 'Boston Scientific is 'very bullish' on 2025 despite $200M tariff hit'. MedtechDive. April 23, 2025. https://www.medtechdive.com/news/boston-scientific-trumo-tariffs-2025-guidance/746080/

71 Erman, Michael, Patrick Wingrove and Bhanvi Satija. 'Johnson & Johnson lifts 2025 forecast, halves tariff cost outlook'. Reuters. July 16, 2025. https://www.reuters.com/business/healthcare-pharmaceuticals/johnson-johnson-beats-profit-estimates-strong-darzalex-medtech-sales-2025-07-16/ & Zipp, Ricky. 'Boston Scientific halves expected tariff hit'. MedtechDive. July 23, 2025. https://finance.yahoo.com/news/boston-scientific-halves-expected-tariff-115400894.html

72 FDA: Food and Drug Administration, CDC: Centres for Disease Control and Prevention, CMS: Centres for Medicare and Medicaid Services, NIH: National Institutes of Health.

Ashley, Madeline and Kristin Kuchno. 'HHS Begins Layoffs: What to Know.' Becker's Hospital Review, April 1, 2025. https://www.beckershospitalreview.com/hospital-management-administration/hhs-begins-layoffs-what-to-know/

73 Fitch Wire. US Policies and Budget Pose Headwinds for Healthcare Credits. February 28, 2025. https://www.fitchratings.com/research/insurance/us-policies-budget-pose-headwinds-for-healthcare-credits-28-02-2025

11 million individuals in the US will become uninsured by 2034.[74] Patients will suffer by incurring medical debt, giving up necessary medications, and losing access to clinical services. With the reduction of Medicaid, many healthcare organizations are concerned about trimmed budgets on operation, talent recruitment, and device sourcing, leading to a drop in service quality of hospitals across the country.

1.2 Europe

In 2024, market value of medical devices in Europe was estimated to reach US$172.7 billion, and is projected to increase to US$204.5 billion in 2027, according to Statista.[75] Based on manufacturer prices in 2023, Germany contributed the largest market value to the European medical device market at 26.5%, followed by France (14.0%), Italy (12.3%), the UK (6.8%), and Spain (6.3%).

There are over 37,000 companies in the entire European medical technology sector.[76] Around 90% of European-based medical device makers are small- and medium-sized companies. Most of them are based in Germany, followed by Italy, the UK, Poland, and Sweden. However, the sector is dominated by a few world-renowned medical device giants in terms of revenue, including Siemens Healthineers, Fresenius, and Philips Healthcare (See Table 7).

Over 880,000 individuals were employed in the European medical technology sector in 2024, accounting for 0.4% of total employment in Europe. Among all countries, Germany ranked top in terms of individuals employed in the medical technology sector in 2024 at 257,000. That same year, Italy had the second largest number of individuals employed in the sector at 177,607, followed by the UK (117,200), France (84,000), and Switzerland (67,500). Overall, the value added per individual in the sector in Europe was estimated at around 177,000 euro.

Table 7: Major medical device companies based in Europe

Headquarters	Company	Financial Performance in Fiscal 2024	Major Product Categories	Location of Production Sites
France	BioMérieux[77]	Sales: Euro 4.0 billion	In-vitro diagnostics	France, China, Spain, and US

74 Ashley, Madeline and Jakob Emerson. 'President Trump Signs GOP Budget Bill into Law: 9 Things to Know.' Becker's Hospital Review. April 1, 2025. https://www.beckershospitalreview.com/hospital-management-administration/senate-passes-gop-budget-bill-heads-to-house-8-things-to-know/

75 Statista. 'European medical technology industry.' Accessed September 9, 2025. https://www.statista.com/study/39065/european-medical-technology-industry-statista-dossier/

76 MedTech Europe. 'MedTech Europe's Facts & Figures 2024.' July 11, 2024. https://www.medtecheurope.org/resource-library/medtech-europes-facts-figures-2024/

77 BioMérieux. Universal Registration Document. 2024. https://www.biomerieux.com/content/dam/biomerieux-com/investor/02---news---reports/URD-biomerieux-2024-EN.pdf.coredownload.pdf

Headquarters	Company	Financial Performance in Fiscal 2024	Major Product Categories	Location of Production Sites
Germany	Siemens Healthineers[78]	Revenue: Euro 22.4 billion	Diagnostic imaging, laboratory diagnostics, advanced therapies	Germany, China, India, Slovakia, UK, and US
Germany	Fresenius SE & Co. KGaA[79]	Revenue: Euro 21.5 billion	Dialysis equipment, infusion therapies, clinical nutrition	Germany, China, Dominican Republic, the Netherlands, US, etc.
Germany	Carl Zeiss Meditec[80]	Revenue: Euro 2.1 billion	Ophthalmology, medical imaging	Germany, China, France, the Netherlands, and US
Italy	Amplifon[81]	Revenue: Euro 2.4 billion	Hearing devices and solutions	Business network in 26 countries across the world
Netherlands	Philips Healthcare[82]	Sales: Euro 18.0 billion	Diagnostic imaging, patient monitoring, connected care	The Netherlands, China, India, Indonesia, US, other American countries, etc.
Sweden	Mölnlycke Health Care[83]	Sales: Euro 2.1 billion	Wound care, surgical products	Austria, Denmark, Finland, Malaysia, Saudi Arabic (under construction), UK, US, etc.
Sweden	Getinge[84]	Net sales: SEK 34.8 billion	Infection control, surgical systems	Sweden, China, France, Germany, the Netherlands, Poland, Turkey, UK, and US
Switzerland	Straumann Group[85]	Revenue: CHF 2.5 billion	Implant and regenerative dentistry	Switzerland, Brazil, Canada, China, Costa Rica, France, Germany, Japan, Luxemburg, Pakistan, Spain, Sweden, Taiwan China, China, US
UK	Smith+Nephew[86]	Revenue: US$5.8 billion	Advanced wound care, orthopedics, sports medicine	UK, China, Costa Rica, Israel, Malaysia, Switzerland, and US

Source: companies' website

78 Siemens Healthineers. Annual Report. 2024. https://corporate.webassets.siemens-healthineers.com/427714ab59c7e09a/34f542dcc913/siemens-healthineers-ir-annual-report-2024.pdf

79 Fresenius. Annual Report. 2025. https://www.fresenius.com/sites/default/files/2025-03/Fresenius_Annual_Report_2024.pdf

80 Carl Zeiss Meditec. Annual Report. 2024. https://www.zeiss.com/content/dam/med-ag/investor-relations/financial-publications/afx_annual_report_202324.pdf

81 Amplifon. Annual Report. 2024. https://corporate.amplifon.com/en/investors/financial-reports/Annual-Report-2024

82 Philips Healthcare. Annual Report. 2024. https://www.results.philips.com/publications/ar24/downloads/files/en/PhilipsFullAnnualReport2024-English.pdf?v=20250917180655

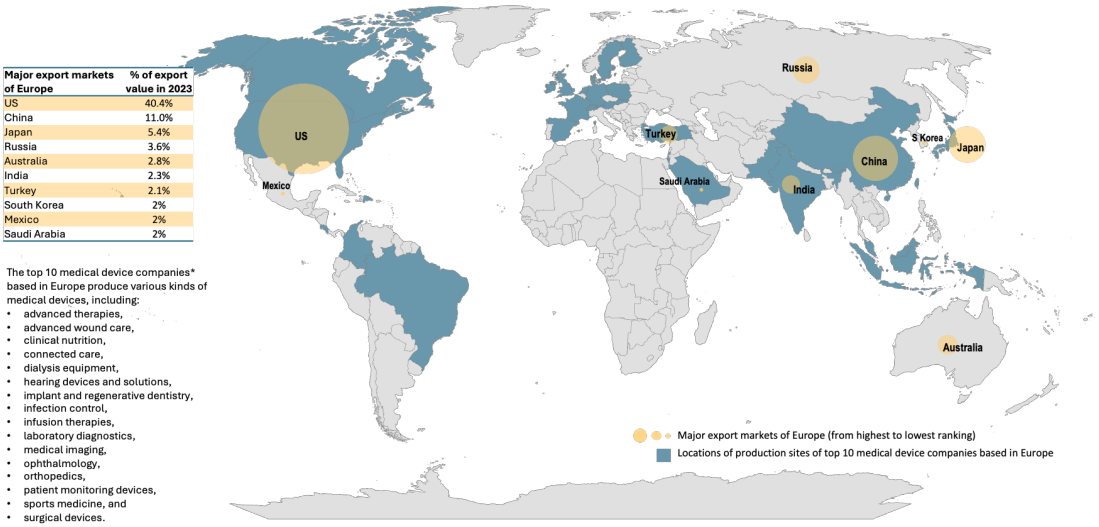
83 Mölnlycke Health Care. Annual Report. 2024. https://www.molnlycke.com/globalassets/global/annual-reports/molnlycke-annual-report-2024-digital.pdf

84 Getinge. Annual Report. 2024. https://www.getinge.com/dam/corporate/documents/investors/annual-reports/english/getinge-annual-report-2024-en-global.pdf

85 Straumann. Annual Report. 2024. https://www.straumann.com/content/dam/media-center/group/en/documents/annual-report/2024/Straumann_AR24.pdf

86 Smith+Nephew. Annual Report. 2024. https://smith-nephew.stylelabs.cloud/api/public/content/dd84fe0e01cf43fda2b6455fba42751c?v=d216808b

Map 2. Major export markets of Europe's medical technology devices, 2023



* Note: For the company list, please refer to Table 7
Source: Statista, company websites

In 2023, the largest European exporting country of medical technology was the Netherlands, followed by Germany and Ireland.[87] The major destination of Europe's medical device exports was the US, accounting for 40.4% of total exports, followed by China (11.0%), Japan (5.4%), Russia (3.6%), and Australia (2.8%). Regarding imports of medical technology into Europe, the Netherlands and Germany were the largest importers in Europe in 2023 (See Table 8a and 8b).

