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Medtech Pulse: Thriving in the next decade

September 2023



Medtech Pulse:
Thriving in
the next decade

Letter to medtech leaders

The medtech industry has had a tremendous impact on society and has improved quality of life for billions. Innovations have changed treatment paradigms for complex conditions, expanded access to care, and provided more options to healthcare providers and patients for improved disease management.

The past few years have challenged the medtech industry in unprecedented ways. The lasting impact of the COVID-19 pandemic has led to permanent shifts across the healthcare landscape. Macroeconomic and geopolitical uncertainties continue to loom. Shareholder returns have started to stagnate. Resilience has become increasingly important.

This is the time for leaders to act boldly in anticipation of the next wave of value creation. As you embark on this journey, consider these questions:

- What strategic shifts could position your organization to capture the next wave of growth?
- Against a backdrop of persistent market uncertainties, where can you invest to capitalize on new value pools?
- What new capabilities will your organization need in order to deliver on the industry's potential?
- What actions are you taking personally to effectively lead and bolster the resilience of your organization?

With this report, we seek to provide insights and perspectives to inform the journey ahead, starting with a look at shifting the value creation equation and how it influences medtech's next act. We follow with an examination of topics that are of paramount importance to medtech leaders and that, we believe, will propel the next decade of value creation.

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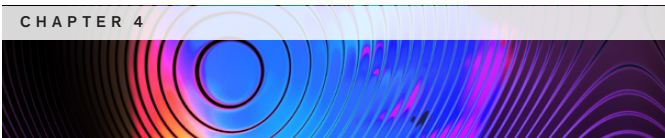



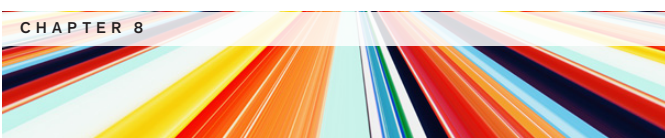

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Contents

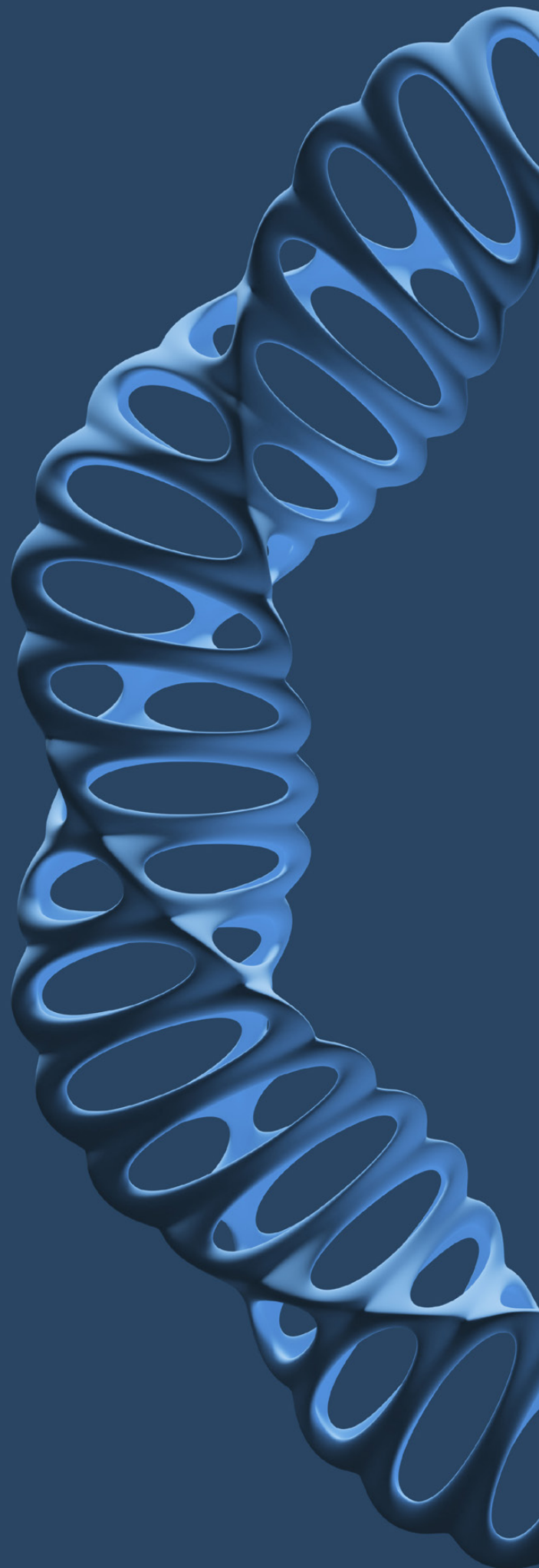
 <p>CHAPTER 1</p>	4	Introduction: Medtech's value-creation imperative Patients in need and uncertain shareholders have medtech leaders plotting their strategies for a new wave of value creation.
 <p>CHAPTER 2</p>	12	Reimagining R&D to drive sustainable growth To unlock sustainable long-term growth, medtech companies should aim for significant improvements to R&D and product development.
 <p>CHAPTER 3</p>	20	Cracking the code of software innovation Software development calls for an entirely different approach from traditional product development methods. Medtech companies can borrow a page from leading software firms.
 <p>CHAPTER 4</p>	28	Bringing hardware and software together into digital health ecosystems Medtech companies can expand their role in digital healthcare ecosystems by combining devices and data to improve care outcomes.
 <p>CHAPTER 5</p>	36	Building a next-generation medtech commercial model Commercial models must evolve to support new types of offerings, adapt to changing customer expectations, and position companies to succeed in the decade ahead.
 <p>CHAPTER 6</p>	46	Reimagining operations for the challenges of the next decade As medtech companies emerge from the COVID-19 pandemic, leaders are scrutinizing operations to find ways to better serve patients and bolster competitiveness.
 <p>CHAPTER 7</p>	54	Committing to ESG as a differentiator An environmental, social, and governance (ESG) strategy is not merely a compliance checklist item; it is an untapped opportunity for medtech companies to differentiate their devices.
 <p>CHAPTER 8</p>	62	Updating the post-COVID-19 playbook for M&A M&A could help the medtech industry boost value creation, but only if companies can adapt their dealmaking approaches to changing macroeconomic conditions.
 <p>CHAPTER 9</p>	70	Competing in China: Medtech multinational companies' way forward China will continue to be a critical market for medtech multinational companies despite market uncertainties. Big moves are in order.

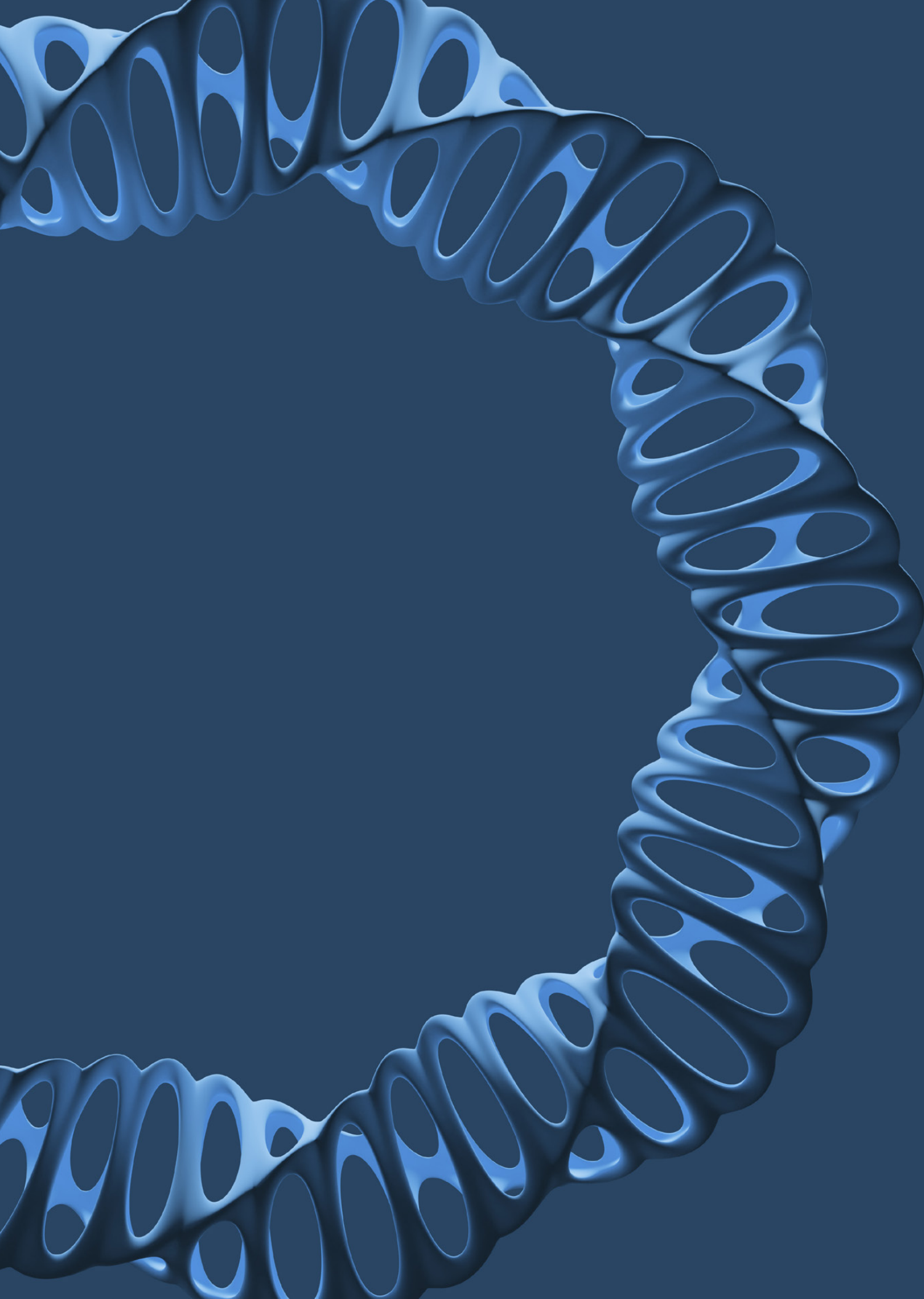
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Introduction: Medtech's value-creation imperative

Patients in need and uncertain shareholders have medtech leaders plotting their strategies for a new wave of value creation.

*by Richard Bartlett, Colin Field-Eaton,
Gerti Pellumbi, and Tommy Reid*





Billions of patients, families, and healthcare workers around the world rely on the medtech industry every year. Medtech plays a major role in their lives, from an ultrasound's detection of a baby's first heartbeat to an electrocardiogram's record of a person's last. In between, Band-Aids cover scrapes, stents reopen vessels, and robots resect tumors. For decades, medtech innovations have helped people live longer, healthier, and happier lives:

- Since 1980, medtech advancements have added five years to US life expectancy.¹
- An estimated 10 percent of the US population will have medical devices implanted in their bodies.²
- Medtech companies employ more than two million people around the world.³
- Medtech's value is cost-effective: since 2009, prices for medical devices have increased at one-seventh the rate of the broader medical consumer price index.⁴
- In 2023, the medtech industry is estimated to grow to nearly \$600 billion,⁵ with rising access to care and new innovations positioning the market for 5 to 6 percent annual growth through 2026.⁶

The industry continues to expand its impact. Consider the mother of two who avoided a stroke thanks to innovations in atrial fibrillation, the diabetic who replaced daily finger pricks with continuous glucose monitors, and the overworked nurse who saved a patient's life with the help of digitally enabled remote monitoring. All told, medtech companies have created more than two million types of medical devices for patients and caregivers around the world.⁷ With a focus on patient impact, medtech companies have largely

aligned their innovation priorities with areas of highest unmet need (Exhibit 1).

Companies have an opportunity—and responsibility—to transform the industry

Despite the value created for patients in the past decade, many are still waiting. Across therapeutic areas and geographies, patients remain unserved and are still coping with conditions that medtech could potentially ameliorate or cure. In the United States, more than 50 percent of 2021 deaths were preventable,⁸ patient experience remains highly variable, and the financial burden of cardiovascular conditions alone is projected to grow rapidly, doubling between 2017 and 2035.⁹ Medtech leaders have the opportunity and the responsibility to continue to grow, innovate, and create value for patients and caregivers around the world.

Additionally, companies should consider how to unlock the next era of value creation for shareholders. Fifteen years ago, the medtech industry faced a wave of disruptions resulting from the Great Recession and other events. In response, the industry reinvented itself, accelerating innovation on its way to top-tier shareholder returns. Medtech posted a stellar run of value creation for much of the 2010s, outperforming the S&P 500 by nearly twofold in the 2012–19 period. Since 2019, however, investor skepticism has returned; the S&P 500 has beaten medtech every year, and valuation multiples for the highest-growth companies have been more than halved since (Exhibit 2).