Table 8a: Exports of medical technology in Europe in 2023, by country (million euros)

Top 5 exporting countries in Europe	Export value
The Netherlands	37,202
Germany	33,570
Ireland	16,558
Belgium	12,088
Switzerland	11,941

Source: Statista (2024)

87 Statista. 'European medical technology industry.' Accessed September 9, 2025. https://www.statista.com/study/39065/european-medical-technology-industry-statista-dossier/

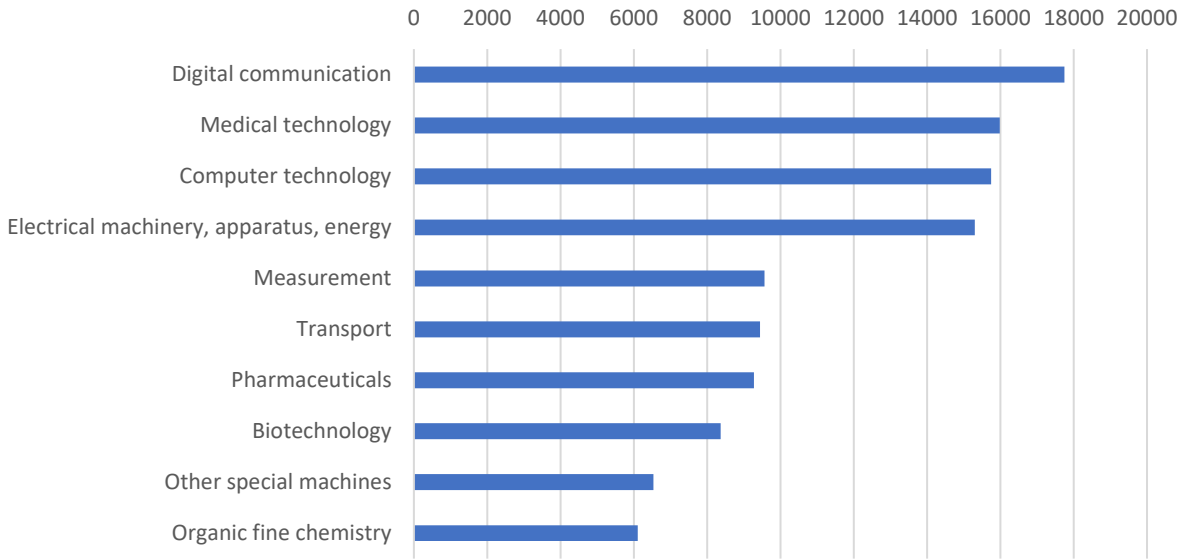
Table 8b: Imports of medical technology in Europe in 2023, by country (million euros)

Top 5 importing countries in Europe	Import value
The Netherlands	28,978
Germany	21,970
France	12,379
Belgium	11,557
UK	11,149

Source: Statista (2024)

There is strong innovation momentum in the European medical technology sector. Patent applications in the field of medical technology filed with the European Patent Office (EPO) have grown persistently from nearly 11,000 in 2013 to nearly 16,000 in 2023, according to MedTech Europe (See Figure 4).[88] Among the patent applications filed with the EPO, 40% came from the EU member states, the UK, Norway, and Switzerland, followed by the US (38%) and other countries (22%).

Figure 4: Top 10 technical areas in patent applications filed with EPO, 2023



Source: MedTech Europe (2024)

88 MedTech Europe. 'MedTech Europe's Facts & Figures 2024.' July 11, 2024. https://www.medtecheurope.org/resource-library/medtech-europes-facts-figures-2024/

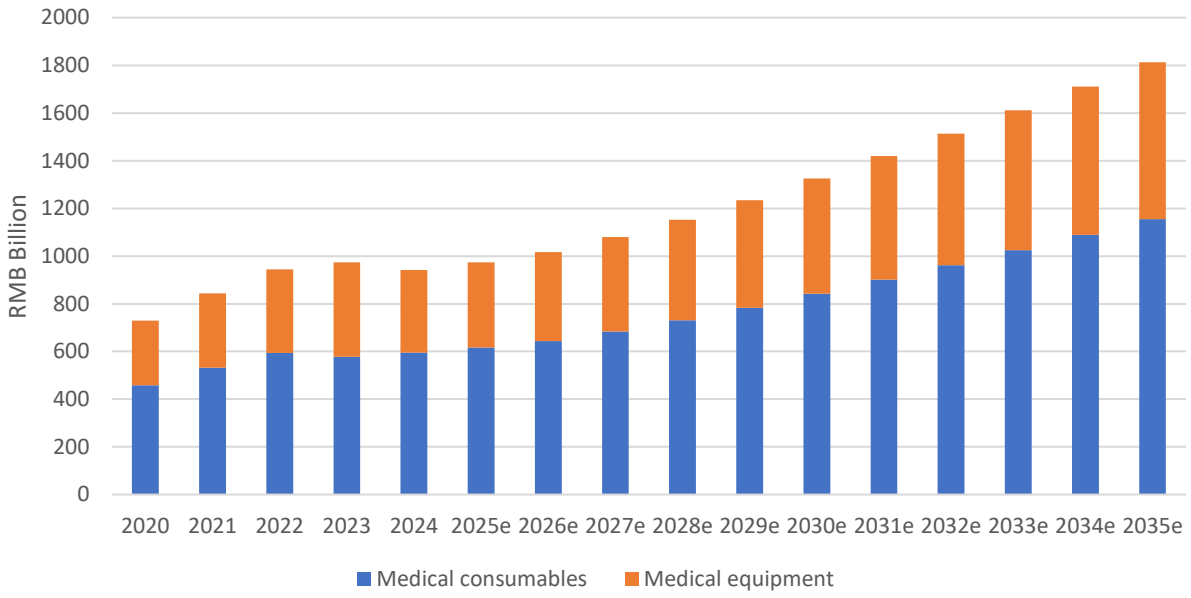
Moreover, the role of AI is gaining traction in European medical technology. According to a MedTech Europe study,[89] AI could save 400,000 lives every year, reduce healthcare expenses by 200 billion euros, and free up 1.8 billion working hours. However, data governance, cybersecurity, and trust issues related to AI are crucial. Nowadays, medical device makers targeting the EU market must comply not only with EU MDR and In Vitro Diagnostics Regulation (IVDR), but also with the EU AI Act.

Last but not least, the Corporate Sustainability Report Directive (CSRD) requires all companies selling their goods in the EU market to report carbon emissions and green practices.[90] Medical device makers should pay attention not only to cost effectiveness and product innovation, but also to the sustainability of their supply chains.

1.3 China

China's medical device market has achieved steady growth due to innovative technology advancement, a rising aging population, and increases in chronic diseases. According to Frost & Sullivan, the market size of China's medical device industry jumped from RMB 730 billion in 2020 to RMB 942 billion in 2024, with a CAGR at 6.6%. The market size is projected to further increase to RMB 1.8 trillion in 2035 (See Figure 5).

Figure 5: Market size of China's medical device market



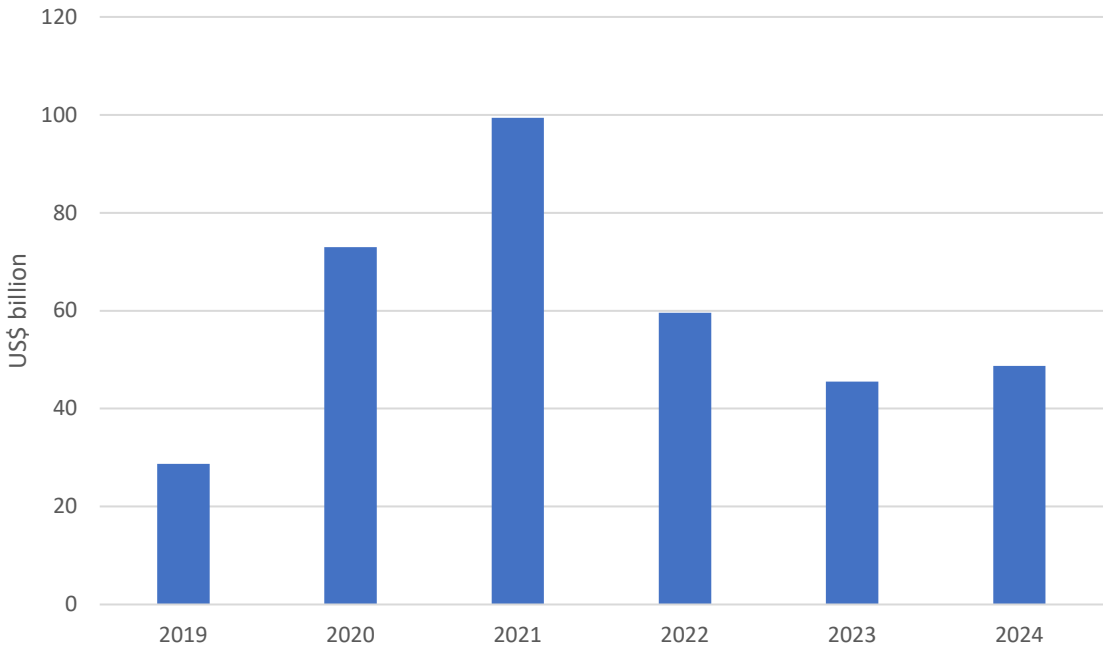
Source: Frost & Sullivan

89 MedTech Europe. 'Towards an EU Single Market Strategy: Reinforcing the EU Single Market for Innovation, Health Resilience and Competitiveness.' 2025. https://www.medtecheurope.org/wp-content/uploads/2025/02/250131_medtech-europe_single-market-strategy_final.pdf

90 Kuman, Prashant. 'Optimising the Supply Chain in the Medical Device Industry.' May 15, 2025. https://performansc.com/news/optimising-the-supply-chain-in-the-medical-device-industry/

Chinese medical device companies have long been traditional original equipment manufacturers (OEMs) and secured significant global and domestic market shares in low- and mid-end medical segments. With strong overseas demand, China has become one of the major exporters of medical devices. Exports of medical devices from China valued at US$28.7 billion prior to the pandemic in 2019 and surged to US$73 billion and US$99.4 billion during the pandemic in 2020 and 2021, respectively. In 2024, the export value of medical devices amounted to US$48.8 billion (See Figure 6).[91]

Figure 6: Export value of medical devices from China



Source: Frost & Sullivan

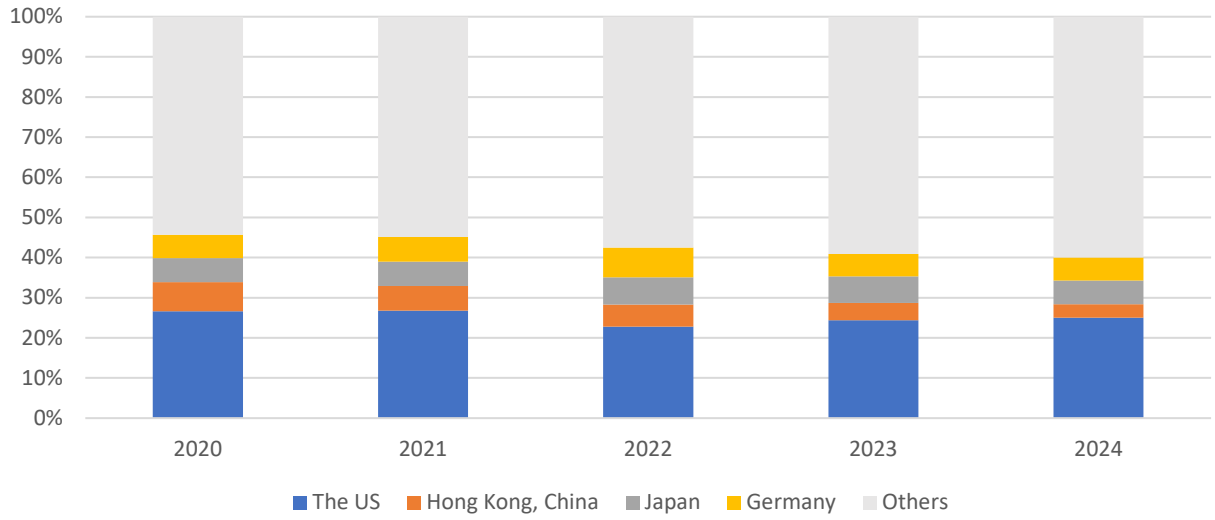
In 2024, the US was the largest export destination of China's medical devices, accounting for 25%, followed by Japan (5.9%), Germany (5.7%), and Hong Kong, China (3.4%) (See Figure 7).[92] Chinese medical device manufacturers are also proactively expanding their business network to various emerging markets, such as Southeast Asia, Africa, and the Middle East. In terms of export categories, medical equipment, medical consumables, and IVD testers are the major items from China in 2024 (See Figure 8).[93]

91 Frost & Sullivan. 2025 Zhōngguó yīliáo qìxiè chūhǎi xiànzhuàng yǔ qūshì lán píshū 2025 中国医疗器械出海现状与趋势蓝皮书. [2025 Blue Book on the Current Status and Trends on Going Global of China's Medical Devices]. June 11, 2025. https://www.frostchina.com/content/insight/detail/6847c95a963422c0528beaab

92 Frost & Sullivan. 2025 Zhōngguó yīliáo qìxiè chūhǎi xiànzhuàng yǔ qūshì lán píshū 2025 中国医疗器械出海现状与趋势蓝皮书. [2025 Blue Book on the Current Status and Trends on Going Global of China's Medical Devices]. June 11, 2025. https://www.frostchina.com/content/insight/detail/6847c95a963422c0528beaab

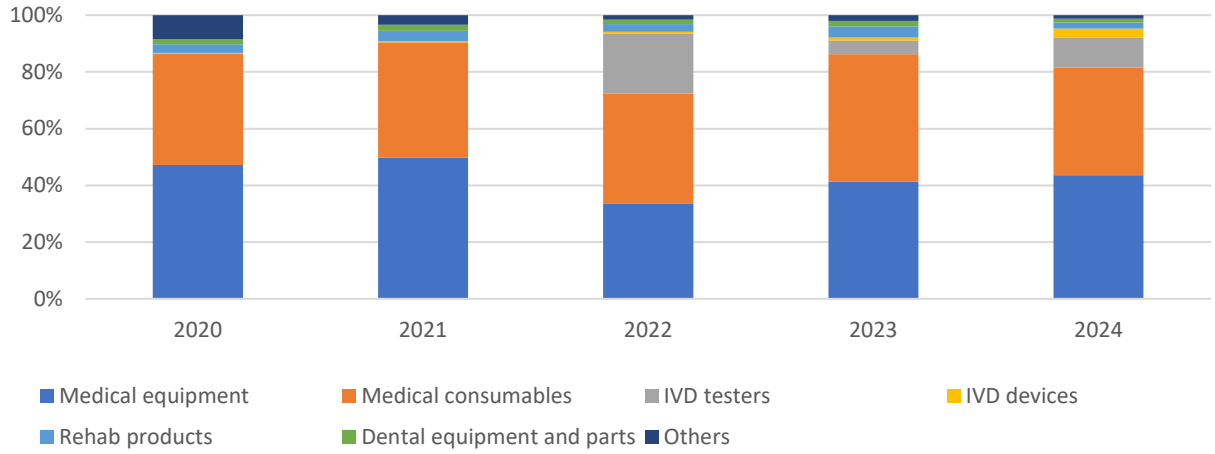
93 Frost & Sullivan. 2025 Zhōngguó yīliáo qìxiè chūhǎi xiànzhuàng yǔ qūshì lán píshū 2025 中国医疗器械出海现状与趋势蓝皮书. [2025 Blue Book on the Current Status and Trends on Going Global of China's Medical Devices]. June 11, 2025. https://www.frostchina.com/content/insight/detail/6847c95a963422c0528beaab

Figure 7: Major export destinations of China's medical devices



Source: Frost & Sullivan

Figure 8: Major exports of medical devices from China, by product category



Source: Frost & Sullivan

Recently, China's medical device companies have been keen on upgrading their product portfolios and expanding their global market footprints. With government support, medical device companies have invested in R&D to improve their product quality, produce innovative high-end devices, climb up the global medical value chain, and comply with stringent international regulatory requirements (See also Section VI).

At the same time, China's medical device companies have also accelerated their development in domestic medical markets to mitigate headwinds led by global geopolitical tensions, stringent overseas regulatory requirements, and complex procurement procedures of overseas hospitals. In addition, China's healthcare institutions still rely on imports of high-end medical devices from overseas manufacturers, reflecting huge domestic market potential. The localization rates of MRI and CT scanning machines in China were less than

30% (See Table 9).[94] Local medical device companies are keen on upgrading high-end supplies for the domestic market.

Table 9: Percentage of made-in-China devices used in China

Low-value consumables		**Medical equipment**	
Wound care materials	90%	Ventilator	35%
Infusion set	90%	Ultrasound	30%
		CT scanner	25%
High-value consumables		MRI	10%
Vascular	80%	Radiotherapy	10%
Trauma	67%	In vitro diagnostics	
Spine	40%	Biochemical tools	80%
Artificial lens	20%	Microorganism identification	30%
Blood purification	20%	Molecular assay	30%
		Vaccination	30%

Source: National Innovation Centre for Advanced Medical Devices. (2023)

To support domestic medical device companies and promote the use of domestically manufactured products, the Chinese government initiatives such as 'Made in China 2025' and the 14th Five-Year Plan emphasized localization strategies. Government schemes like 'In China for China' and 'In China for Global' highlight China's commitments to support medical device manufacturing for both local and international markets. Domestic medical device manufacturers can apply for grant and loan support from the Innovative Medical Device Assessment office, particularly for segments like diagnostic imaging and cardiovascular implants. Reimbursement reforms, hospital centralized procurement schemes, device trade-in programs, and standardized tendering processes also help boost demand for domestic medical devices.[95]

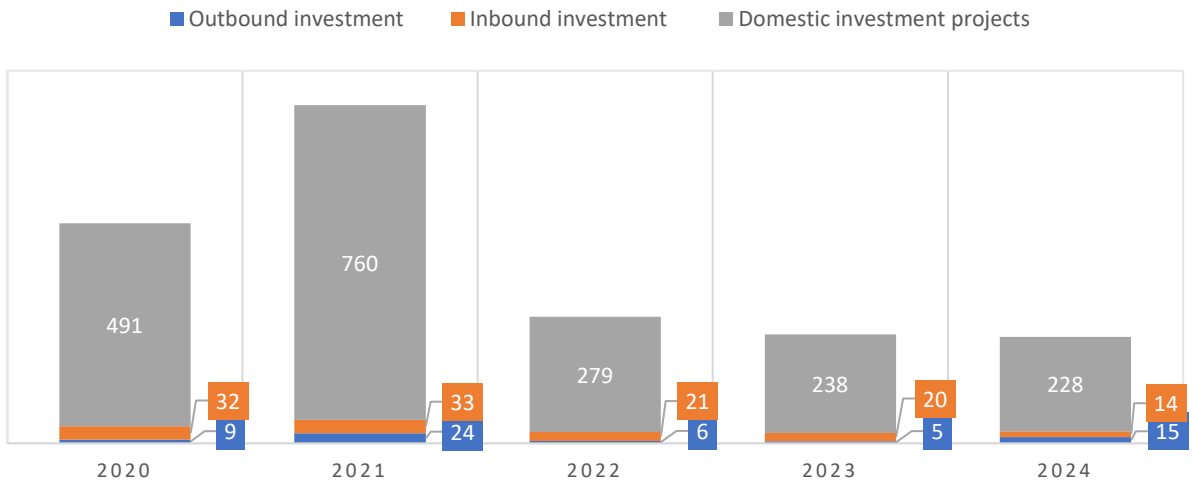
94 National Innovation Centre for Advanced Medical Devices. Quánqiú dì èr, wànyì guīmó de Zhōngguó yīliáo qìxiè chǎnyè rúhé jiāsù guóchǎn tìdài, chōngjī quánqiú chuàngxīn gāodì 全球第二，万亿规模的中国医疗器械产业如何加速国产替代，冲击全球创新高地. [How can China's trillion-yuan medical device industry, the world's second largest, accelerate domestic substitution and strive to become a global innovation leader]. July 4, 2023. https://nmed.org.cn/Content/xwzx/xw/2023-07/146905.html

95 Campbell, Ivor, and Snedden Campbell. 'China in the Global Medtech Industry: Equal Parts Promising and Uncertain.' MedDevice Online, May 1, 2024. https://www.meddeviceonline.com/doc/china-in-the-global-medtech-industry-equal-parts-promising-and-uncertain-0001

Moreover, the National Medical Products Administration (NMPA) released the 'Announcement on optimizing whole-life-cycle regulation to support innovative development of high-end medical devices' in July 2025.[96] The announcement highlights the government support for developing four major innovative categories in medical technology: surgical robots, advanced medical imaging equipment, AI-powered diagnostic systems, and novel biomaterials. It is observed that the technological-driven capabilities of China's medical device makers for making high-end equipment are improving.

The booming medical device market in China presents investment opportunities for both local and international medical device manufacturers. According to a KPMG report, there were 14 inbound investment deals in China's healthcare sector in 2024 (See Figure 9). The US was the largest investor, accounting for 36.7% of total number of deals, followed by Singapore, the UK, Japan, France, and Switzerland.[97] It is worth noting that many global investors are establishing their operations in China not only for their manufacturing capabilities and massive domestic market demand, but also for R&D potential. For instance, in early 2025, GE Healthcare established its Precision Medicine Localization Practice Base in Chengdu, aiming at expanding its high-end medical production in China through supply chain localization. In the same year, Siemens commenced a new R&D and manufacturing project in Shenzhen. The high-end medical equipment production base is anticipated to start operations by the end of 2027.[98]

Figure 9: Number of investment deals related to China's healthcare sector



Source: KPMG (2025)

96 Interesse, Giulia. 'China's Strategy for Advancing High-End Medical Devices in 2025.' China Briefing. July 22, 2025. https://www.china-briefing.com/news/china-strategy-for-advancing-high-end-medical-devices-in-2025/

97 KPMG. China life sciences sector overview and outlook. April 2025. https://assets.kpmg.com/content/dam/kpmg/cn/pdf/en/2025/04/china-life-sciences-sector-overview-and-outlook.pdf

98 China Association for Medical Devices Industry. 'Foreign medical device enterprises usher in a major boon.' February 21, 2025. http://en.camdi.cn/news/5180

However, due to global geopolitical headwind in 2025, many multinational companies and global investors are still cautiously evaluating their China strategies on whether pursue divestments or increase investments.

In short, the Chinese government has initiated reforms to revamp the nation's medical system and developing domestic and international markets. With the government support, it is foreseeable that Chinese high-end medical device makers will advance up the value chain, competing not only in the budget and mid-value medical device segments, but also in the domestic and global high-end medical device markets in the long term.