Creating value for patients and shareholders over the next decade will require another industry reinvention, with a bias toward transformation, not incremental improvement.

¹ *Health, United States, 2014: With special feature on adults aged 55–64*, National Center for Health Statistics, May 2015.

² "Implantable material and device regulation," American Medical Association, September 2021.

³ McKinsey analysis of 2021 company annual reports of top 20 medtech companies by revenue.

⁴ Gerald F. Donahoe, "Estimates of medical device spending in the United States," AdvaMed, June 2021.

⁵ McKinsey analysis of growth estimates accessed via S&P Global Market Intelligence, May 20, 2023.

⁶ *Ibid.*

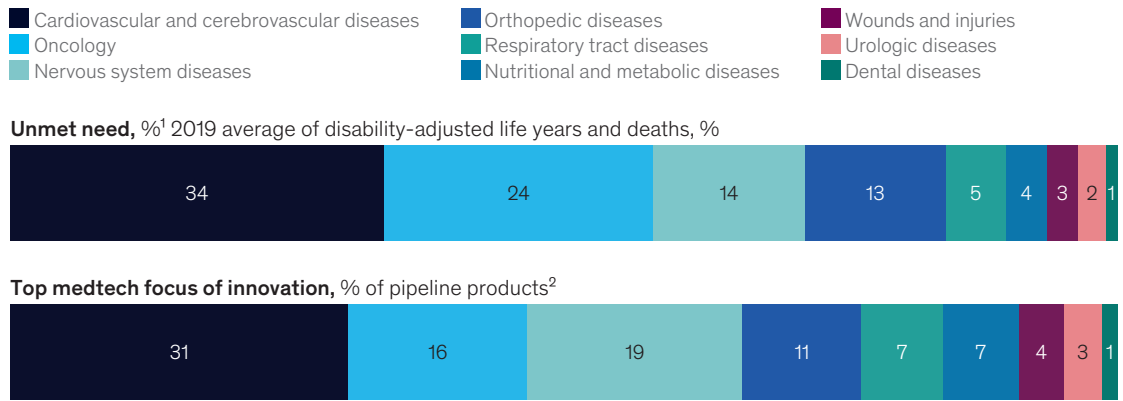
⁷ "Medical devices," World Health Organization, accessed May 26, 2023.

⁸ Excluding COVID-19-related deaths; "Age and cause," National Safety Council Injury Facts, accessed May 20, 2023.

⁹ "Cardiovascular disease: A costly burden for America—projections through 2035," American Heart Association, 2017.

Exhibit 1

Medtech innovation pipelines mostly align with patient needs.



Note: Figures may not sum to 100%, because of rounding.
¹Average percentage of each condition's contributed proportion of all disability-adjusted life years and deaths.
²Including all global medtech pipeline products, per GlobalData, excluding those in early development (largely academic). Excluding in vitro diagnostics and hospital supplies.
 Source: GlobalData Medical Device Intelligence Center; Institute for Health Metrics and Evaluation (IHME), accessed May 20, 2023

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Medtech leaders have multiple transformation strategies to consider

Against this backdrop, leaders could consider pursuing one or more transformation strategies to lead value creation in the future:

Create the next frontier of innovation. With millions of patients still unserved and the rising cost of care a chronic concern, demand for medtech innovation remains high. Thanks to advances in miniaturization, new materials, and digitalization, companies are increasingly able to focus on “premium innovation” to meet this demand. For example, new, minimally invasive treatments such as transcatheter technologies are improving outcomes and expanding access for the sickest patients. Remote-monitoring solutions that shift patients out of intensive care units (ICUs) and into more comfortable care settings are bending the cost curve and improving patient experience.

Leading innovators in these and other categories will continue to capture the hearts and minds of patients, healthcare workers, and shareholders. From 2017 through May 2023, companies in the top quartile of novel product approvals saw shareholder returns almost twice as high as those in the second and third quartiles (and four times higher than those in the bottom quartile).¹⁰ As rewards for innovation have risen, so have market expectations for what constitutes innovation. R&D spending has accelerated, growing at twice the rate of industry sales since 2019 (up from being on par with sales in the 2010s).¹¹ Clinical-trial volumes, which remained flat from 2015 to 2019, are now growing at 11 percent annually,¹² and customer expectations for clinical data (safety, efficacy, and, often, cost-efficiency) are rising.

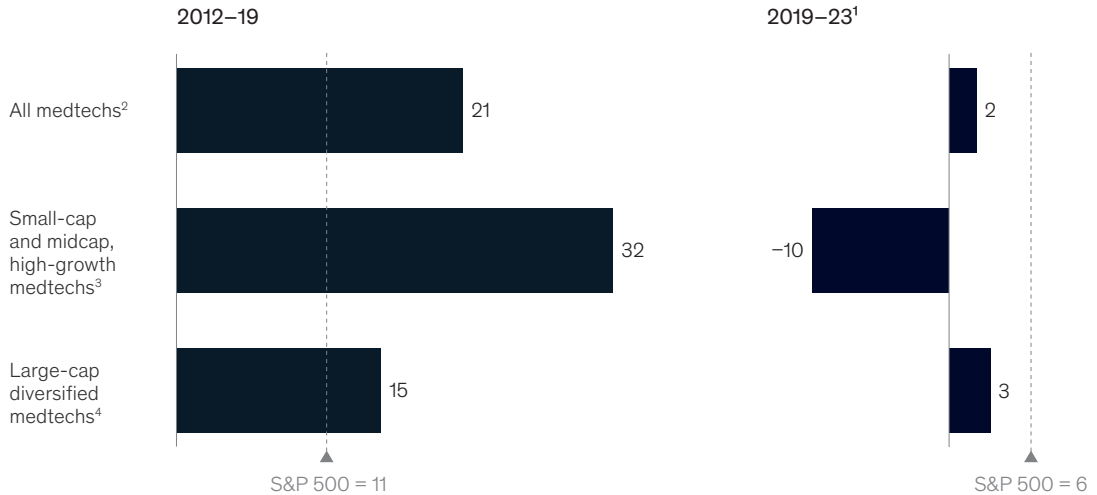
As medtech moves into this next generation of innovation, companies will need to consider how best

¹⁰ McKinsey analysis of S&P Global Market Intelligence financial data and Food and Drug Administration approvals data, May 20, 2023.
¹¹ Financial data accessed via S&P Global Market Intelligence, May 20, 2023.
¹² McKinsey analysis of Clinicaltrials.gov.

Exhibit 2

Medtech outpaced the S&P 500 in the 2010s, but value creation has since slowed.

Annualized total shareholder returns CAGR, 2012–23, %



¹As of May 2023.
²The 100 largest publicly traded medtech companies by market cap as of May 20, 2023.
³All publicly traded medtech companies with a market cap between \$0.1 billion and \$10.0 billion and with growth expectations in excess of 10% CAGR.
⁴The 30 largest publicly traded medtech companies by market cap with multiple franchises contributing at least 20% of sales, as of May 20, 2023.
 Source: S&P Global Market Intelligence

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to participate (organically or inorganically) in premium areas of innovation and generate clinical evidence to better serve patients and outperform competitors.

Reassess approaches to incremental innovation.

Although premium technologies garner headlines, incremental innovation remains critical in responding to user feedback and improving shortcomings in established products. However, incremental innovation has recently had an outsize presence in companies’ pipelines, with limited end-user benefit. In portfolio reviews across the industry, managers justify incremental programs as significant upgrades critical to retaining share, only to be met with skepticism from physicians and price pressure from purchasers. As a result, the slow-growth portion of the market has doubled since 2012.¹³ With buyer scrutiny heightening, companies will have to be more efficient and creative with their resource allocation.

For established products, companies should evaluate digital solutions and services as a new source of value. If the opportunity for adding meaningful value is low, leaders will need to consider shifting resources elsewhere.

Going forward, companies should apply more scrutiny to resources dedicated to incremental innovation and consider if a business without “premium” innovation has a role in the portfolio of the future.

Enable the shift to new care sites. Provider systems are racing to treat patients in new settings to improve outcomes and reduce the cost of care. Medtech innovations could support this shift. Devices that are less invasive result in lower-risk procedures and quicker postoperation recoveries. Connected-care ecosystems allow caregivers to monitor and communicate with patients outside of ICUs. According to McKinsey

¹³ Lower than 3.5 percent annual growth; Health Resources International 2013 medical devices and diagnostics report.

analysis, general acute-care facilities, medtech's largest customer segment, are projected to see slower growth than almost all other healthcare provider types (Exhibit 3).¹⁴

To date, medtech companies, especially non-large-cap companies, have struggled to engage newer sites of care. As these sites continue to account for a larger proportion of profitable care, medtech companies should work to refine their value propositions and commercial operations to effectively compete in these segments.

Rethink global growth strategies. Geographic strategies have risen to the top of many medtech CEO agendas. Many companies that pursued global expansion now find themselves with unwieldy commercial organizations, complex regulatory challenges, and innovation road maps with competing regional priorities. Although

Europe remains the source of innovation for many segments, the European Union Medical Device Regulation (EU MDR) has introduced new costs, such as postlaunch surveillance requirements, for companies operating in the region.¹⁵ Likewise, hospital-level tendering and contracting policies are increasing the commercial investment needed to serve European healthcare providers. The United States and Japan, with expertly trained surgeons and care teams on the cutting edge of technology adoption, continue to be priority markets, but competition is intensifying, requiring new levels of innovation and service to effectively compete. China, which grew at double the rate of the rest of the market before the COVID-19 pandemic,¹⁶ offers an underpenetrated market of patients and providers. However, it also offers unprecedented short-term challenges for multinational companies, such as increases in volume-based procurement and viable local competition.

¹⁴ For more on US healthcare profit pools, see Neha Patel and Shubham Singhal, "What to expect in US healthcare in 2023 and beyond," McKinsey, January 9, 2023.

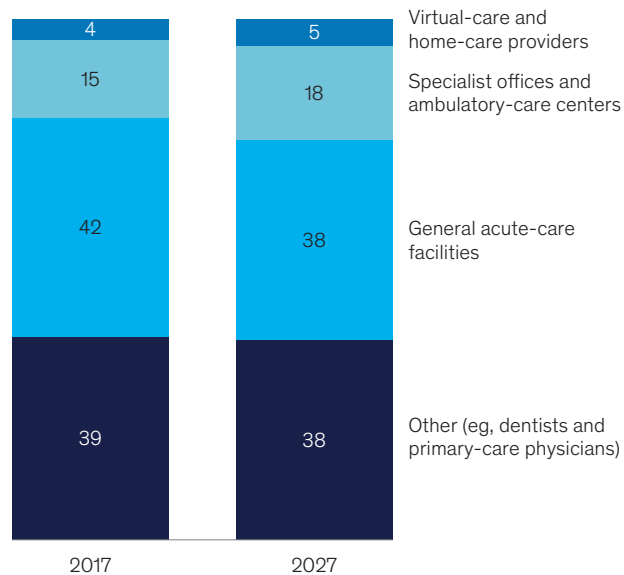
¹⁵ "Regulation (EU) 2017/745 of the European Parliament and of the Council," European Union, April 5, 2017.

¹⁶ Health Resources International 2012 and 2019 medical devices and diagnostics reports.

Exhibit 3

Hospital profits are shifting to alternate care settings, challenging medtechs to find growth by serving new customer types.

Share of overall US healthcare provider profit pool, %



Note: Figures may not sum to 100%, because of rounding.

Company leaders should take action to clarify their global intentions and tailor their strategies to specific geographic regions. This includes reassessing commercial models, increasing or reducing investment, and considering local acquisitions to foster profitable growth.

Compete intelligently in digital ecosystems.

Medtech companies have been experimenting with digital solutions for more than a decade. In many cases, these R&D programs and customer pilots have not materialized, leaving executives and boardrooms skeptical about the so-called digital revolution in medtech. Conversely, companies that have cracked the code are changing the care paradigm and realizing better outcomes for patients, providers, and companies. Digital ecosystems that marry capital products with technology are reshaping how companies create products, go to market, and engage with stakeholders.

Consider the digitalization of the operating room. AI-based clinical decision making, fueled by device data, has become an integral part of many spine and general surgery procedures, and patient-monitoring solutions are helping critical-care caregivers wean patients off life-sustaining devices more safely. Some imaging companies are generating up to \$1 billion a year from data-related solutions that improve patient care.¹⁷

As the next decade progresses, some executives may be tempted to ignore digital opportunities because of a history of failed internal attempts. Those companies might reconsider, take note of other companies' successes, and collaborate with their customers to build winning solutions based on lessons from the 2010s.

Commit to investments in execution excellence.

COVID-19-related supply shortages, drops in the number of health system procedures, and hospital staffing challenges have introduced uncertainty to medtech company operations. Following a decade of steady economic growth, one implication of this newfound uncertainty is increased scrutiny of

pilot programs and initiatives. Companies that had been experimenting with new commercial models, supply chain investments, or digital offerings are now facing calls to cut funding to reduce costs. Although some medtech companies are reducing resources evenly across programs, we are seeing that firms have more success when they make trade-offs and commit at scale. For instance, one company recently considered two ongoing investments: one in a new digital offering and one in a new, digitally enabled commercial model that allows clinical consultants to spend more time with care teams. The company made the bold choice to shut down the new offering while committing to commercial innovation. In addition to providing immediate cost savings and accelerating growth, the choice has delivered the benefit of clarity, aligning the organization's employees in their execution priorities.

Companies should perform a detailed review of ongoing investments and use this period of uncertainty to commit to the handful that will drive performance in the long term.

Take note of investors' increased attention to margins.

Medtech companies created significant shareholder value during the 2010s. The industry accelerated growth and innovation, propelling share price appreciation. As performance improved, investors began to "price in" future growth improvements, which created additional share price gains. The result is a new value-creation paradigm: in investors' eyes, companies' chances to beat current growth expectations are low, given that the industry has already doubled its growth rate in the past ten years. Meanwhile, as of the first quarter of 2023, the operating margins for medtech companies are 200 to 400 basis points lower than they were in 2021, returning to mid-2010s levels.¹⁸ As a result, although revenue growth remains the primary driver of value creation, investors are also increasingly paying attention to profit margin. Since 2019, the correlation between profit margin and medtech valuations has more than doubled (Exhibit 4).¹⁹

¹⁷ McKinsey analysis.

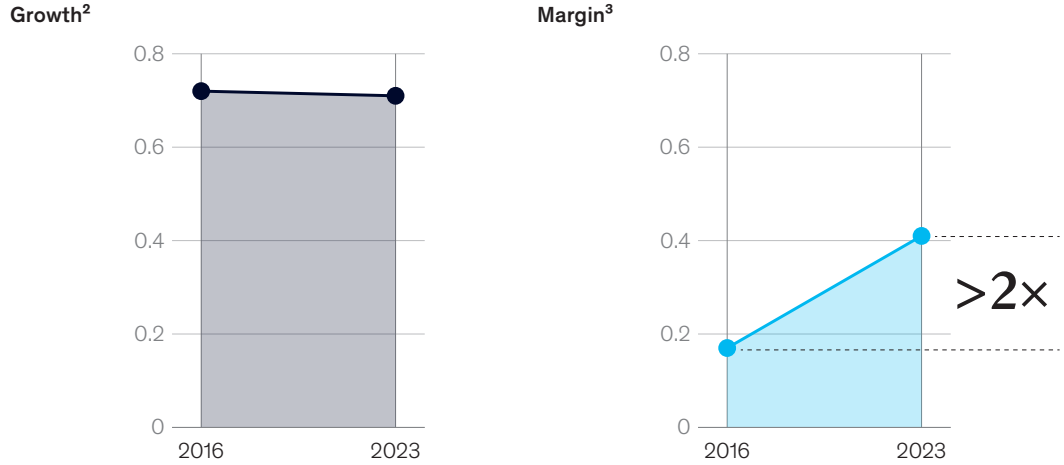
¹⁸ McKinsey analysis of S&P Global Market Intelligence financial data of top 40 companies by market cap, as of May 20, 2023.

¹⁹ Ibid.

Exhibit 4

Profit margins are increasingly important to company valuations.

Correlation between performance metrics and enterprise-value-to-revenue ratio (R^2 value)¹



¹ R^2 represents the correlation between two numbers. The closer the R^2 is to 1, the higher the correlation.
²3-year future sales CAGR expectations.
³3-year future EBITDA change expectations.
Source: S&P Global Market Intelligence

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Along with investing in growth, companies should also consider profitability programs as ways to boost long-term value creation.

to find new ways to create value. Companies that transform their innovation, operations, and strategies could successfully reaccelerate profitable growth and meet the next generation of healthcare needs.

In the next decade, patients, caregivers, and shareholders are counting on the medtech industry

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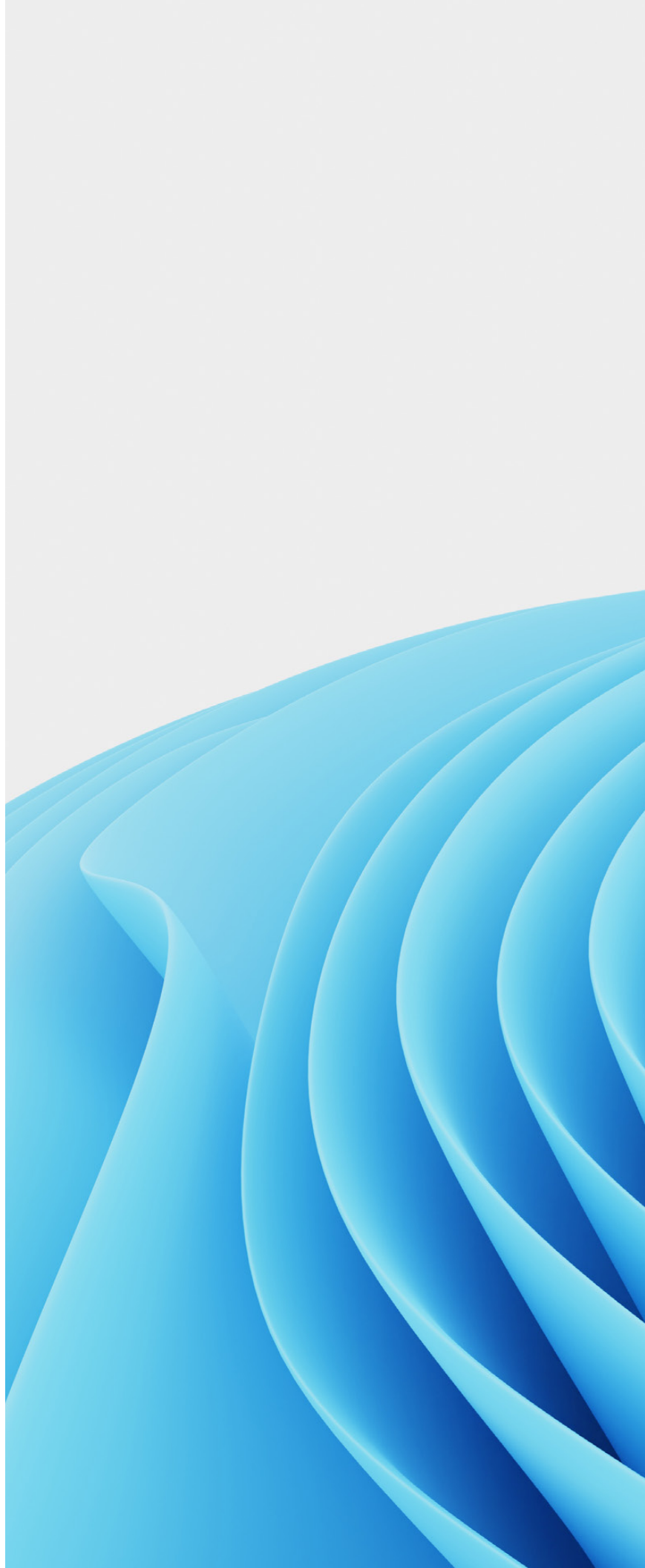
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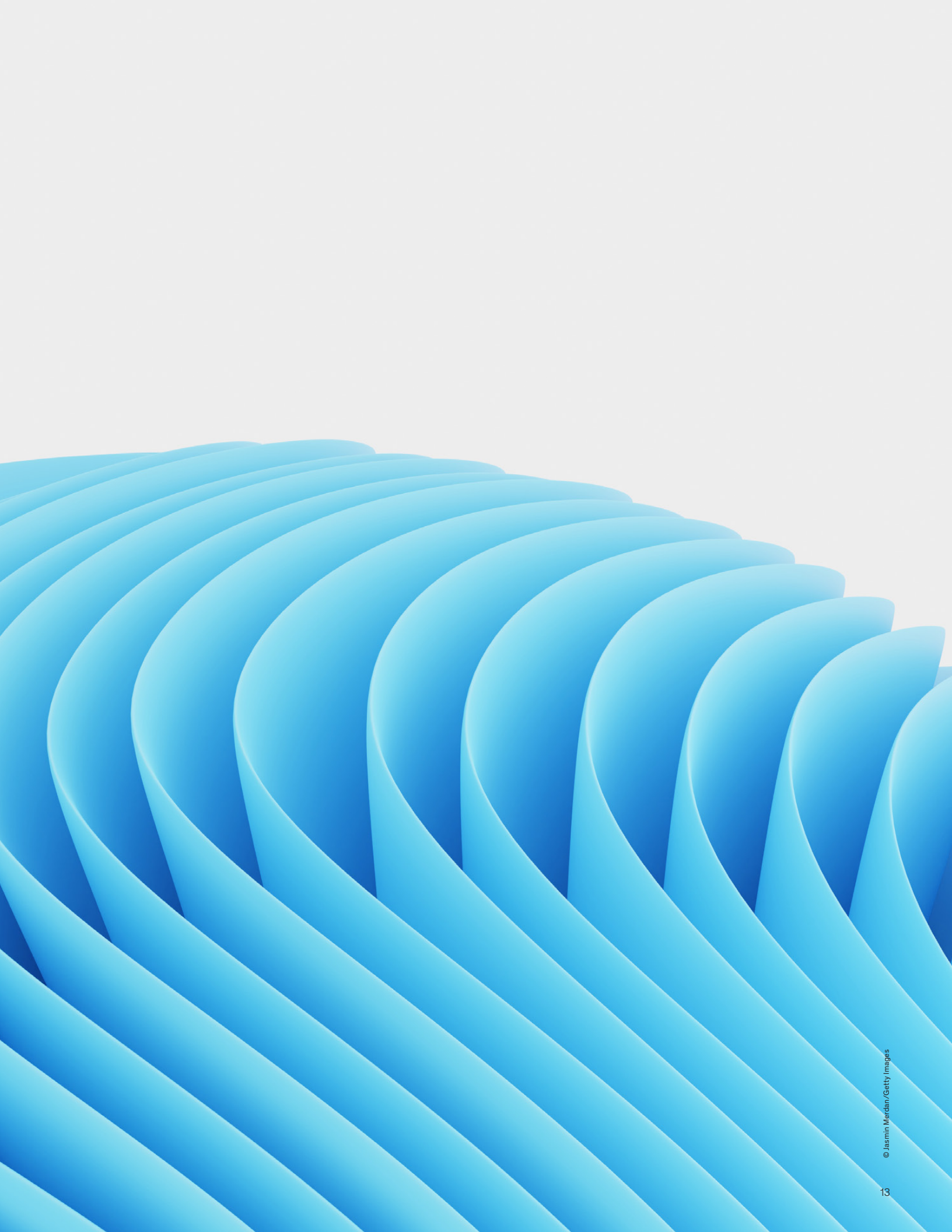
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Reimagining R&D to drive sustainable growth

To unlock sustainable long-term growth, medtech companies should aim for significant improvements to R&D and product development.

This article is a collaborative effort by Josh Copp, Jack Donohew, Stefan Frank, Zherui Huang, and André Rocha, representing views from McKinsey's Life Sciences Practice.





R&D and product development excellence are foundational for sustainable business growth in medtech. Accordingly, the industry invests substantially in innovation. At the same time, medtech profits are under pressure and demand higher productivity and returns from R&D. In this environment, R&D excellence is a top priority for company leaders.

In medtech, R&D spending alone is not strongly correlated with growth. Instead, our research and experience suggest four areas of focus. First, a systematic approach to portfolio management is prerequisite for any R&D organization to stay focused on value-creating innovation. Second, a subset of enablers is associated with delivering world-class products—namely, empowered product managers, deeply embedded design thinking, and strong system-engineering capabilities. Third, leading R&D organizations have effectively adopted agile principles and are harnessing next-generation digital and analytical tools. Finally, R&D organizations' outward orientation (for example, working with open development networks) helps boost their pipelines and productivity.

To be sure, acting on and excelling in all these areas amounts to a transformational change compared to how medtech R&D organizations typically operate, but the prize could be a boost in value creation and a sustainable competitive advantage.

An innovative industry with opportunities to optimize R&D

Prolific innovation occurs in the medtech industry. For instance, about 15,000 patent applications were filed at the European Patent Office by medtech companies in 2021, significantly more than by pharmaceutical or biotech companies.

This level of activity comes at a cost: the largest global medtech companies invest an average of 8 percent of their revenue on R&D.¹ Other capital-

intense, innovative industries spend much less; for example, in the automotive industry, the figure stands at just 4 percent of revenues.