2. Emerging production bases

2.1 India

In 2024, the revenue generated by India's medical device market accounted for 1.3% of the total revenue of the worldwide medical device market. The projected contribution by the country to the world in 2030 will slightly increase to 1.5%, according to Statista.[99] However, the projected CAGR of the revenue generated by the country from 2024 to 2030 will be 9%, ahead of that in China, the US, and other counterparts worldwide (see also Table 2). During the period of April and October 2024, India's exports of optical, medical, and surgical instruments reached US$2.3 billion, up by 5.7% yoy.[100]

Traditionally, the development of India's domestic medical market has lagged other countries. Compared with the global average of per capita medical device spending at US$47, India was as low as US$3.[101] Approximately 85% of the medical devices consumed in India are imported from other countries. The sector is mainly dominated by foreign medical device giants (See Table 10). Domestic medical device manufacturers focus on producing low cost, low technology medical consumables and disposables. About 65% of them target local demand, with limited export capability.

Table 10: Major companies of medical equipment in India

Company	Headquarters	Major Product Categories
India Medtronic Pvt. Ltd.	US	Cardiac devices (pacemakers, heart valves), neurostimulation systems, and minimally invasive surgical tools.
Johnson & Johnson Pvt. Ltd.	US	Surgery, orthopedics, and cardiology

99 Statista. 'Medical Technology - Worldwide.' Statista Market Forecast. Accessed July 30, 2025. https://www.statista.com/outlook/hmo/medical-technology/worldwide.

100 Rao, Archana. 'India's Medical Devices Industry: Investor Outlook'. India Briefing, January 10, 2025. https://www.india-briefing.com/news/indias-medical-devices-industry-investor-outlook-35779.html

101 Centre for Market Research and Social Development. Survey of medical devices clusters. 2023. https://pharma-dept.gov.in/sites/default/files/Final%20Report-Survey%20of%20Medical%20Devices%20Clusters.pdf

Abbott India Limited	US	Diagnostics (blood glucose monitors, immunoassays), diabetes management, and cardiovascular care.
Siemens Healthcare Pvt. Ltd.	Germany	Advanced imaging technologies (X-ray, CT, MRI), laboratory diagnostics, and cancer care solutions
GE Healthcare Pvt. Ltd.	US	Imaging, patient monitoring, and ultrasound.
DHR Holding India Pvt. Ltd.	India	Blood glucose monitors, dental tools, and clinical instruments.
3M India Ltd.	US	Surgical drapes, sterilization wraps, and wound care dressings
Baxter India Pvt. Ltd.	US	Infusion pumps and dialysis machines, devices for critical care, renal care, and surgical needs
Stryker India Pvt. Ltd.	US	Orthopedic implants, endoscopy equipment, and navigation systems
B. Braun Medical India Pvt. Ltd.	US	Infusion systems, catheters, and dialysis equipment

Source: India Briefing (2025) and the Internet

Alerted by the COVID-19 disruption and growing demand for healthcare services, local conglomerates in traditional industries, such as automobiles, electronics, and textiles, have tapped into the medical device sector. The strategic move enhances the R&D and production capabilities of the Indian medical device industry.

More importantly, the Indian government has promulgated various strategic initiatives, such as the Production-Linked Incentive (PLI) Scheme and the Medical Devices Parks Scheme to catalyze the development of the medical device industry.

In 2023, there were 21 medical device clusters across nine states in India, targeted at fostering local manufacturing capabilities and driving down production costs.[102] According to a survey conducted by the Centre for Market Research and Social Development (CMRSD) in 2023,[103] 736 medical device companies were situated in the 21 clusters, of which 126 were export-oriented and shipped their products to major destinations, such as the US, Germany, China, France, Singapore, and UAE.

102 Rao, Archana. 'India's Medical Devices Industry: Investor Outlook.' India Briefing, January 10, 2025. https://www.india-briefing.com/news/indias-medical-devices-industry-investor-outlook-35779.html

103 Centre for Market Research and Social Development. Survey of medical devices clusters. 2023. https://pharma-dept.gov.in/sites/default/files/Final%20Report-Survey%20of%20Medical%20Devices%20Clusters.pdf

To further enhance medical infrastructure and attract investment, local governments have announced plans on establishing more medical device parks. For instance,

- The Uttar Pradesh state government announced in July 2021 an investment of nearly US$59 million in a medical device park. By May 2023, 59 companies have been awarded slots for setting up their businesses in the upcoming medical device park.
- The Himachal Pradesh state government announced in July 2024 a plan to develop a medical device park in Nalagarh, Solan district, with an investment of around US$350 million.

Also, wholly-owned foreign direct investment (FDI) projects in the medical device sector are allowed by the Indian government.[104] During April 2000 to March 2025, the cumulative FDI equity inflow into the drugs, pharmaceuticals, and medical and surgical appliances in India was over US$27.3 billion, accounting for 3.7% of total FDI equity inflow.[105]

2.2 Singapore

In recent years, the Southeast Asian medical device market has been experiencing significant growth, due to a rise in middle-class population, increasing spending in healthcare, an improvement in local medical insurance coverage, popularity of medical tourism, strong regulatory supports, and the emergence of advanced medical technologies. On one hand, most of the Southeast Asian countries rely on medical supplies from overseas. On the other hand, due to diverse stages of economic development, unique market demands, and different demographic mixes, the development of medical device sectors among these countries varies.

Singapore is the leading medical and healthcare hub in Southeast Asia, offering outstanding medical and treatment services to its neighbours in Malaysia, Brunei, Thailand, and the Philippines, and other patients around the world. It also serves as a regional gateway for global medical device companies and startups to enter the Southeast Asian market.[106]

- According to Statista,[107] the largest medical device brand in Singapore in 2022 was Medtronic with a market share of 9%, followed by Becton Dickinson (8%), Johnson & Johnson (6%), Siemens Healthineers (6%), and Danaher (5%).
- Among the top 50 healthtech start-up companies in the region in 2023, 66% were from Singapore, with a medical start-up funding value at US$43 million.

104 Centre for Market Research and Social Development. Survey of medical devices clusters. 2023. https://pharma-dept.gov.in/sites/default/files/Final%20Report-Survey%20of%20Medical%20Devices%20Clusters.pdf

105 Department for Promotion of Industry and Internal Trade. Government of India. Accessed August 7, 2025. https://dpiit.gov.in/publications/fdi-statistics

106 Source of Asia. 'Med-tech market in Southeast Asia 2025-2026.' March 6, 2025. https://www.sourceofasia.com/med-tech-market-in-southeast-asia-2025-2026/

107 Statista. 'Medtech industry in Singapore.' Accessed July 30, 2025. https://www.statista.com/study/168674/medtech-industry-in-singapore/

- The value of M&A deals in healthcare sector of the country was US$0.5 billion in 2023 and jumped to US$1.1 billion in January to April 2024.

Though the country leads in medical R&D, over 85% of medical devices used in Singapore are imported, including high-value medical equipment, such as CT scanners, MRI scanners, and radiotherapy equipment. In terms of import origins, in 2022, the US was the largest exporter of medical devices to Singapore, accounting for 39% of Singapore's total imports of medical devices, followed by Japan (17%), Germany (7%), the Netherlands (5%), and China (2%).[108] In 2023, exports of medical and surgical instruments from Singapore were US$3.1 billion.[109] The largest export destination was the US, accounting for 21% of total exports of medical and surgical instruments from Singapore. South Korea, India, and China were also the major export markets of Singapore, each accounting for roughly 8% of the total export value.

Box 6: LifeSync Robotics, a Singapore-based surgical solution service provider eyes the ASEAN market[110]

Envisioning growing demand for spinal and joint replacement surgeries due to aging issues in Asia, LifeSync Robotics, established in 2024, offers a wide range of human-machine surgical solutions for the ASEAN market. The Singapore-based startup aims toprovide safe, assessible and AI-enabled medical options to Asian patients and transform the future surgical landscape.

The company collaborates with co11ab Novena, the first biomedical technology incubator in Singapore, and established a demonstration unit at NTU's Lee Kong Chian School of Medicine Novena campus in early 2025. By showcasing its product capabilities at the medical research hub, LifeSync Robotics has achieved positive feedback from healthcare professionals, potential investors, and collaborators across Asia.

Their flagship robotic device, Asclepius, supports major orthopedic surgeries and minimally invasive procedures, featuring AI-powered preoperative planning, force feedback, and sub-millimeter precision. Asclepius is also compatible with existing hospital infrastructure, such as MRI, CT, and fluoroscopy systems, minimizing extra installation costs and reducing unnecessary waste of resources. The device is expected to obtain medical device regulatory approvals in Singapore, Thailand, and Malaysia by 2026.

108 Witmed. Zuì jiā yīliáo guójiā——Xīnjiāpō yīliáo qìxiè shìchǎng jiěxī 最佳医疗国家——新加坡医疗器械市场解析 [The Best Medical Country—An Analysis of Singapore's Medical Device Market]. March 31, 2023. http://www.cn-witmed.com/list/9/5766.html

109 Statista. 'Medtech industry in Singapore.' Accessed July 30, 2025. https://www.statista.com/study/168674/medtech-industry-in-singapore/

110 LifeSync Robotics. Company website. Accessed July 30, 2025. https://www.lifesyncrobotics.com/

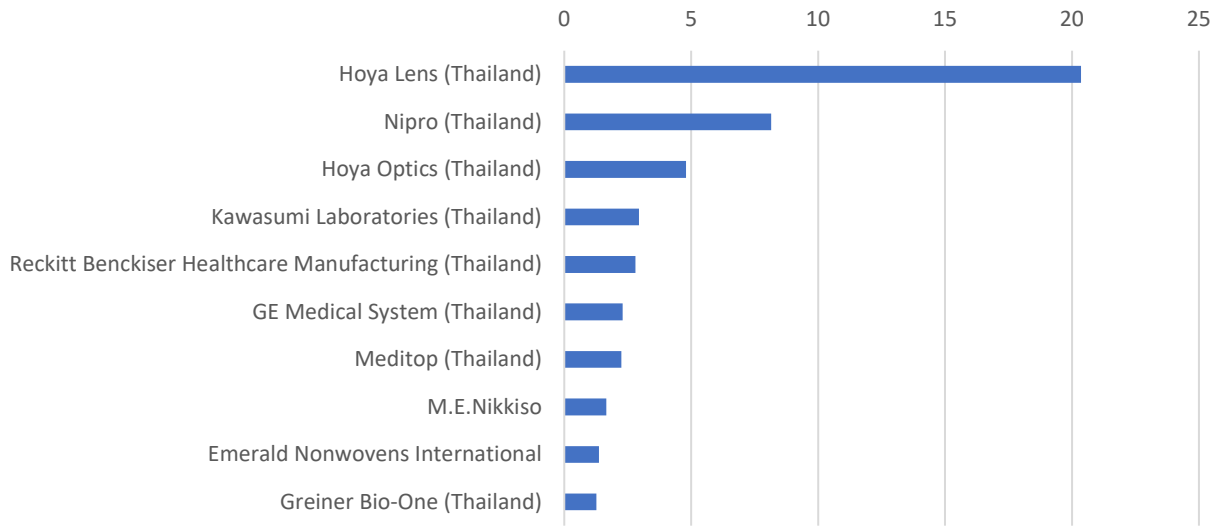
2.3 Thailand

Thailand is known for its strong manufacturing capabilities for medical devices and being one of the top destinations for medical tourism in Asia. The Thai government proactively promotes the country to become a regional medical hub by 2026, which will boost demand for advanced medical equipment, serving global medical tourists.[111]

The Thai government also envisions the country being developed as an ASEAN medical equipment manufacturing base. With the government's support for medical R&D, advanced medical technologies and AI-enabled healthcare solutions are developing in Thailand.