But R&D spending and patents alone don't guarantee proportional value creation. Our analysis of the 70 largest global medtech companies reveals that average R&D spending in the previous three years accounted for only about 1.6 percent of the variation in companies' growth rates. In fact, the average number of US Food and Drug Administration (FDA) approvals per billion dollars spent has declined by an average of 9 percent per year since 2011 (exhibit).²

Some medtech companies are falling behind in R&D productivity and returns, as measured by new product approvals. Our survey of 220 industry leaders in medtech, advanced electronics, and high-tech sheds some light on the challenges.³

First, there are gaps in basic R&D execution. Our experience shows that only about 35 percent of medtech projects are developed on time and on budget. The number sinks further within organizations that fail to counter increasing R&D complexity by improving R&D maturity and efficiency.

We also find that medtech companies are more likely than their counterparts in other industries to lack foundational elements, such as adequate staffing and proper definitions of project goals. Moreover, nearly two-thirds of medtech respondents in this survey reported as common occurrences unrealistic project timelines and a lack of specific expertise in product development teams.

At the same time, the stakes for timely delivery of innovation are getting higher: competition is intense in many attractive segments, and the order of product launches can have considerable impact on market shares. Commoditized products are facing intensifying price pressure in many markets. Finally, patients and physicians are urgently awaiting new solutions to diagnose and treat diseases.

¹ Based on McKinsey analysis of 106 medtech players worldwide.

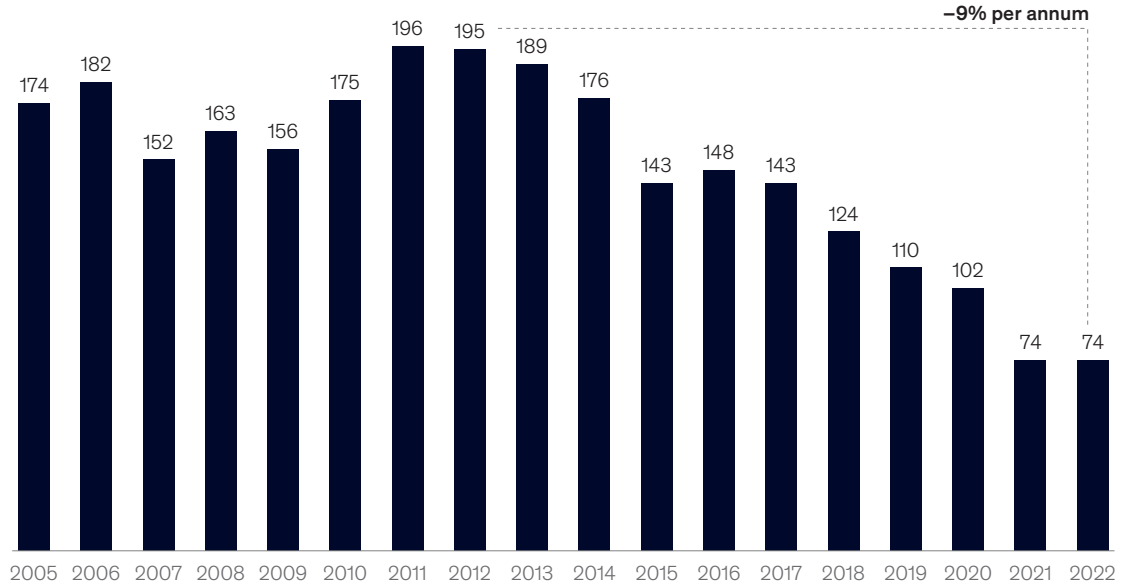
² The data set includes data from the 18 largest medtech companies by market cap for which data on R&D spending was available in the 1990–2018 time frame, per S&P Global. 510(k) data was retrieved from the FDA. For more on 510(k)s, see "501(k) clearances," FDA, updated August 31, 2021.

³ McKinsey R&D Benchmarking Survey, n = 220, completed January 2022.

Exhibit

The average medtech company has achieved fewer device approvals relative to R&D spending over time.

Number of US Food and Drug Administration (FDA) approvals per \$ billion of R&D spending¹



¹Includes supplementary premarket approvals, original premarket approvals, 510(k) approvals, and 510(k) de novo approvals.
Source: Evaluate MedTech, R&D spending and FDA approvals, 30 largest medtech companies by sales volume, 2005–2022, data accessed March 20, 2023

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The stakes for timely delivery of innovation are getting higher: competition is intense in many attractive segments, and the order of product launches can have considerable impact on market shares.

Reimagining medtech R&D for growth

In our experience, medtech companies that outperform their counterparts take a holistic approach to R&D transformation. This means tackling in parallel five areas that are critical for R&D excellence.

A systematic approach to portfolio management

An effective approach to developing and managing an R&D portfolio builds a compelling road map to growth and bolsters commercial performance. Companies with effective R&D portfolio management systems share certain characteristics. First, they have formalized R&D portfolio management processes and a strong decision-making culture in which top management is deeply committed and engaged. Practically, this can mean that global business-unit heads and R&D teams review pipelines on a quarterly basis. Importantly, determining what *not* to do is as crucial as deciding what to pursue. According to our research, the organizations that are the most successful in their R&D portfolio management are unafraid to terminate projects that fail or struggle to advance or those whose business cases have weakened due to changes in the market.

Another marker of best-in-class R&D portfolio management is a single centralized and frequently updated source of truth for all R&D project data, particularly data that feeds into each project's

business case and enables the informed and timely decision-making described above.

Importantly, R&D performance management does not end with the commercialization of a new asset: leading R&D teams closely monitor their portfolios throughout the life cycle and continuously learn from their real-world performance. For example, organizations could monitor how a newly launched product performs against the expectations that were built into its initial business case. This kind of feedback can help R&D—and commercial—organizations to continuously improve the quality of their predictions and decision making.

Medtech leaders know these efforts matter to investors. A senior executive at one large global medtech company told industry analysts that their organization doubled the value of the company's pipeline R&D projects and multiplied the number of high-value R&D projects (as measured by net present values) in three years, clearly displaying value creation potential to the public markets.

Three “power capabilities” to define world-class products

Delivering world-class products, technologies, and services to healthcare providers and patients is every R&D organization's ultimate purpose. To achieve this, R&D organizations need to excel in three areas.

Medtech companies that outperform their counterparts take a holistic approach to R&D transformation. This means tackling in parallel five areas that are critical for R&D excellence.

Product management. In practice, this means empowering product managers to act as business owners for their respective products. To fulfill this mission, product managers need to have a comprehensive set of skills, particularly in leadership and influencing, and a strong understanding of unmet customer needs. Ideally, they also have sufficient technical knowledge to manage product requirements and engage effectively with R&D engineers.

Because such talent is rare, organizations should invest in building these skills through in-house capability-building programs; strategic hiring of experienced product managers from outside, including from other industries; and a leadership development model that incorporates product management into an attractive career path.

Design thinking. Design thinking should be systematically applied to every R&D project.⁴ Design-thinking methods include closely observing healthcare providers and patients, mapping end-to-end journeys from the perspective of user personas, and rapidly prototyping and iterating product concepts in partnership with users.

In a world in which consumer products set the bar for simplicity, performance, and ease of use, design thinking is key to developing distinctive medtech solutions. It leads to products that engage patients and healthcare providers through intuitive user interfaces and that offer a seamless experience across the user journey—attributes that can provide a decisive competitive edge.

Excellence in design correlates strongly with value creation: medtech companies that led the industry in adopting best design practices had 42 percent higher revenue growth and 108 percent higher shareholder returns compared with the average competitor.⁵ The impact can also be seen on an individual product level: Distalmotion, a

manufacturer of surgical robots, adopted design-thinking best practices when developing its next-generation system and achieved a significant reduction in development time.⁶

Systems engineering. Systems engineering is an R&D function composed of engineers with extensive experience and deep technical capabilities. This group is usually responsible for new-product concepts, architecture, and specifications. A strong system-engineering function effectively translates users' unmet needs and requirements into actionable product architectures and technical specifications for entire systems and their components. Input from systems engineers is vital for engineers—including mechanical, electrical and electronics, and software—who design, verify, validate, produce, and launch products.

Agility and speed in product development execution

Speeding up product development is paramount for most medtech R&D leaders. Agile development practices, such as continuous decision making, can help increase speed and effectiveness.⁷ In our experience, agile development practices are especially influential in the R&D of complex systems, where they can reduce time to market by more than 30 percent and increased productivity by about 20 percent. They generally help organizations respond more flexibly to changes or new information and reduce risk by providing transparency into the status of projects.

Of note, agile development needs to be applied in the unique context of medtech R&D. For example, agile processes will need to be tailored to work in between the typical stage gates of R&D necessary for quality assurance and regulatory compliance. Still, they can significantly improve collaboration among R&D engineers and between R&D and other functions.

⁴ For more on design thinking, see John Edson, Garen Kouyoumjian, and Benedict Sheppard, "More than a feeling: Ten design practices to deliver business value," McKinsey, December 8, 2017.

⁵ For more on the link between design practices and business outcomes, see Fabricio Dore, Garen Kouyoumjian, Hugo Sarrazin, and Benedict Sheppard, "The business value of design," *McKinsey Quarterly*, October 25, 2018.

⁶ For more on design thinking in medtech, see Jack Donohew, Matthew Durack, Maiko Hirai, and Thomas Nilsson, "Accelerating customer-centric innovation in medtech," McKinsey, March 7, 2023.

⁷ "The five trademarks of agile organizations," McKinsey, January 22, 2018.

Medtech companies draw the most benefit from agile practices when used in concert with other core agile principles.

The medtech quality process can likewise be adapted to agile frameworks. Currently, many design control deliverables are still developed and documented manually and retroactively, with the documents approved in batches in quality-management systems. Instead, quality could be embedded in the development process from the outset and tested at each development stage, aided by digital tools. These best practices have streamlined design controls, allowing organizations to cut in half the time it takes to generate design history files (DHF), a requirement for regulatory approval.

In our experience, medtech companies draw the most benefit from agile practices when used in concert with other core agile principles, such as small cross-functional teams and daily rituals.⁸ Finally, basic principles of R&D effectiveness—for example, allowing a critical number of engineers to fully focus on one project at a time and investing in project management capability building—remain important.

Next-generation digital and analytical tools

Next-generation digital and analytical tools can help R&D functions increase productivity and speed in product development and enhance the performance and quality of products. These technologies have already helped reduce development cycle times by more than 50 percent and have reduced costs by 30 percent in other industries, according to our analysis.

Medtech companies have begun to adopt these tools to boost efficiency. One medical equipment R&D organization used to rely primarily on paper, needed to be co-located, and took 12 to 18 months to develop new products. New software now allows the team to create digitized design-history files that support collaboration on three continents, and the team cut its development timeline to six months. Another company reduced its R&D costs by 10 percent and increased throughput by 15 percent by using advanced analytics to identify and respond to opportunities to improve R&D productivity. For instance, the company discovered that it could dramatically improve collaboration between functions by altering the composition of product development teams, with more frequent and direct contact between engineering, upstream marketing, and supply chain during stage gate handovers.

Digital tools can also enhance the performance and quality of medical devices and avoid costly reworks. For example, a severe adverse event in a human implant was discovered during animal testing. The traditional approach to design and validation would have delayed the launch by many months. But the R&D team used a digital twin (a virtual representation of the physical medical device) and a deep-learning model to rapidly simulate and validate hundreds of potential alternate designs.⁹ This approach helped the team quickly converge on an improved design that addressed the issue and kept the launch on schedule.

⁸ For more on agile, see Wouter Aghina, Christopher Handscomb, Olli Salo, and Shail Thaker, "The impact of agility: How to shape your organization to compete," McKinsey, May 25, 2021.

⁹ For more on digital twins, see Kimberly Borden and Anna Herlt, "Digital twins: What could they do for your business?," McKinsey, October 3, 2022.

External development

Unlike their pharmaceutical counterparts, which may derive up to 50 percent of their product development pipeline from external partners such as contract research organizations, medtech companies have traditionally focused on in-house innovation. But with disruption from fast-moving digital players and pressure from low-cost providers in commoditized areas, medtech companies could consider accessing ideas, talent, and technologies from external sources.

This broad category includes original development manufacturers and joint development manufacturers. It also includes joint ventures and strategic alliances for new businesses, as well as corporate venture funds, through which companies take equity positions in promising start-ups.

For development efforts that fall outside the company's core businesses and competencies, one approach is to spin off the venture, find co-investors to scale it, and reintegrate it into the parent company later. Among the benefits, the new venture—freed from corporate decision making—can move more quickly, has access to a larger pool of capital from investors with a higher-risk appetite, and can maintain a strong strategic and operational focus (as can the core business).

Medtech companies can get more out of their substantial investments in R&D. Rewiring the function could help make it not only a source of innovation but also an engine for commercial growth.

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3

Cracking the code of software innovation

Software development calls for an entirely different approach from traditional product development methods. Medtech companies can borrow a page from leading software firms.

*by Venky Anant, Shih-Yung Huang,
Sreeharsha Konga, and Delphine
Nain Zurkiya*



Software is taking on a new, expanded role in medtech. Traditionally, it has performed a basic function within a medical device, such as the reader of an in vitro diagnostic assay. However, more companies are discovering that software can be a value-adding differentiator. Consider a spinal cord stimulator, which uses personalized algorithms to enhance the value of the physical device itself. Going even further, some companies are proving that software can be the device itself, as in the case of Click Therapeutics, whose digital therapeutics products treat patients directly.

As software becomes a more significant source of differentiation in medtech, organizations see a need to reimagine their product development processes. Software development has shorter cycles than hardware, necessitating end-to-end collaboration across a range of functions. The best software products are developed through continual interactions with users, allowing companies to learn as they go and incorporate feedback—a practice not available for hardware products. In fact, according to our recent medtech R&D roundtable survey, the top constraints for software development in medtech are related to operating models—team capacity, skills, and talent—not technology or demand (Exhibit 1).

In this article, we highlight how medtech companies can integrate lessons from leading software companies to excel in software development.

Adapting software R&D operating models for success

For medtech incumbents seeking to shift to value-added software or software as a device itself, we suggest three actions to improve their operating model: build a robust tech stack, adopt software development best practices, and strategically source intellectual property and talent.

Build a robust tech stack

Patients' very lives may depend on their medical devices. Unlike in social media or other digital-first industries, end-product failures cannot be tolerated. Healthy functionality begins with a robust tech stack that enables elasticity (to grow), agility (to innovate rapidly), and reliability (to reduce risk).

At a high level, the stack has three layers¹:

The *engagement layer* is the software's connection to the outside world (other devices and data sources). Because medtech software will likely need to work with many counterparties, medtech companies should focus on building a flexible engagement layer that ensures the ability to integrate reliably and securely with partners through APIs.

A distinctive *intelligence layer* harnesses algorithms (a key source of differentiation) and seamlessly aggregates data from proprietary and publicly available sources.

¹ In our chapter on ecosystems, we discuss how each layer can add value to patients and clinicians. In this chapter, we highlight where medtech companies need to focus to build strong and functional layers.

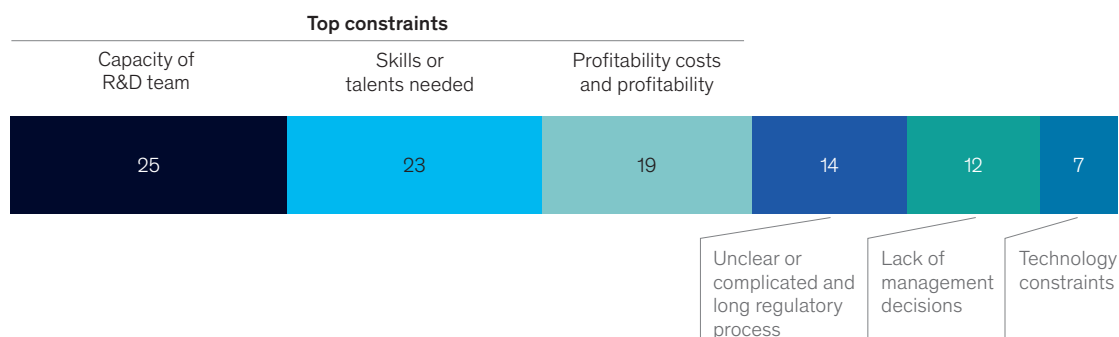
'We've been using software for over three decades, but its function was to make our instruments run. Now we're in the business of using software to deliver actionable insights, using digital tools and data science in the service of patients to drive outcomes. These tools support our core strategy of delivering personalized healthcare as well as our next step: adding insights to that combination of pharma and diagnostics.'

• — **Global head of information solutions,** •
global pharmaceutical and diagnostics
company

Exhibit 1

Medtech companies face several constraints in developing software as a medical device.

Constraints in software development, % of respondents, n = 192



Source: McKinsey Medtech R&D Roundtable

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In many industries, proprietary data can be the most critical differentiator, while algorithms can be seen as more commoditized. In medtech, data is similarly important, but the thinking on algorithms differs. Given that algorithms make decisions that influence patient care and outcomes, effective algorithms can quickly differentiate companies from one another. In our experience, medtech companies that prioritize algorithms alongside data are most likely to achieve better outcomes.

The *infrastructure layer* has been the focus of much innovation over the past ten years, thanks to the advent of cloud. The traditional model, which required large, onetime investments in data centers, has been replaced by consumption-driven pricing models that lower barriers to entry.

Although companies often focus on cloud's potential to lower infrastructure costs, the true benefits extend further. Global cloud-services providers (CSPs) have made significant investments to develop industry-specific offerings and innovate in the engagement and intelligence layers. To get the most benefit, medtech companies should build a new tech stack tailored for the cloud rather than simply retrofit their existing tech stack.

Adopt software development best practices

The good news is that leading software companies have established a tried-and-true method for developing products in a consistent, efficient manner. For medtech companies to adopt this method, which differs substantially from their standard hardware development processes, following several best practices will be crucial.

Rethink product management. Innovative start-ups excel at responding precisely to the most critical unmet needs of customers. They start with an idea but then use their product leadership muscles to rapidly iterate (with customers, product managers, and product developers) to develop and deliver the most desired features.

By comparison, product managers within medtech organizations often report to regional marketing teams and focus largely on gathering requirements. Their interactions with R&D often involve rigid, legacy documentation of market and product requirements rather than more collaborative problem-solving sessions. This disconnected structure leads to elongated development loops, quality issues, and multiple postrelease refinement cycles, which increase overall R&D costs and erode value.

The role of product manager at medtech companies is often conflated with those of project and program managers. Medtech leaders point to two characteristics of great product managers. First, they carefully track usage data (for example, from product telemetry) and draw on it to know their customers, shape the product road map, determine when to retire products, and enable users to capture value more quickly. Active field testing and experimentation enable product managers to aggregate data that supports the product's continuous improvement.

Second, great product managers have an impeccable "product sense." Drawing on years of experience and a mindset unfettered by norms, they have an intuitive ability to understand how technology can address an issue in a new way. The best product managers tap designers, engineers, and data scientists early in the ideation phase to benefit from their unconventional thinking.

Promote engineering excellence. Software engineering excellence can unlock significant value across multiple dimensions. In our experience, companies that increase the productivity of engineers, teams, and the whole organization can save 15 to 30 percent in IT operating expenditures, accelerate time to market tenfold, and achieve 55 percent higher innovation from self-organizing, agile teams.

For most software-driven companies, engineers are the most expensive resource. Therefore, development velocity—the ability to achieve transformative business performance through software development—is critical. A McKinsey

survey of more than 400 companies found that product management, culture, talent management, and development tools have the highest impact on developer velocity (Exhibit 2).² However, identifying and executing these levers is a difficult challenge.

To fully unlock velocity and deliver innovation to the front lines quickly, companies can act in four phases. In the diagnostic phase, companies assess their current development velocity using machine learning–based analysis and benchmarking. In the blueprint phase, companies redesign their organizational structure and product development life cycle. In the frontrunner phase, companies implement a new product and engineering model with one to two teams and an embedded coach. Finally, during the scaling phase, companies systematically scale this new way of working to the broader team.

Lead in cybersecurity. Quality and safety requirements already play an important role in medical devices. For software-based solutions, cybersecurity enters the equation. For patients, providers, payers, and other ecosystem partners, the concept of medtech manufacturers handling sensitive patient data is relatively new. Companies that develop leading cybersecurity practices and prove themselves to be trusted partners could therefore gain a competitive advantage.

Tailor development processes based on regulatory needs. In conversations with medtech executives, we frequently hear concerns about whether their organizations can harness the benefits of software product development—including agility and rapid iterative cycles—in a highly regulated industry.

² For more on developer velocity, please see Chandra Gnanasambandam, Neha Jindal, Shivam Srivastava, and Dilip Wagle, "Developer Velocity at work: Key lessons from industry digital leaders," McKinsey, February 22, 2021; and Shivam Srivastava, Kartik Trehan, Dilip Wagle, and Jane Wang, "Developer Velocity: How software excellence fuels business performance," McKinsey, April 20, 2020.

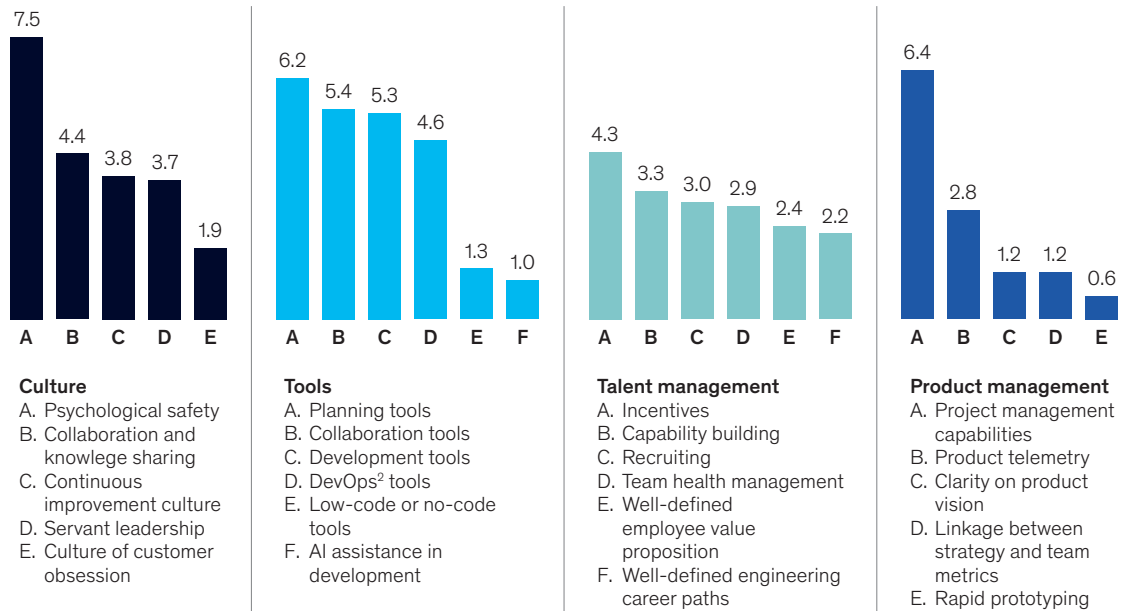
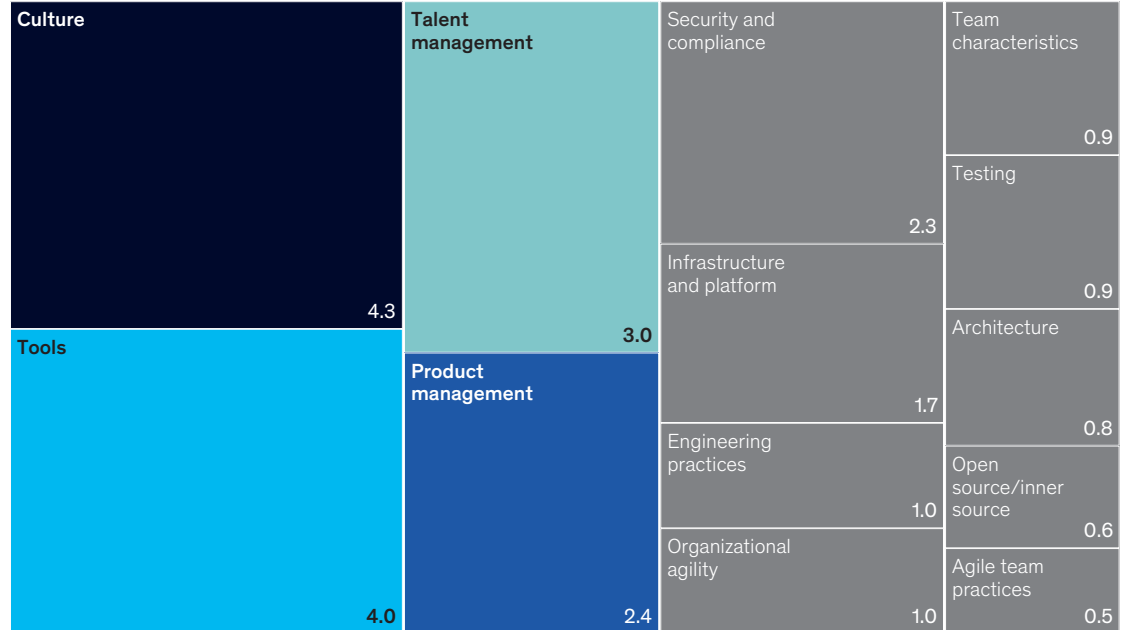
'Most of our compliance and quality issues emanate from our inability to gather nonfunctional requirements. Our [product] teams have never done it. That will not work in a software product. Product managers need to know what, when, how, where, and everything around it.'