According to Statista,[112] in 2022, both micro-sized device makers and small-sized manufacturers in Thailand each accounted for roughly 47% of the total business volume. Approximately 4% of medical device manufacturers were medium-sized businesses. The remaining 2% were large-sized companies, including multinational corporations, contributing 89% of total medical device revenue to the country (See Figure 10). The major types of medical exports from Thailand are infusion or transfusion sets, optical lenses, and other medical devices, with over 80% for single use. The major export destinations were the US (22% of total exports), Japan (10%), the Netherlands (7%), and China (7%). On the other hand, the country imports high-value medical equipment from the US, Germany, and Japan.

Figure 10 Major medical device makers in Thailand in 2022, by revenue (in billion Thai Baht)



Source: Statista (2024)

111 Qualtech. 'Thailand: where healthcare meets tourism.' June 3, 2025. https://www.qualtechs.com/en-gb/article/thailand-medical-tourism-device-market-2024

112 Statista. 'Medical device industry in Thailand.' Accessed July 30, 2025. https://www.statista.com/study/90252/medical-device-industry-in-thailand/

Box 7: ML algorithms for medical implant design

Meticuly,[113] a medtech startup based in Thailand, creates tailor-made implants based on each patient's anatomy by using Machine Learning (ML) and 3D printing technologies.

Standard implant designs often fail to perfectly fit each patient's unique anatomical differences. Patients always find that the standardized implants are unfit for their bodies, while waiting for custom-made implants lengthen the healing period, with increasing risk and costs.

To address this issue, Meticuly uses ML algorithms to analyse the patient's bone structure and generate a bespoke implant design. The company then uses 3D printing to produce the implant, which is ready for surgery within two to seven days.

The entire AI analytic process helps surgeons and healthcare providers better understand each patient's needs and provide customized treatment. The AI-powered customized implants benefit patients by providing more comfortable recovery journeys.

Currently, Meticuly has expanded its market from Thailand to the entire Southeast Asian region. The company has also secured various medical approvals from the US, the UK and the EU.

2.4 Malaysia

There is a strong growth momentum in the medical device market in Malaysia, driven by a rising aging population, increased global demand for medical devices, and the government's support for medical device manufacturing and medical tourism. According to the Malaysian Healthcare Industry Action Plan 2021-2025, the country pursued a goal of becoming a top global destination for medical tourism, generating a revenue target of RM2.4 billion by 2024. In 2024, Malaysia achieved remarkable success by attracting more than 1.5 million worldwide visitors for medical treatments and generating a revenue of over RM2.7 billion, meeting the government's target.[114] Most of the medical tourists came from Indonesia, followed by China and India.[115]

Malaysia is another Southeast Asian country with robust manufacturing capabilities for medical devices, competing with Singapore and Thailand to be the regional healthcare hub. In 2023, exports of medical or surgical instruments from Malaysia were US$2.4 billion.

113 Y Consulting. 'Meticuly: Revolutionizing the Future of Medical Implants with AI and 3D Printing.' Medium. August 26, 2024. https://y-consulting.medium.com/meticuly-revolutionizing-the-future-of-medical-implants-with-ai-and-3d-printing-248d4974a7f7

114 Statista. 'Number of people who travelled to Malaysia for healthcare from 2015 to 2024'. https://www.statista.com/statistics/1013809/medical-tourists-numbers-malaysia/ & 'Revenue from medical tourism in Malaysia from 2015 to 2024'. https://www.statista.com/statistics/1013817/medical-tourism-revenue-malaysia/ Accessed November 18, 2025.

115 Fuchen Group 輔臣集團. RCEP dōngfēng jìng chuī! Mǎláixīyà chéng yīliáo chūhǎi dōngnányà 'huángjīn tiàobǎn,' zhè 3 dà jīyù yǔ 4 gè kēng bì kàn! RCEP 东风劲吹！马来西亚成医疗出海东南亚「黄金跳板」，这 3 大机遇与 4 个坑必看！[RCEP Winds Propel Malaysia as Southeast Asia's Golden Gateway for Medical Device Exports: 3 Key Opportunities and 4 Pitfalls to Watch] April 16, 2025. https://mp.weixin.qq.com/s/VyJY5j4OVtEwUMNo0rN9eA

Medical consumables were the major export categories, including medical gloves and catheters, surgical instruments, implants and clinical devices. Major export markets included the US, Germany, Belgium, Singapore, and Japan. Although medical exports from Malaysia are well-received by overseas markets, the country still heavily relies on the imports of high-value medical devices from overseas countries, such as the US, China, Singapore, Germany, and Japan.[116]

In 2023, Malaysia launched the New Industrial Master Plan 2030 and highlighted the medical device industry as one of the five priority sectors, aiming to advance the position of the medical device industry in the global value chain.[117] The plan encourages the medical device industry to adopt advanced technology for product development and promote exports. In addition, the Malaysian government provides incentives to attract foreign investment, including tax exemptions such as Pioneer Status and Investment Tax Allowances, with additional incentives available at specialized industrial zones like Kulim Hi-Tech Park[118]. Reputable multinational companies like Abbott and B-Braun have established manufacturing bases in Malaysia—Abbott produces cardiac rhythm management devices including pacemakers and implantable cardioverter defibrillators in Penang, while B-Braun manufactures intravenous catheters, pharmaceutical solutions, surgical instruments, and hypodermic needles at one of its largest global facilities, also located in Penang.[119]

2.5 Indonesia

Medical infrastructure in Indonesia is relatively underdeveloped. During the COVID-19 period, over 90% of medical equipment was imported,[120] highlighting the country's heavy reliance on foreign medical supplies. In addition, over 2 million Indonesians travel abroad for medical treatments each year, significantly boosting the medical tourism sectors of

116 Statista. 'Medical technology in the Asia-Pacific Region.' Accessed July 30, 2025. https://www.statista.com/study/167485/medical-technology-in-the-asia-pacific-region/ & Ministry of Investment, Trade and Industry. 'New Industrial Master Plan 2030: Medical Devices Industry.' 2023. https://www.nimp2030.gov.my/nimp2030/modules_resources/bookshelf/e-05-Sectoral_NIMP-Medical_Devices_Industry/index.html

117 Ministry of Investment, Trade and Industry. 'New Industrial Master Plan 2030: Medical Devices Industry.' 2023. https://www.nimp2030.gov.my/nimp2030/modules_resources/bookshelf/e-05-Sectoral_NIMP-Medical_Devices_Industry/index.html

118 Medina, Ayman Falak. 'Maximizing Malaysia's tax and investment incentives: What foreign investors should know.' ASEAN Briefing. August 19, 2025. https://www.aseanbriefing.com/news/maximizing-malaysias-tax-and-investment-incentives-what-foreign-investors-should-know/ & Lee, Esther. 'Kulim hi-tech park eyes expansion, doubling its area to 12,000 acres.' The Edge Malaysia. November 13, 2024. https://theedgemalaysia.com/node/732625

119 Malaysian Investment Development Authority. 'Abbott's state-of-the-art manufacturing facility for cardiac devices in Penang.' & 'B. Braun expands its global test centre for medical devices in Penang, proving Malaysia's capabilities in scientific measurement.' Accessed December 1, 2025. https://www.mida.gov.my/abbotts-state-of-the-art-manufacturing-facility-for-cardiac-devices-in-penang/ & https://www.mida.gov.my/media-release/b-braun-expands-its-global-test-centre-for-medical-devices-in-penang-proving-malaysias-capabilities-in-scientific-measurement/

120 Santoso, Shirley and Sanath Balasubramanyam. 'The time is now: a wake-up call to Indonesia's healthcare system.' Kearney Analysis. 2020. https://www.kearney.com/documents/291362523/291368967/The-time-is-now-a-wake-up-call-to-indonesia-healthcare-system.pdf/39aaa019-4c61-3465-ffe5-ee19965190fe?t=1608450230000

neighbouring countries.[121] These factors reveal substantial market potential of Indonesia's domestic healthcare sector.

Government initiatives aim to modernize healthcare infrastructure, reduce outflows of medical tourists, and stimulate local production and access to advanced medical technologies. The Omnibus Health Law and its implementing regulations, including Government Regulation No. 28 of 2024, clarify foreign ownership limits and capital requirements for healthcare investments in Indonesia. The Positive Investment List prioritizes healthcare, allowing up to 100% foreign ownership in hospitals, specialized clinics, and medical device manufacturing, subject to minimum bed requirements for foreign-owned hospitals and other regulatory standards. These reforms collectively foster a more foreign-investor-friendly environment in Indonesia's healthcare sector.[122] Currently, many multinational device manufacturers, such as Siemens Healthineers, Philips, and GE Healthcare, have set up their offices in Indonesia, especially around major cities including Jakarta, Surabaya and Bandung, where major advanced healthcare and high-end diagnostic centres are located.