— VP of product development,
top five global medtech company

Exhibit 2

Four software development drivers have the greatest impact on overall business performance.

The relative importance of software development drivers on overall business performance,¹ %, n = 440



¹Calculated using Johnson's relative weights: % importance is relative importance of driver on business outcomes. Total sums to 100%. Higher % indicates stronger impact on business performance. Overall business performance measured as average score for innovation, customer satisfaction, brand, and talent.

²Software development and IT operations.
Source: McKinsey Developer Velocity Survey

‘Not all software needs to follow the same standards. In a single meeting, we were able to carve out 20 percent of our software code that could be released using a [continuous integration and continuous delivery] pipeline, which we never thought was possible.’

—Program manager, medtech services and product company

The companies that have done so most successfully have recognized the benefit of “branching”: tiering software features within a given product and tailoring their development accordingly. Highly regulated features follow one branch of the development pathway, while less-regulated features follow another branch.

One large medtech company dedicated three months to an “all hands on deck” effort to categorize its software products and develop tailored branches for each category. Some of the most interactive software elements (for example, a phone app that shows status and schedule) were identified as being subject to less-stringent standards. As a result, the company can frequently update the user interface based on user feedback and still maintain compliance.

Source talent strategically

Medtech companies use advanced recruiting capabilities to attract world-class hardware and engineering talent. However, companies have yet to prove their value proposition and recruiting prowess when it comes to software candidates.

Recently, a council of leading medtech chief information officers (CIOs) and chief technology officers (CTOs) identified the shortage of good technical software talent as the most significant inhibitor of growth and innovation for their organizations. Successful companies can capture substantial benefits, have higher growth potential (Exhibit 3), and ultimately deliver better patient outcomes.

Today, medtech companies routinely fill open software positions with contingent labor to close

the talent gap. This strategy can be effective to a point, but it can also cause issues: as contractors become a larger portion of the software team, companies may experience a shortage of in-house strategic capabilities, the loss of a long-term product pipeline, higher operational costs, and quality issues.

A company pivoting to a software-focused strategy will likely find value in restructuring the organization toward a team of in-house talent that will enable long-term productivity and performance enhancements. Not every company will be able to prioritize a wholesale transformation: talent is scarce, and speed to market should remain a priority over waiting until the organization has a fully equipped team in-house. However, companies should be aware of these potential risks when hiring contingent labor. Companies can map their end-state organization and identify which roles will be most strategic (more appropriate for in-house) and which will be primarily execution oriented (more appropriate for contingent). Medtech executives can also build relationships with staffing companies and other ecosystem players to establish a more reliable source for contingent team members.

These talent considerations apply not only to software developers but also to roles in the product management, quality, compliance, and legal departments.

In the next era of medtech innovation, value will be disproportionately skewed toward software. Medtech companies have an in-depth understanding

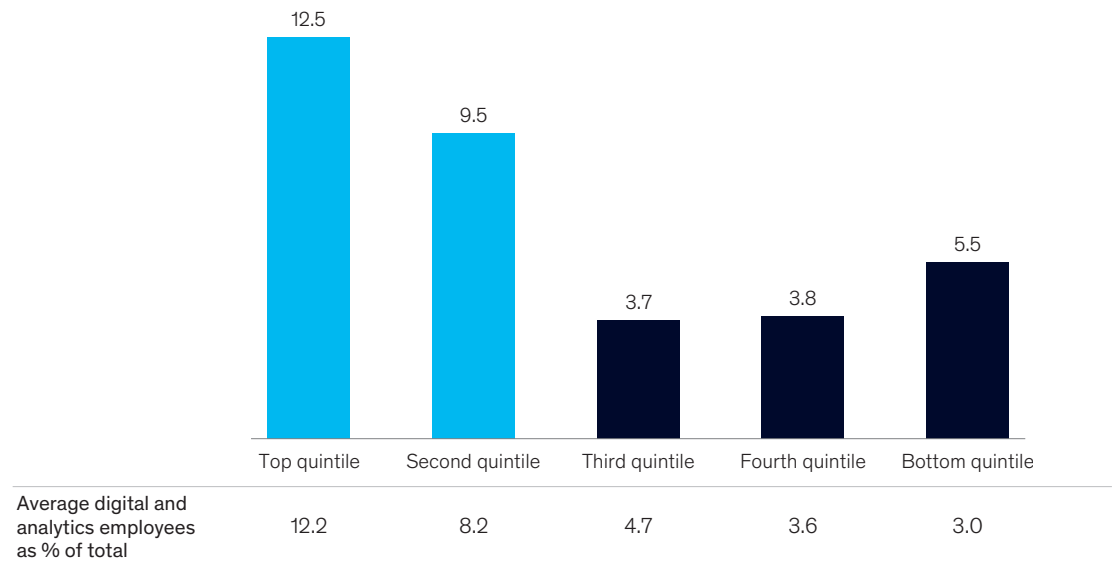
‘A local university conducted a survey of the most desired employers in tech; the first life sciences or medtech company was listed at number 14. When we engaged one-on-one and shared the mission and our role in reshaping the pandemic, we had a majority of the graduating class apply. We’ve got to use our beliefs a bit more to get the best of this generation.’

—Chief technology officer,
global medtech company

Exhibit 3

Companies with a higher percentage of digital and analytics employees have higher growth potential.

Median sales growth projection (CAGR, 2022–25) of the top 25 medtech companies¹ by quintile, %



¹Top 25 pureplay medtech companies by market cap where data was available. Average market cap in each quintile is inline. Source: LinkedIn data, S&P Global

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of products, markets, patient needs, and regulations, but their R&D will need to be overhauled to support software development at scale. The three levers for transformation will be key. By pursuing this path,

medtech companies could also be positioned to expand patient access to higher-quality healthcare services in the years ahead.

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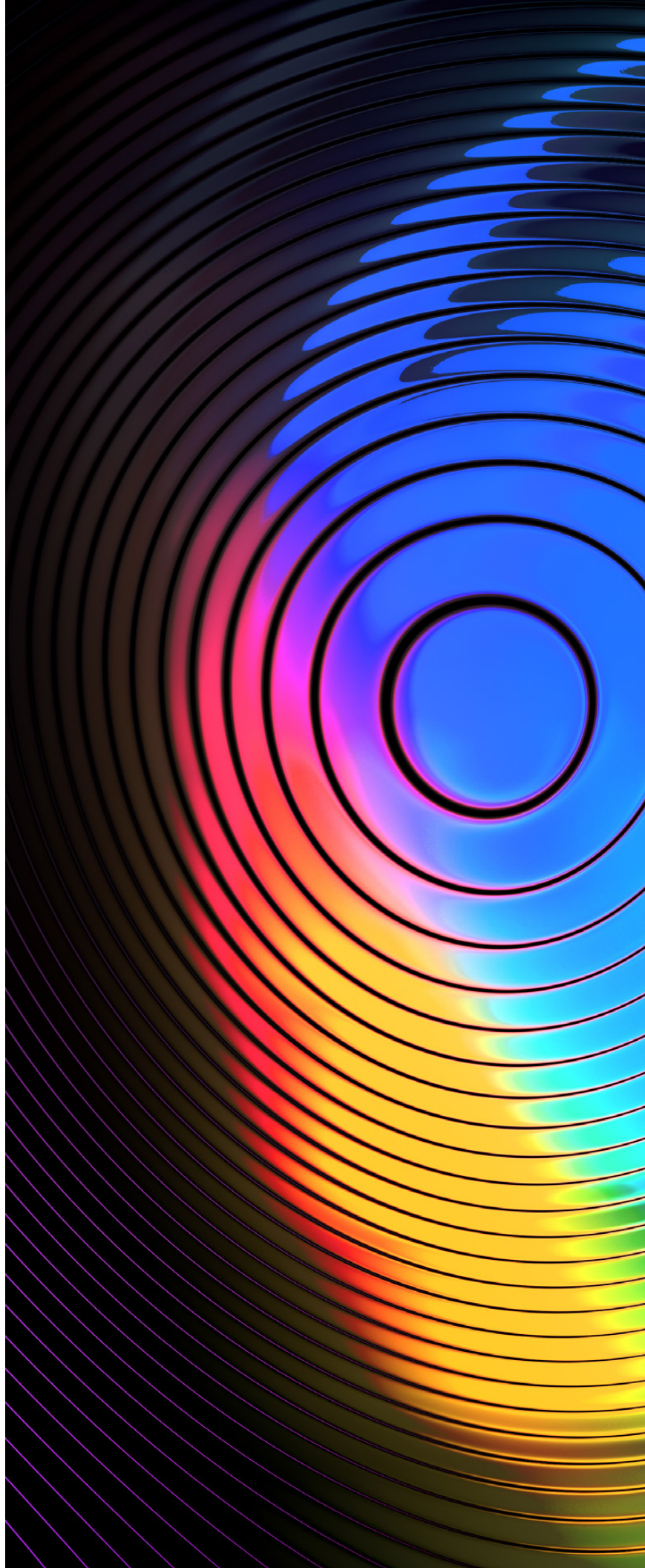
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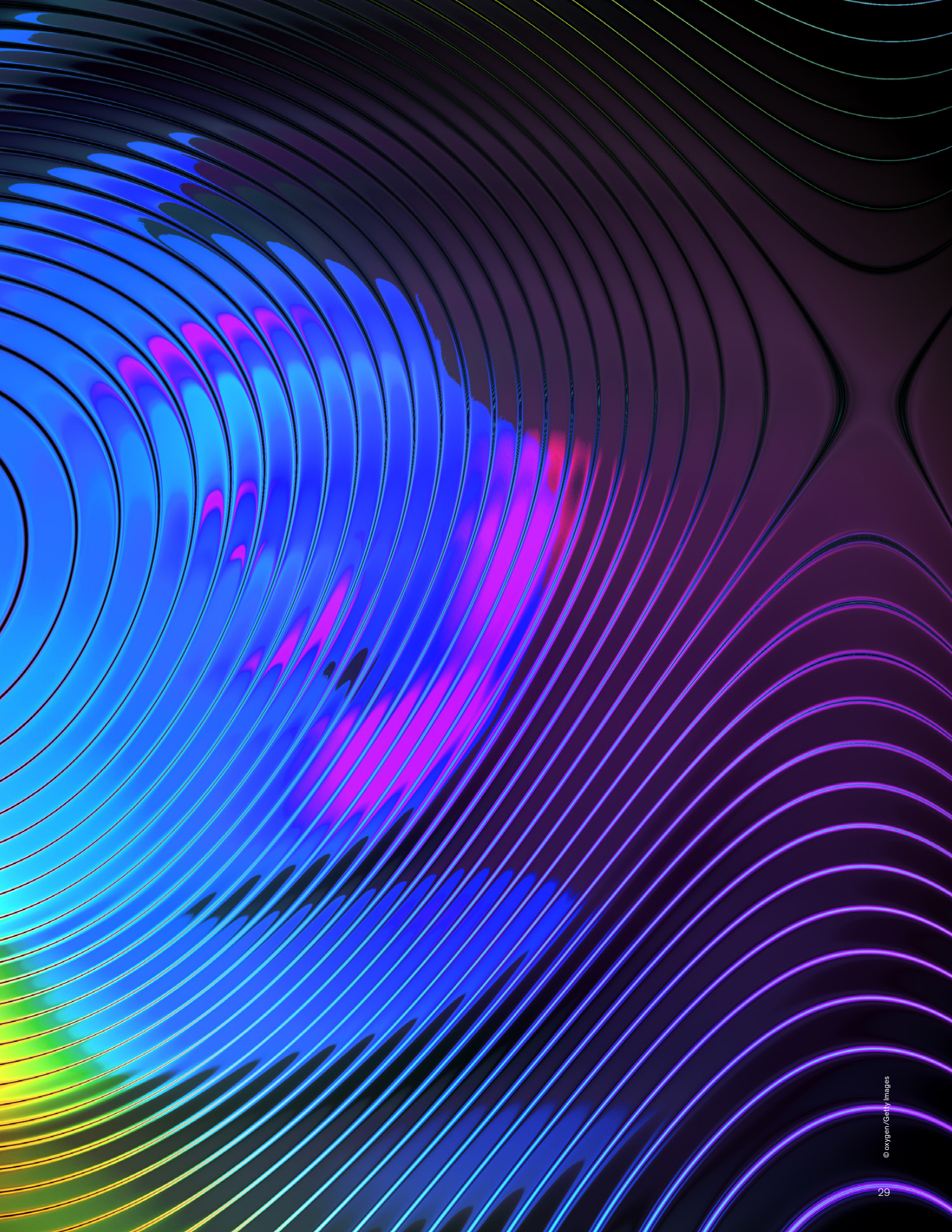
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Bringing hardware and software together into digital health ecosystems

Medtech companies can expand their role in digital healthcare ecosystems by combining devices and data to improve care outcomes.

This article is a collaborative effort by Jason Bello, Josh Copp, Mike Ennen, Ari Perl, and Delphine Nain Zurkiya, representing views from McKinsey's Life Sciences Practice.





Medical devices have become smaller, lighter, safer, and sturdier. Following the lead of other technologies—from computers and cell phones to cars—the next frontier is to make devices smarter. Smart devices form ecosystems, which aggregate data, derive insights to improve experiences, and create loyalty (to that ecosystem over others). In healthcare, ecosystems have advanced significantly in recent years,¹ thanks to improved access to health data (for example, through improved electronic-health-record [EHR] data interoperability) and an increase in funding in healthcare technology.²

To date, large medtech companies have not participated at scale in digital health ecosystems. Medtech companies' absence in ecosystems comes despite the companies' two valuable, relevant assets: medical devices and the data they generate. The previous two chapters explore innovation in each asset—devices and software—on its own. This chapter explores what's possible when companies bring devices and data together into device-driven ecosystems.

McKinsey estimates that the total addressable market for medtech companies in digital health ecosystems will reach \$140 billion by 2025, with double-digit CAGR. This opportunity is spread across five areas: clinical-decision enablement, workflow improvement, population health monitoring, chronic-condition management, and patient engagement.

The basics of a device-driven digital health ecosystem

A device-driven digital health ecosystem is a gateway, providing users (patients, clinicians, health systems, care coordinators, and payers) with access to software-based products and services through a single digital platform, connected to a device. We define ecosystems based on their technology components, the companies involved in a variety of roles, and whether they are “open” or “closed.”

Technology components

As discussed in chapter 3, “Cracking the code of software innovation,” ecosystems comprise three technology layers: engagement, intelligence, and infrastructure (Exhibit 1). Each layer plays a role in every ecosystem.

The engagement layer supports flexible collaboration with the other devices and sources in an ecosystem to curate an end-to-end experience for users. The intelligence layer, in which companies can develop distinctive algorithms, consists of an analytics platform used to extract and deploy actionable insights from the data. The infrastructure layer, built on a cloud-native tech stack and housed in the cloud, includes a data platform where data is captured, curated, managed, stored, and exchanged.

Ecosystems frequently involve multiple stakeholders. Medtech and health technology companies often contribute digital solutions and software to the engagement layer (for example, patient engagement apps and wearables) and to the intelligence layer (such as AI and algorithms tied to healthcare data). Technology companies often contribute to the infrastructure layer (for example, cloud and edge computing), and patients and providers are often the primary users who contribute to and access the data.

Roles in ecosystems

Given the complexity of ecosystems and the range of available opportunities, medtech leaders will need to decide what role their company will play³:

- **Builder.** A builder typically plans to construct a new ecosystem business to provide diversified offerings that constitute a break with tradition. Generally, builders have their own strong core technology, customers, and data.
- **Orchestrator.** An orchestrator helps connect companies in an ecosystem by developing a series of strategic partnerships and alliances and using digital technology to link them

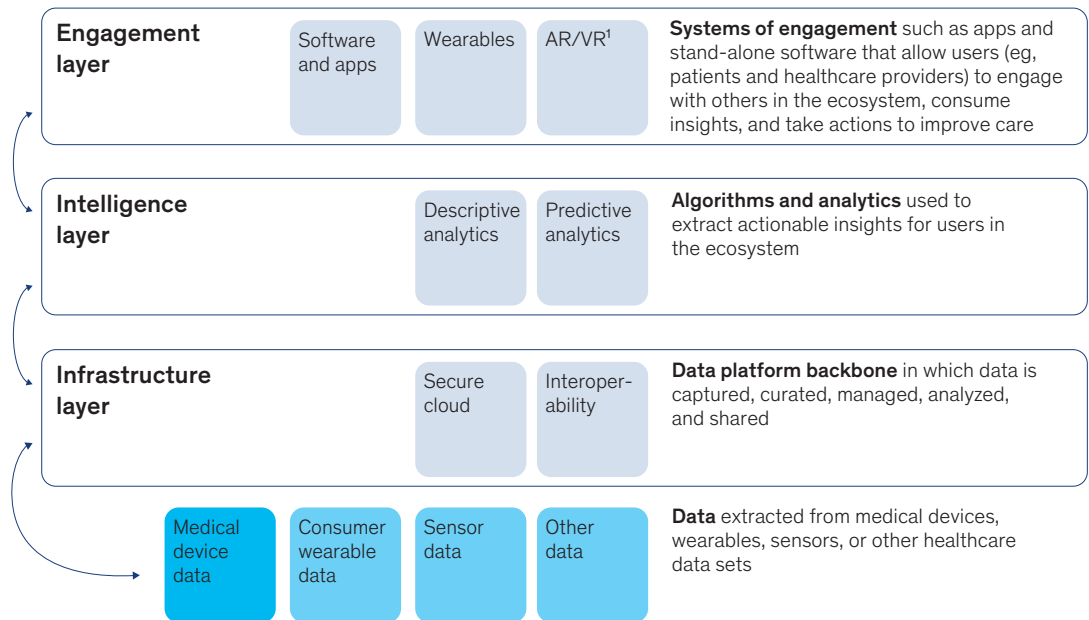
¹ Stefan Biesdorf, Ulrike Deetjen, and Basel Kayyali, “Digital health ecosystems: Voices of key healthcare leaders,” McKinsey, October 12, 2021.

² Rock Health Venture Funding Database, 2021, accessed May 31, 2023; McKinsey analysis.

³ *The ecosystem playbook: Winning in a world of ecosystems*, McKinsey, April 2019.

Exhibit 1

An ecosystem built around a medical device comprises three layers.



¹Augmented reality and virtual reality.

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together, provide products and services, and share customers and data.

- **Participant.** Participants provide products and services in an ecosystem, acting as a link in a value chain connected through alliances and partnerships and using partners' resources and capabilities to enhance their business, upgrade their products to adapt to ecosystems, and better meet user needs.

The choice of what role to play depends on the company's capabilities, ambition, and risk appetite, among other considerations. Most medtech companies today do not play a role in ecosystems. Those that do generally act as participants, such as imaging companies whose scans (for example, MRIs⁴) are sent to EHRs and stored digitally for easy, compliant access by healthcare providers.

Playing the participant role can be immensely valuable to a company, creating loyalty to that company's device beyond a discrete use and offering the opportunity to collect additional data and glean new insights. Each step up can multiply the value at stake. Two examples show the roles medtech companies can play:

- **ResMed.** ResMed orchestrates its ecosystem, which has helped the company build a leading position in sleep apnea. ResMed's AirSense machine connects to its myAir app and provides milestone accomplishments and motivation to patients, increasing therapy adherence by 17 percent. AirSense also connects to AirView, a provider-facing platform that improves patient monitoring through remote diagnostic tools and feeds data back to ResMed to better personalize care and inform product development.⁵

⁵ "40th annual J.P. Morgan Health Conference," ResMed, January 10, 2022.

- *Johnson & Johnson's Abiomed.* Abiomed plays the builder role with Impella Connect, a smartphone app that allows healthcare professionals and Abiomed's clinical support team to monitor a patient's status without having to sit at their bedside. The ecosystem improves patient care by sending notifications when urgent care is needed. It also enables collaborative patient management between the Abiomed support team and clinicians, fostering streamlined communication based on real-time data.⁶

Open and closed ecosystems

Beyond a company's role in an ecosystem, the value of an ecosystem will also depend on whether it is open or closed (see sidebar, "Considerations for open and closed ecosystems").

Open ecosystems. Open ecosystems use proprietary data from medtech devices as a source of insights, and they integrate and share data and insights to and from other devices and systems. This multifaceted lens can generate a more

⁶ "Impella Connect," Abiomed, accessed May 31, 2023.

Considerations for open and closed ecosystems

Medtech companies can assess their open and closed ecosystem opportunities with their device portfolios and data types, as well as the ecosystem's *raison d'être*, in mind. For instance, a monitoring device may lend itself to an open ecosystem when several products and data components are required to get a holistic view of the patient's

condition and because it would be easier to partner than to build out each ecosystem component. By comparison, when the device and data are more self-contained and readily accessible from a single medtech company, such as in cardiac-rhythm management, a medtech company could more easily build a closed system (see table).

Each type has challenges. An open ecosystem relies on collaboration from different partners. Closed ecosystems can be difficult to maintain because competitors are often offered incentives to interject their products and services.

Based on recent ecosystem successes, it has become clear

Open and closed ecosystems vary based on device type and reliance on data.

Ecosystem platform	Basis for ecosystems of monitoring and therapeutic devices	Basis for ecosystems of interventional devices	Basis for ecosystems of monitoring and therapeutic devices
Open	Devices with complex adherence patterns, requiring physician monitoring and output to other devices or systems of record	Interventional devices and equipment with complex pre- and postoperation clinical workflow (eg, imaging, PROs, ¹ treatment planning, and EHR ² data)	Diagnostic devices with data interpreted in core systems of records (eg, PACS and LIS ³) or other systems of intelligence or engagement
<i>Examples</i>	<i>Sleep apnea and continuous glucose monitoring</i>	<i>Radiotherapy treatment</i>	<i>Diagnostic imaging and in vitro diagnostics</i>
Closed	Devices in a self-contained care pathway that require limited input and output to other devices or systems	Interventional devices and equipment that operate in a closed-loop system and require limited input and output to other systems for the care pathway	Diagnostic and screening devices through which data is mostly interpreted in a closed-loop system, with limited external input and output
<i>Examples</i>	<i>Cardiac-rhythm management</i>	<i>Robotic systems, energy-based devices, and smart instruments</i>	<i>Endoscopy</i>

¹Patient-reported outcomes.

²Electronic health record.

³Picture archiving and communication system and laboratory information management system.

Considerations for open and closed ecosystems (continued)

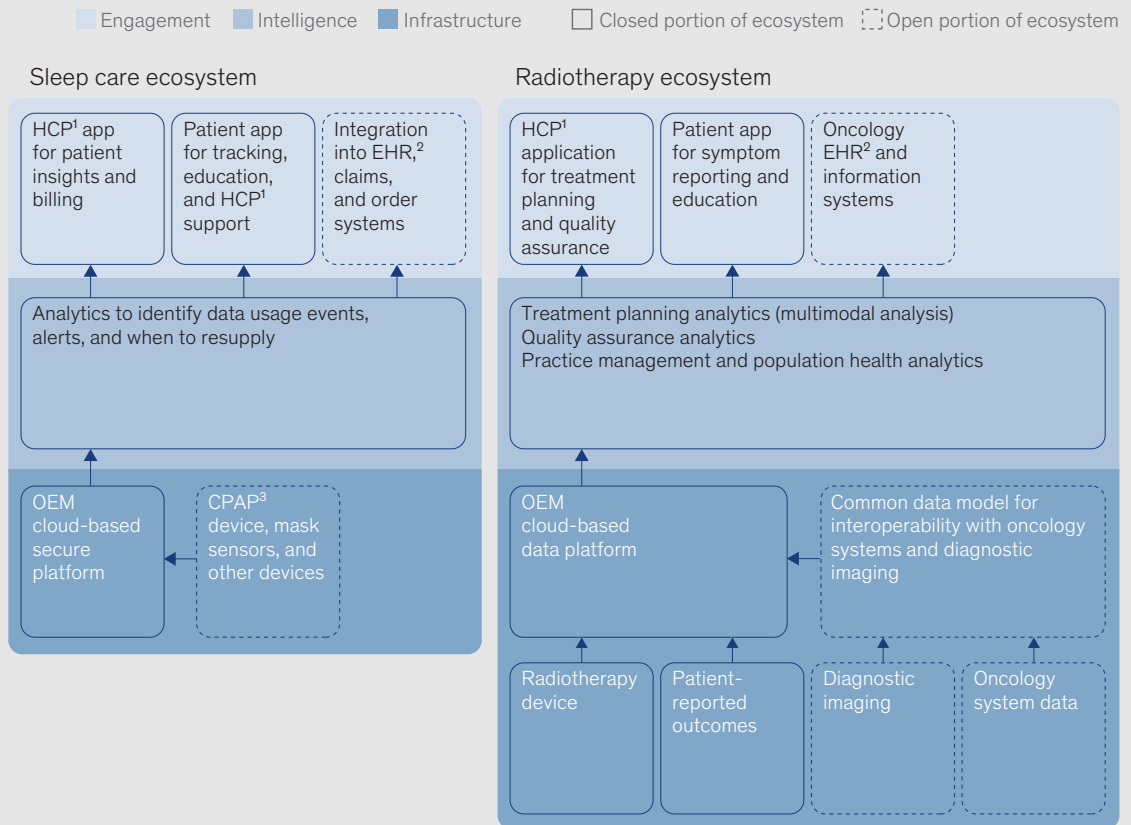
that the notion of open versus closed is not always binary; this decision might vary across the three technical layers to create an optimal structure. This could be the case, for example, in an open system used to treat sleep apnea or radiotherapy (exhibit). In the sleep apnea ecosystem, the engagement and infrastructure layers are open to incorporate the required data and insights about the patient's chronic-disease state (which requires output from and to other devices and systems of record, such as an electronic health

record [EHR]), but the analytics, which dictate how the patient could most benefit from their continuous positive airway pressure (CPAP) device and associated services, could be closed in order to generate targeted pull-through for the medtech company. In the radiotherapy ecosystem, the infrastructure layer had to be even more open, given the need for third-party imaging and broader oncology system data, but the radiotherapy treatment planning and reported patient outcomes could be closed to enhance both patient value (enabling

smarter treatment) and the device's real-world evidence generation (more comprehensive data).