According to Statista,[123] the local production value of medical equipment in Indonesia in 2023 was estimated at US$2.8 billion, while the import value of medical equipment to Indonesia in 2023 was estimated at US$2.0 billion. In 2024, medical consumables and disposables are the major medical device categories made in Indonesia, accounting for 35% of the total market share, followed by patient monitoring devices (25%), diagnostic imaging devices (20%), and surgical instruments (12%).[124]

2.6 Mexico

Mexico, as a nearshoring production base for the US market, has obtained a reputation for upholding high-quality standards in medical device manufacturing. With the US-Mexico-Canada Agreement (USMCA) trade agreement, effective since July 2020, Mexico's medical device sector has grown steadily, as medical equipment is one of the duty-free items entering the US. Many US medical giants have set up their operations in Mexico. Among the

121 36Kr Global 36 氪出海. Jiěmǎ, Yìnní yīliáo tóuzī xīn jīyù: Zhèngcè hónglì xià de běndì huà cèlüè 解码印尼医疗投资新机遇：政策红利下的本地化策略. [Decoding New Opportunities for Healthcare Investment in Indonesia: Localization Strategies Under Policy Dividends]. June 5, 2025. https://mp.weixin.qq.com/s/mObMC08UUrio6y-uB9SBDA

122 AFH. 'Setting up a foreign-owned hospital in Indonesia – Licensing and ownership rules.' November 2, 2025. https://mapresourcesindonesia.com/setting-up-a-foreign-owned-hospital-in-indonesia-licensing-and-ownership-rules/ & ASEAN Briefing. 'Doing Business in Indonesia.' Accessed December 1, 2025. https://www.aseanbriefing.com/doing-business-guide/indonesia/sector-insights/new-regulation-opens-up-foreign-investment-opportunities-in-indonesia-s-hospital-sector

123 Statista. 'Medical device industry in Indonesia.' Accessed July 30, 2025. https://www.statista.com/study/140598/medical-device-industry-in-indonesia/

124 Nexdigm. Indonesia medical device market outlook 2030. July 2025. https://www.nexdigm.com/market-research/report-store/indonesia-medical-devices-market-report/

top ten exporters of Mexico's medical equipment sector, the majority was originated from the US and set up manufacturing bases and operation centres in Mexico (See Table 11).[125]

Table 11: Major exporting companies of medical equipment in Mexico

Company	Origination (Mother company)	% share of total exports of medical equipment in 2024
Medline Mexico	US-based (Medline)	9.4%
Cordis Mexico	US-based (Cordis)	5.8%
Availmed	Mexico-based	5.6%
Convertors de Mexico	Mexico-based	4.9%
Critikon de Mexico	US-based (GE Healthcare)	4.5%
Medtronic Mexico	US-based (Medtronic)	3.7%
Becton Dickinson Mexico	The US-based (Becton Dickinson)	3.0%
NPA de Mexico	US-based (Jabil)	2.8%
Intuitive Surgical Mexico	US-based (Intuitive Surgical)	2.5%
Bard Reynosa	US-based (Bard, acquired by Becton Dickinson)	2.3%
Others	-	55.5%

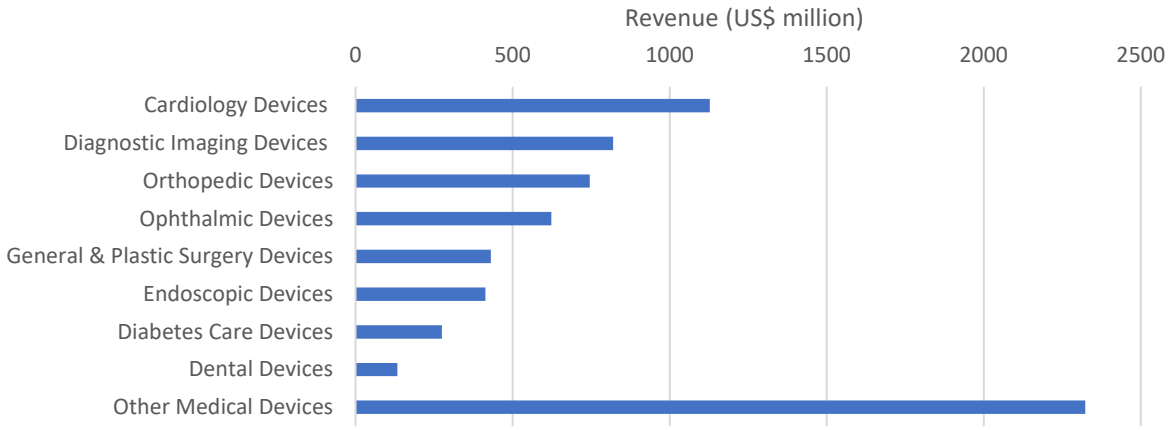
Source: Statista (2025) and the Internet

In 2023, the number of establishments in Mexico's medical equipment industry was 116. The number of employees in this sector exceeded 150,000 starting in 2021 and reached 156,147 in 2023. The gross production value generated by medical equipment increased consistently over the years and exceeded 100 billion Mexican pesos in 2023.[126]

Among all medical devices made in Mexico in 2023, revenue of cardiology devices was US$1.1 billion, accounting for 16.4% of the total revenue, followed by diagnostic imaging devices (11.9%) and orthopedic devices (10.8%) (See Figure 11).

125 Statista. 'Distribution of exporting companies of medical equipment in Mexico as of 2024, by share of total exports.' Accessed September 9, 2025. https://www.statista.com/statistics/1560886/share-total-exports-of-medical-equipment-exporting-companies-mexico/
126 Statista. 'Medical technology in Mexico.' 2025. https://www.statista.com/study/167326/medical-technology-in-mexico/

Figure 11: Revenue of medical devices in Mexico in 2023, by product category



Source: Statista (2025)

In terms of international trade, the country exported around US$12 billion of health equipment in 2023, more than double the health equipment exports of US$5.8 billion in 2014.[127] Mexico stands out as a net exporter of medical devices. Regarding export destinations, the US accounted for roughly 95% of total exports of Mexico's health equipment in 2023, according to Statista (See Table 12).

Table 12: Trade value of health equipment in Mexico in 2023, by origin/destination (US$ million)

Origin	Import value
US	3,007
Chinese Mainland	368
Germany	220
Japan	115
Malaysia	80
Taiwan, China	76
Others	826

Destination	Export value
US	12,190
Chinese Mainland	173
Netherlands	111
Ireland	110
France	91
Others	164

Source: Statista (2025)

127 Statista. 'Exports of health equipment from Mexico from 2014 to 2023.' Accessed September 9, 2025. https://www.statista.com/statistics/999576/mexico-health-equipment-export-value/

However, after enjoying zero tariffs for a couple of years, US President Trump announced on 1 February 2025 a plan to impose a 25% additional tariff on imports coming from Mexico.[128] Subsequently, a series of tariff negotiations and threats between the two countries ensued. On 31 July 2025, Trump announced a 90-day extension of the existing tariff arrangement with Mexico. Medical device imports from Mexico complied with the USMCA continue to be exempt from increased tariffs.[129] The extension was subsequently prolonged beyond the initial 31 October deadline as negotiations continue. The ongoing trade uncertainties and tariff threats are prompting manufacturers to review their location strategies, considering either diversification or reshoring to the US.

2.7 Central America and Caribbean

In 2024, three American countries ranked among the top ten suppliers of medical instruments to the US, with Mexico ranking first on the list (See Figure 3). Costa Rica was the third-largest supplier with an import value at US$4.2 billion, and the Dominican Republic ranked seventh at US$1.7 billion. This reflects that nearshoring production bases play an important role in the US medical device market, driven by geographic proximity, competitive costs, and favourable trade agreements.

Regional proximity of Central America and Caribbean countries to the US enables quicker response times to market demand, reduces inventory costs, and supports just-in-time manufacturing. Over the years, many international medical device makers have established their businesses in these nearby countries, which offer sufficient skilled labour (See Table 13).

More importantly, these countries have established favourable trade agreements with the US. For instance, under the Dominican Republic–Central America-United States Free Trade Agreement (CAFTA-DR), Costa Rica and the Dominican Republic have strong trade and investment ties with the US.[130] Although President Trump's tariff policy in 2025 has had some negative impacts on CAFTA-DR countries, the FTA still provides certain trade protections and commercial advantages to the member states, compared with non-FTA member countries around the world.[131]

Besides, Puerto Rico is a US territory, providing it with preferential trade access to the US market and FDA regulatory alignment. Unlike other independent foreign countries, Puerto

128 Garcia, David Alire and Ana Isabel Martinez. 'Mexico vows retaliation to Trump tariffs without detailing targets.' February 3, 2025. https://www.reuters.com/world/americas/mexican-president-orders-retaliatory-tariffs-against-us-2025-02-02/

129 Neuffer, Philip. 'US, Mexico agree to extend USMCA-tariff pause.' August 1, 2025. https://www.medtechdive.com/news/us-mexico-tariff-pause-extended-trump-sheinbaum/756533/

130 Office of the United States Trade Representative. 'Dominican Republic-Central America FTA (CAFTA-DR).' Accessed October 13, 2025. https://ustr.gov/trade-agreements/free-trade-agreements/cafta-dr-dominican-republic-central-america-fta

131 Pellerano Nadal. 'How do U.S. tariffs affect nearshoring dynamics in Central America and the Dominican Republic?' May 28, 2025. https://www.pellerano.com/en/articles/22eluewv4p1wbdodogxwvvauahxyg2

Rico's medical device manufacturing industry has not been directly affected by Trump's tariff threats, making it an attractive nearshoring location for US medical device companies.[132]

Table 13: Footprints of world leading medical device giants in Costa Rica, Dominican Republic, and Puerto Rico

Company	Origination	Costa Rica	The Dominican Republic[133]	Puerto Rico[134]
Medtronic[135]	US	☑	☑	☑
Becton Dickinson[136]	US		☑	
GE Healthcare[137]	US			☑
Johnson & Johnson[138]	US		☑	☑
Abbott Laboratories[139]	US	☑	☑	
Stryker Corporation[140]	US			☑
Boston Scientific[141]	US	☑		☑
Baxter International[142]	US	☑	☑	
Fresenius SE & Co. KGaA[143]	Germany		☑	
Smith+Nephew[144]	UK	☑		

Source: companies' website and internet

132 Invest Puerto Rico. 'Puerto Rico: The Strategic Solution for Reshoring.' March 3, 2025. https://www.investpr.org/puerto-rico-the-strategic-solution-for-reshoring/

133 Embassy of the Dominican Republic in the Republic of India. 'DR positions itself as one of the three powerhouses on med-tech exports in the LAC region.' Accessed October 13, 2025. https://www.dominicanembassy.in/blognews202101/dr-powerhouses-med-tech-exports-latam-region & Tapia, Carlos. 'Protecting innovation: a guide to registering industrial designs for medical devices in the Dominican Republic.' November 27, 2024. https://www.clarkemodet.com/en/articles/protecting-innovation-a-guide-to-registering-industrial-designs-for-medical-devices-in-the-dominican-republic/

134 Invest Puerto Rico. 'Puerto Rico: The Strategic Solution for Reshoring.' March 3, 2025. https://www.investpr.org/puerto-rico-the-strategic-solution-for-reshoring/ & Burton, Patrick. 'Puerto Rico's Innovation Transformation.' Pharma Boardroom. July 28, 2025. https://pharmaboardroom.com/articles/puerto-ricos-innovation-transformation/

135 Medtronic. Annual Report. 2025. https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=319434355&type=PDF&symbol=MDT&cdn=f3efe99b3d2c4f03ac9f8b473ef48be2&companyName=Medtronic+plc.&formType=ARS&dateFiled=2025-09-04

136 Becton Dickinson. Form 10-K. 2024. https://investors.bd.com/sec-filings/all-sec-filings/content/0000010795-24-000084/bdx-20240930.htm#i27a448c89cec45ef9e3877c9734386ff_16

137 GE Healthcare. Form 10-K. 2024.https://investor.gehealthcare.com/static-files/2a3d2d9c-3cf7-4fa5-9acc-4b90570b9330

138 Johnson & Johnson. Annual Report. 2024 https://www.jnj.com/download/johnson-johnson-2024-annual-report

139 Abbott Laboratories. Annual Report. 2025. https://www.abbottinvestor.com/static-files/61441b9a-bf14-49fa-9748-50188e3aac5c

140 Stryker. Comprehensive Report. 2024. https://s22.q4cdn.com/857738142/files/doc_financials/2024/ar/SYK-2024-CR_.pdf

141 Boston Scientific. Annual Report and Form 10-K. 2024. https://investors.bostonscientific.com/~/media/Files/B/Boston-Scientific-IR-V3/annual-reports-proxy-statements/2025/bsc-2024-annual-report-and-10-k.pdf

142 Baxter International. Form 10-K. 2024.https://s22.q4cdn.com/911189824/files/doc_financials/2024/ar/BAX-2024-Form-10-K.pdf

143 Fresenius. Annual Report. 2025. https://www.fresenius.com/sites/default/files/2025-03/Fresenius_Annual_Report_2024.pdf

144 Smith+Nephew. Annual Report. 2024.https://smith-nephew.stylelabs.cloud/api/public/content/dd84fe0e01cf43fda2b6455fba42751c?v=d216808b

VI. Rising Role of China's Medical Device Players in the Global Market

Over the years, China's medical device companies have supplied low- and mid-end medical consumables and equipment to overseas markets. During the early stage of the COVID-19 outbreak, there was a global shortage of medical supplies. China's medical device manufacturers have rapidly responded to global market needs and exported various medical devices and consumables, including surgical masks, respiratory devices, and IVD testers. The reputation of China's medical device brands has gradually been established not only in the US and Europe, but also in various emerging markets, such as Southeast Asia, Middle East, Africa, and Latin America.

Today, many leading medical device companies in China invest heavily in developing high-end medical devices and are keen on expanding their global footprints. From Table 14, it is observed that the most common 'go global' approach among leading Chinese medical device companies is extensively setting up regional/ local branches and sales centres in the target markets, such as the US, Europe, and Southeast Asian countries. Since companies have to customize product and regulatory filings to fulfil each region's requirement for obtaining market entry approval, working with regional/ local agents or setting up regional/ local sales centres is a relatively light asset approach. The local team must prepare documentations for regulatory submission, such as product testing, environmental compliance, clinical evaluation, medical expert endorsements (when required), factory audits, and post-market plans.

As shown in Table 14, over half of the top 20 leading Chinese medical device companies have set up their branches or sales centres in Hong Kong, China. The city plays a strategic role connecting the Chinese mainland and overseas markets, driven by its favourable geographical location, supply of talent with comprehensive medical knowledge and international business experience, and sophisticated legal and financial support.

To further engage in the overseas market development and penetration, some Chinese medical device companies acquire foreign medical device manufacturers or distribution companies, while others form strategic alliances with local partners.

- Mindray, the largest medical device company in China, adopted the M&A approach for global expansion. The company set up its first US office in 2008 by acquiring the patient monitoring business of Datascope, a US-based company. In 2013, Mindray acquired another US-based imaging device company, Zonare. Over the years, the company has continued expanding its global business network by acquiring various foreign medical companies to accelerate market access. In 2024, overseas business of Mindray

accounted for 45% of its overall business, up from 39% in 2023.[145] Currently, Mindray has become one of the top three suppliers of anesthesia devices, monitors, and ultrasound machines in North America. Over 10,000 medical institutions in the US are sourcing from Mindray.[146] The company has also obtained FDA and CE certificates for various kinds of products, which can be sold not only in the US and Europe, but also in emerging markets in Southeast Asia and Latin America.[147]

- United Imaging Healthcare (UIH), another market leader producing CT/ MRI scanners and imaging equipment, has established a global network in more than 85 countries across the world. The Chinese-based company works closely with local hospitals and medical institutions in North America and Europe, providing equipment, service, and clinical trial support. UIH also collaborates with top hospitals and universities in Belt and Road countries to develop research projects, such as Astana Medical University in Kazakhstan, Hussein King Cancer Centre in Jordan, and Morocco's Health Garden.[148]

In terms of overseas investment, a rising number of long-term contracts between Chinese suppliers and foreign hospitals and medical organizations have been signed. The number of outbound investment deals made by Chinese healthcare suppliers increased to 15 in 2024, up from 5 in 2023 (See Figure 9). Of these, over 40% were sealed with companies in the US, followed by Germany, the UK, Spain, South Korea, and Australia.[149]

As mentioned, China's leading medical device companies earnestly invest in inventing high-end products and set up R&D centres in matures markets that offer advanced medical infrastructure and medical experts. Among the top 20 leading Chinese companies shown in Table 14, they have established their R&D centres mainly in the US and Germany. For instance, Mindray Medical, Autobio Diagnostics, Sinocare Inc, and MGI Technology in the US; Mindray Medical and Yuwell Medical in Germany. Also, many Chinese medical device companies plan to consistently engage in international trade shows and involve in global research and academic conferences, so as to further enhancing their global visibility and product creditability.

145 Mindray. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300760&id=11047328 and company website.

146 Internet. A gǔ yīliáo qìxiè lóngtóu, yǐ shì qiān yì tǐliàng de Màiruì yīliáo shìfǒu hái zhídé chángqí tóuzī A 股医疗器械龙头，已是千亿体量的迈瑞医疗是否还值得长期投资. [Is Mindray Medical, a leading A-share medical device company, still a worthwhile long-term investment?]. February 4, 2025. https://mp.weixin.qq.com/s/sPFDKTLOwadfP0RMC0iBUg

147 Frost & Sullivan. 2025 Zhōngguó yīliáo qìxiè chūhǎi xiànzhuàng yǔ qūshì lán píshū 2025 中国医疗器械出海现状与趋势蓝皮书. [2025 Blue Book on the Current Status and Trends on Going Global of China's Medical Devices]. June 11, 2025.
https://www.frostchina.com/content/insight/detail/6847c95a963422c0528beaab

148 Shangguan News. Liányǐng chuàngxīn chéngguǒ liàngxiàng ālābó yīliáo shèbèi zhǎn, yǐ jìnrù sān fēn zhī yī 'Yīdài yīlù' gòngjiàn guójiā 联影创新成果亮相阿拉伯医疗设备展，已进入三分之一'一带一路'共建国家. [United Imaging's innovative achievements showcased at the Arab Health Medical Equipment Exhibition, already present in one-third of the countries under the Belt and Road Initiative.']. February 7, 2024. https://www.jfdaily.com/wx/detail.do?id=714210

149 KPMG. 'China life sciences sector overview and outlook.' April 2025.
https://assets.kpmg.com/content/dam/kpmg/cn/pdf/en/2025/04/china-life-sciences-sector-overview-and-outlook.pdf

Currently, most of the medical devices supplied by these leading Chinese medical device companies are made in China. However, some gradual changes have been observed in recent years. To benefit from market proximity, mature medical infrastructure, and alignment with local regulatory requirements, some companies–especially high-end device makers, such as Mindray Medical, Yuwell Medical, Blue Sail Medical, Tofflon Science and Technology, Sinocare Inc, and MGI Technology–operate their overseas manufacturing facilities in the US, Germany and other European countries.

On the other hand, companies making low- and mid-end devices, such as medical gloves, consumables, and rehabilitation equipment, extended their production lines beyond the Chinese mainland into emerging countries to reduce cost, such as Lepu Medical in Malaysia, Intco Medical in Vietnam, and Zhende Medical in Ethiopia, Kenya, and Mexico.

When considering global expansion of manufacturing networks in future, Chinese device makers should also prioritize cost optimization and risk mitigation strategies to address global tariff threats, currency fluctuations, and inflation. They should carefully reassess their manufacturing strategies and explore potential for diversification. For instance, affected by the US's tariff policy, UIH announced plans to set up new manufacturing bases in Southeast Asia and Latin America between 2025 and 2027.[150]

In sum, worldwide medical device market today is still dominated by global giants. As more Chinese medical device companies persistently develop their overseas businesses by M&A, forming strategic alliance with global partners, setting up sales centres, R&D lab, and manufacturing facilities around the world, a new chapter in the development of global medical device market is expected.

Table 14: Overseas business of China's leading medical device companies (Top 20 A-Shares listed companies in medical device sector)

Medical device companies	Operating income in 2024 (RMB million)	Ratio of overseas business over overall business in 2024	Major Product Categories	Global business network			
				Market network	Branch/Sales centre	R&D centre	Factory
Mindray Medical 迈瑞医疗 [151]	36,726	45.0%	Life support, In Vitro diagnostic, imaging	Over 190 countries	Australia, Brazil, Colombia, France, Germany, Hong Kong China, India, Indonesia, Italy, Mexico, the Netherlands, Russia, Spain, Sweden, UK, US	Finland, Germany, Russia, US	Germany

150 Med Space. Liányǐng yīliáo, yào xuè pīn ma? 联影医疗，要血拼吗？[United Imaging, Ready to Battle?]. May 6, 2025. https://mp.weixin.qq.com/s/7dTxPfu5rUAKmzMPhUgVrQ

151 Mindray. Annual Report. 2024. https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300760&id=11047328

Medical device companies	Operating income in 2024 (RMB million)	Ratio of overseas business over overall business in 2024	Major Product Categories	Global business network			
				Market network	Branch/Sales centre	R&D centre	Factory
United Imaging Healthcare 联影医疗 [152]	10,300	22.5%	Imaging equipment	Over 85 countries	Hong Kong China, Morocco, the Netherlands, Poland, UK, US	NA	NA
Shinva Medical 新华医疗 [153]	10,021	2.8%	Sensors, pharmaceutical equipment	Over 150 countries	Egypt, Germany, Indonesia, Russia, Vietnam	NA	NA
Yuwell Medical 鱼跃医疗 [154]	7,566	12.5%	Respiratory therapy, home medical equipment	Over 100 countries	Germany, Hong Kong China, Thailand, US	Germany	Germany
Guoke Hengtai Medical Technology 国科恒泰 [155]	7,346	0%	Vascular interventional therapy materials, orthopedic materials	NA			
Blue Sail Medical 蓝帆医疗 [156]	6,253	86.5%	Cardiovascular, gloves	Over 130 countries	France, Germany, Hong Kong China, India, Indonesia, Italy, Japan, Malaysia, the Netherlands, Singapore, South Korea, Spain, Switzerland, UK, US	Singapore, Switzerland	Germany, Singapore
Lepu Medical 乐普医疗 [157]	6,103	16.4%	Drugs, cardiovascular consumables	Over 160 countries	The Netherlands	NA	Malaysia, Switzerland
Truking Technology 楚天科技 [158]	5,830	36.7%	Pharmaceutical equipment	Over 40 countries	Hong Kong China, India, Turkey	NA	NA
Shandong Pharmaceutical Glass 山东药玻 [159]	5,125	28.7%	Glass bottles	Over 90 countries	NA		

152 United Imaging Healthcare. Annual Report. 2024. https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=688271&id=11026916

153 Shinva Medical. Annual Report. 2024. https://file.finance.sina.com.cn/211.154.219.97:9494/MRGG/CNSESH_STOCK/2025/2025-4/2025-04-30/11066915.PDF & company website https://www.yuwell.com/about

154 Yuwell Medical. Annual Report. 2024. https://static.cninfo.com.cn/finalpage/2025-04-26/1223316577.PDF

155 Guoke Hengtai Medical Technology. Annual Report. 2024. https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=301370&id=10976392

156 Blue Sail Medical. Annual Report. 2024. https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=002382&id=11055486

157 Lepu Medical. Annual Report. 2024. https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300003&id=10908494

158 Truking Technology. Annual Report. 2024. https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300358&id=11040475

159 Shandong Pharmaceutical Glass. Annual Report. 2024. https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=600529&id=10957322 & company website http://www.pharmglass.com/NetWork.aspx

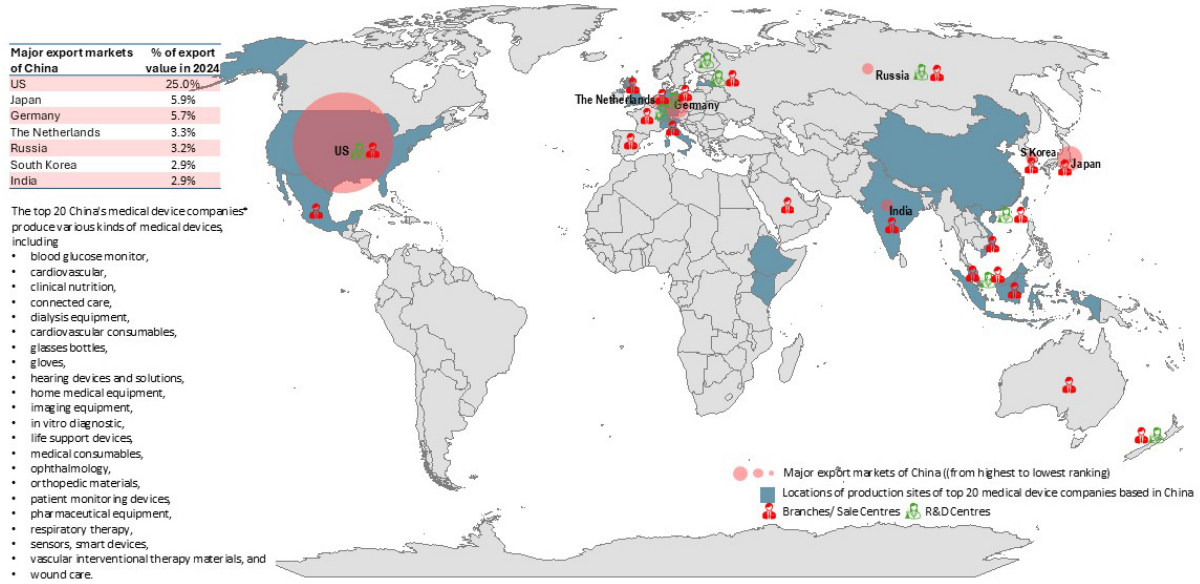
Medical device companies	Operating income in 2024 (RMB million)	Ratio of overseas business over overall business in 2024	Major Product Categories	Global business network			
				Market network	Branch/Sales centre	R&D centre	Factory
Tofflon Science and Technology 东富龙 [160]	5,010	24.1%	Pharmaceutical equipment	Over 50 countries	Branches: Australia, Indonesia, South Africa, Turkey, UAE, Vietnam Sales centres: Germany, Italy, Japan, Panama, Russia, Singapore, US	NA	India, Italy, Switzerland
Intco Medical 英科医疗 [161]	4,913	Over 80%	Gloves	Over 150 countries	Canada, Hong Kong China, Germany, Japan, Malaysia, Singapore, US, Vietnam	NA	Indonesia, Vietnam
Shenzhen New Industries Biomedical Engineering 新产业生物医学工程 [162]	4,535	37.2%	In Vitro diagnostic	Over 160 countries	Brazil, Hong Kong China, India, Indonesia, Italy, Malaysia, Mexico, Pakistan, Peru, Romania, Russia, Saudi Arabia, South Korea, Thailand, Vietnam	NA	NA
Autobio Diagnostics 安图生物 [163]	4,471	6.4%	In Vitro diagnostic	Over 100 countries	Hong Kong China	US	NA
Sinocare Inc 三诺生物 [164]	4,443	42.0%	Blood glucose monitor	187 countries	Australia, Bangladesh, Canada, Hong Kong China, Indonesia, India, Mexico, Philippines, Singapore, Thailand, UK, US, Vietnam	US	Taiwan China, US
Zhende Medical 振德医疗 [165]	4,264	58.0%	Medical consumables	Over 70 countries	Hong Kong China, Japan, Mexico, Singapore, UK, US	NA	Ethiopia, Kenya, Mexico, UK
Guangzhou Wondfo Biotech 万孚生物 [166]	3,065	36.0%	In Vitro diagnostic	Over 150 countries	Hong Kong China, US	Hong Kong China	NA

160 Tofflon Science and Technology. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300171&id=10968701
161 Intco Medical. Annual Report. 2024.
https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300677&id=11409464
162 Shenzhen New Industries Biomedical Engineering. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300832&id=10984450
163 Autobio Diagnostics. Annual Report. 2024.
https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=603658&id=10887408
164 Sinocare Inc. Annual Report. 2024.
https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300298&id=10909196
165 Zhende Medical. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=603301&id=10995749
166 Guangzhou Wondfo Biotech. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=300482&id=10857978

Medical device companies	Operating income in 2024 (RMB million)	Ratio of overseas business over overall business in 2024	Major Product Categories	Global business network			
				Market network	Branch/Sales centre	R&D centre	Factory
MGI Technology 华大智造 [167]	3,013	30.3%	Genetic Testing Instruments	Over 110 countries	Australia, Brazil, France, Germany, India, Hong Kong China, Japan, the Netherlands, New Zealand, Singapore, South Korea, UAE, UK, US	Latvia , New Zealand, US	Latvia, US
Cofoe Medical Technology 可孚医疗 [168]	2.983	2.0%	Smart devices	Over 60 countries	Hong Kong China	NA	NA
Andon Health 九安医疗 [169]	2,592	92.7%	Smart devices, In Vitro diagnostic	No disclosure	France, Hong Kong China, Singapore, US	NA	US
Maccura Biotechnology 迈克生物 [170]	2,549	6.4%	In Vitro diagnostic	Around 100 countries	Indonesia, Singapore, US	NA	NA

Source: Companies' annual report (2024)

Map 3. Overseas business of China's leading medical device companies, 2024



* Note: For the company list, please refer to Table 14
Source: Frost & Sullivan, company websites

167 MGI Technology. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=688114&id=11081207
168 Cofoe Medical Technology. Annual Report. 2024.
https://vip.stock.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=301087&id=11026564
169 Andon Health. Annual Report. 2024.
https://money.finance.sina.com.cn/corp/view/vCB_AllBulletinDetail.php?stockid=002432&id=11052308
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VII. Concluding Remarks

In the post-pandemic era, the global medical device market has entered a transformative period characterized by a growing aging population, rising medical expenditure, and technological advancement. These driving forces present considerable opportunities for growth.

Having learned lessons from COVID-19 disruption, global medical device giants have adopted diversified location strategies to secure supply chain resilience. Many market incumbents in mature medical device countries, especially in the US and Europe, have reviewed their global sourcing strategies through diversification, divestiture, M&A, and other strategic initiatives to enhance operational resilience and cost efficiency. These efforts are aimed at reducing dependency on single suppliers and minimizing supply chain disruptions. When the time came in 2025, amid geopolitical tensions and Trump's tariff policies, global medical device giants were well-prepared by adopting localization strategies for specific markets in Europe and Asia, while applying onshoring/ friend-shoring approach for the US market–i.e. manufacturing in the US and nearby countries in the Americas, including Mexico, Costa Rica, the Dominican Republic, and Puerto Rico.

However, diversification may not be the most feasible location approach for the small-sized medical device makers to fight against tariff uncertainties. Ideally, medical device makers should strike a balance between market proximity, geopolitical tension, regulatory complexities, talent supplies, and operating cost management when determining their supply chain strategies. However, obtaining stringent product entry approval from different markets is a lengthy and costly process, which hinders small medical device makers with limited resources from relocating their manufacturing facilities to regions with lower tariff exposure in the short term.

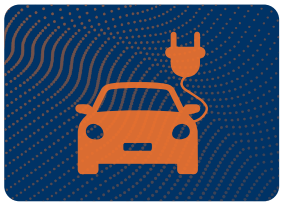
Meanwhile, an emerging global medical device player, China, is adopting another supply chain approach–a dual strategy by simultaneously expanding their local market presence and pursuing global expansion. In recent years, Chinese device makers have increased their investments in R&D and diversified their product categories, ranging from low- and mid-end supplies to high-end innovative medical devices. On one hand, they are aiming to better serve the vast population in the domestic market, with government support and incentives. On the other hand, medical device makers are focused on fulfilling strong global demand in medical devices. Despite facing the headwind of global tariff uncertainties, China's medical device manufacturers are persistently developing their overseas businesses by M&A, forming strategic alliances with global partners, and setting up sales centres, R&D labs, and manufacturing facilities around the world.

Moreover, embracing advanced technology is one of the key strategies pursued by medical device makers in the AI-powered era. The increasing integration of AI and other advanced technologies promises to significantly enhance diagnostic accuracy, therapeutic precision, and patient outcomes. However, these advancements simultaneously necessitate careful attention to ethical considerations, data governance, cybersecurity, and global regulatory compliance.

With the aid of advanced technology, numerous startups and technology companies in Asia are emerging and earnestly investing in the medical device sector. Governments in Singapore, Thailand, Malaysia, and Indonesia are proactively offering incentives to attract investment in medical device innovation and manufacturing, aiming to promote their countries as regional medical tourism hubs. In India, the government has also launched various initiatives for reforming the domestic medical device sector and boosting exports. India's local conglomerates in traditional business have tapped into the medical device sector. The strategic move enhances the R&D and production capabilities of the medical device manufacturing and trading in the country.

The medical device industry is undergoing a transformation process, requiring solid collaboration among governments, regulators, medical professionals, and device manufacturers. Medical device makers should cautiously comply with stringent regulatory requirements and green regulations, while also seizing opportunities from various government support schemes in developing medical device supply chains. Ultimately, the sector must increasingly align with environmental, social, and governance imperatives to ensure sustainable and equitable access to healthcare services. By embracing technological advancement, fortifying supply chains, and prioritizing patient-centric values, the global medical device sector is poised to set new benchmarks in healthcare delivery in the long term.

Our Global Supply Chain Analysis by Industry



Electric Vehicle

Expansion and Diversification: Securing EV Supply Chains Amid Global Fragmentation

Solar PV

Where the Sun Shines: The Changing Landscape of the Global Solar Supply Chain

Apparel

Threading a Green and Intelligent Tapestry:
The Apparel Supply Chain Landscape in a Turbulent World

Medical Device

The Evolving Landscape of Global Medical Devices:
Supply Chain Resilience and Innovation

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