The choice between open and closed, overall and within each ecosystem layer, is the critical design principle that medtech companies will need to evaluate, depending on their product and technological capabilities, strategic vision, and the broader group of participants.

Ecosystems can have a varied set of open and closed decisions.



¹Healthcare provider.
²Electronic health record.
³Continuous positive airway pressure.

comprehensive view of the patient and the ability to grow distinct value for users. A company may choose to be a builder, orchestrator, or participant in an open ecosystem.

Closed ecosystems. A closed ecosystem is one in which users rely exclusively on data and services from a company's device or devices. In certain scenarios, this option can deliver unique benefits to users (for example, a closed-loop system could generate data that is more accurate and insightful) and to the medtech company (for example, creating a higher likelihood that patients will use the company's device and serving as a source of additional data to improve algorithms).

How multiple business models can create value

Building ecosystems is an intensive process, and they require substantial capital, technology, and expertise. As such, getting the business model right is critical to ensure medtech companies can earn a commensurate return on their investments.

Companies can typically monetize ecosystems in two ways (Exhibit 2):

Stand-alone revenue. This entails charging for a portfolio of products separate from the device, typically through a subscription-based software offering or charging other manufacturers and participants for use of the platform to enable their solutions.

Pull-through device value. Companies capture additional device revenue because the ecosystem offers more benefits to users and patients who use the device more often and in combination with more of a company's products.

Whether or not companies can generate stand-alone software or software-as-a-service (SaaS) revenue tied to the ecosystem offering depends on the additional value they bring to the ecosystem (and care pathway), beyond what is already delivered by the primary device. As such, we typically see more stand-alone value captured when companies expand the services and data

Exhibit 2

Two primary revenue streams drive ecosystem business models and the total addressable market.

Ecosystem use cases ■ Target customer	Clinical-decision enablement	Administrative- and operational-workflow improvement	Population health monitoring	Chronic-condition management	Patient or consumer engagement
					Patient or consumer
					Provider
				Payer	
Revenue streams, ecosystem total addressable market (TAM), 2025, \$140–\$150 billion total					
• Stand-alone revenue (software and SaaS ¹) = \$90 billion	\$30	\$5	\$10	\$40	\$5
• Device pull-through = \$50–\$60 billion	\$50–60 Medical device TAM that can be pulled through when the device is digitally enabled and participates in the ecosystem				

¹Software as a service.
Source: Health Resources International; Markets & Markets; McKinsey analysis

they offer through the ecosystem. Furthermore, companies that produce and capture large volumes of high-quality data have the best chance to monetize their ecosystems. For example, a medtech company that built an operating room (OR)-focused ecosystem around its devices could have third-party developers create tools and applications to enhance the OR experience and, in turn, could receive subscription revenues from developers for this access. This type of stand-alone revenue will continue to rise in importance as ecosystems and their value become further solidified.

How medtech companies can launch or advance ecosystem initiatives

Many medtech companies have already built or are currently building digital point solutions (to serve a discrete purpose) around their devices. To extend into full ecosystems, leaders should focus on several strategy and operating model considerations:

Define value concretely and connect it to the user's economic model. Understanding the user's need is at the heart of an ecosystem's value. Aligning the digital ecosystem's economics to user economics can drive adoption, and increased use of ecosystem devices could generate better patient outcomes and lower cost of care. For instance, ecosystem users such as healthcare providers could have value-based-care models with payers in which they earn a portion of cost savings tied to the overall care provided or earn higher reimbursement as patient outcomes improve. Where possible, companies could seek to quantify ecosystem ROI (for example, substantiated through peer-reviewed research and

testimonials from key opinion leaders) and use this as the basis for their ecosystem commercial models.

Clarify your company's role in the ecosystem.

Builders derive more value in ecosystems than orchestrators, who in turn derive more value than participants. However, participants still derive significantly more value than nonparticipants. To capture the opportunity in a timely manner, medtech companies need to be realistic about their potential. Most medtech companies could not act as builders in the near term, but they could readily become active participants and gain a competitive advantage over nonparticipants.

Create network effects and reinforce value.

Successful ecosystems generate positive reinforcement, both for the users they engage and in the value they create. Consider an ecosystem that uses patient-reported outcomes to inform clinical-decision-making tools. As more users engage with the ecosystem, more data is generated, which can lead to better clinical decisions. This, in turn, entices more users into the ecosystem.

Although the level of transformation required by medtech companies to deliver ecosystem offerings may seem beyond reach for many, this is a new frontier of value worthy of consideration. Companies that choose to build, orchestrate, or participate actively in these device-driven digital ecosystems are well positioned to deliver distinct impact to patients and providers and to create new value for shareholders.

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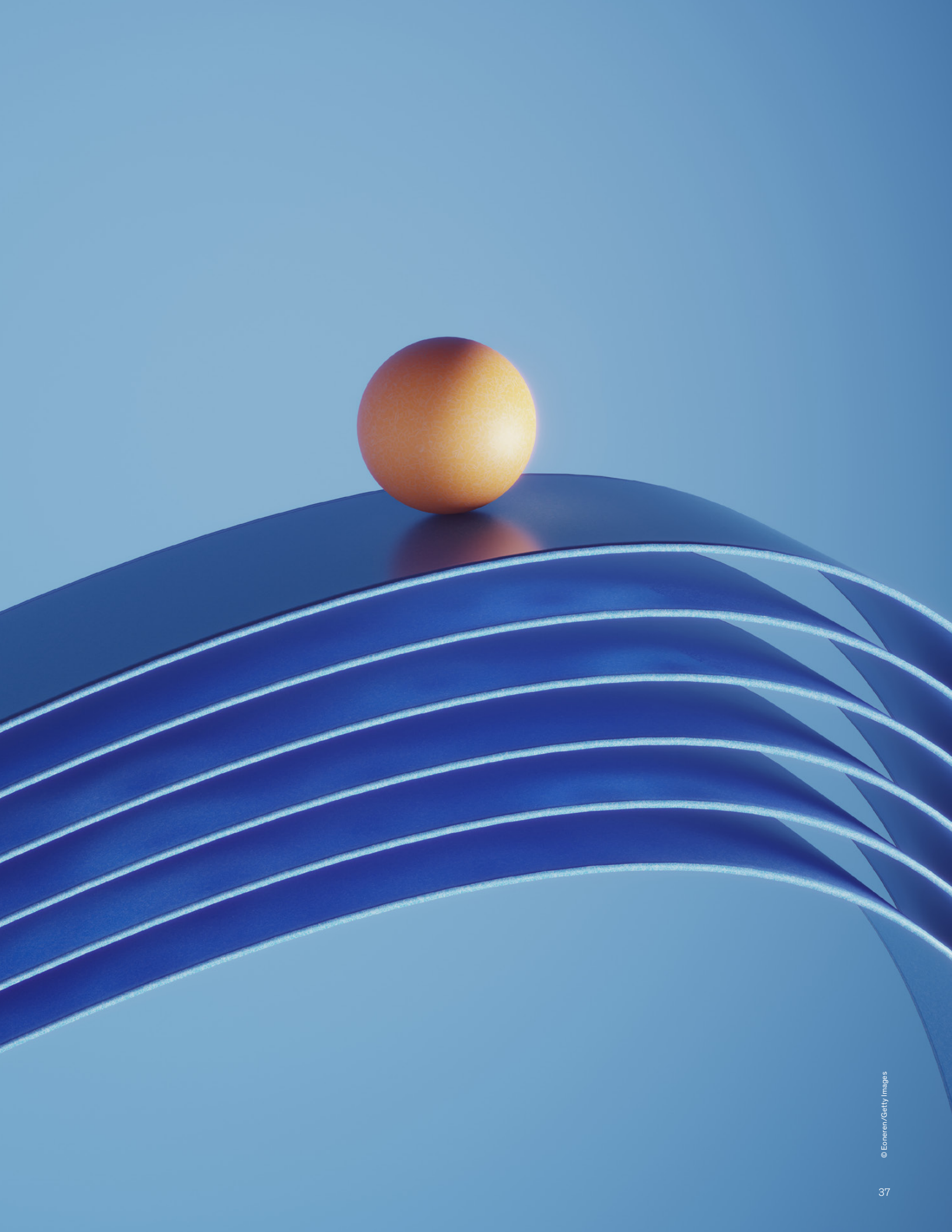
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5

Building a next- generation medtech commercial model

Commercial models must evolve to support new types of offerings, adapt to changing customer expectations, and position companies to succeed in the decade ahead.

This article is a collaborative effort by Ralph Breuer, Marcel Meuer, Abhi Patangay, Julia Samorezov, Maria Strom, and Delphine Nain Zurkiya, representing views from McKinsey's Life Sciences Practice.



In earnings calls and conference halls, medtech companies are being asked—and are asking themselves—the same question: When will the industry return to prepandemic “normal”? For commercial leaders, the answer is likely “never.” In the near term, labor shortages, high inflation, and unpredictable procedure volumes are putting pressure on health systems’ financial positions.¹ More structurally, after three years of digital communication, medtech customers—including healthcare professionals (HCPs), health system procurement departments, and health system administrators²—have higher expectations of their engagements with medtech companies.

Innovating engagement models and offerings is decidedly difficult for medtech leaders, especially in the face of mounting cost containment pressures. With R&D often highly protected and gross profit difficult to move, SG&A has been the target of many CFO reviews. From 2012 to 2019, SG&A spend grew slightly faster than sales at major medtech companies, but from 2019 to 2022, spend shrank as a percentage of sales for the first time since the Great Recession.³

Commercial executives are marshaling their resources to increase efficiency, but most have not pursued a next-generation transformation of the commercial model. In a survey of nearly 1,900 medtech leaders representing a cross-section of business functions, half reported that their companies have articulated an intent to invest in a new commercial model. Two-thirds said they had not laid out a customer-centric vision. Eighty percent said they have not yet meaningfully provided incentives to leaders to execute on the people, processes, and technology required to achieve that vision.⁴ Although the traditional commercial model still has a place in many product categories, medtech leaders increasingly acknowledge that, for most categories, a new approach is needed.

Rising medtech customer expectations

Medtech customers expect new forms of engagement and new products from medtech companies.

Digital engagement. The consumerization trend that has permeated nearly every aspect of daily life has extended into B2B healthcare settings. HCPs have high expectations for digital, omnichannel engagement with medtech companies—a trend that began well before the pandemic, intensified during it, and is likely to become permanent.

Medtech leaders have started to respond to this trend by augmenting the traditional commercial model, which has relied primarily on field representatives to sell products and solutions, with additional roles and channels to provide seamless, convenient, personalized, and on-demand engagement. These channels include self-service portals, webinars, and social media content.

HCPs’ preference for digital and remote interactions with companies has continued to grow: more than two-thirds prefer email interaction with medtech sales reps today, compared with less than half in 2019.⁵ Severe staff shortages, which leave HCPs with even less time for in-person interactions with medtech representatives, are accelerating this trend.

To be sure, in-person interactions are still required (for example, when demonstrating products or supporting physicians in using a new device). But omnichannel engagement—creating a unified customer experience across multiple channels with the requisite investments in people, processes, and technology—is quickly becoming a necessity for medtech companies and is associated with improved business performance (Exhibit 1).

Indeed, HCPs say the experience of interacting with sales and customer service is on a par with price as a reason to switch suppliers.⁶ In short,

¹ For more, see “The gathering storm in US healthcare,” McKinsey, accessed May 20, 2023.

² As used throughout this article, “customers” refers to HCPs, health system procurement departments, and health system administrators.

³ S&P Global Market Intelligence analysis of top 40 healthcare equipment companies by market cap as of April 4, 2023.

⁴ Ralph Breuer, Karen Passmore, Maria Strom, and Delphine Nain Zurkiya, “How medtechs can meet industry demand for omnichannel engagement,” McKinsey, March 28, 2023.

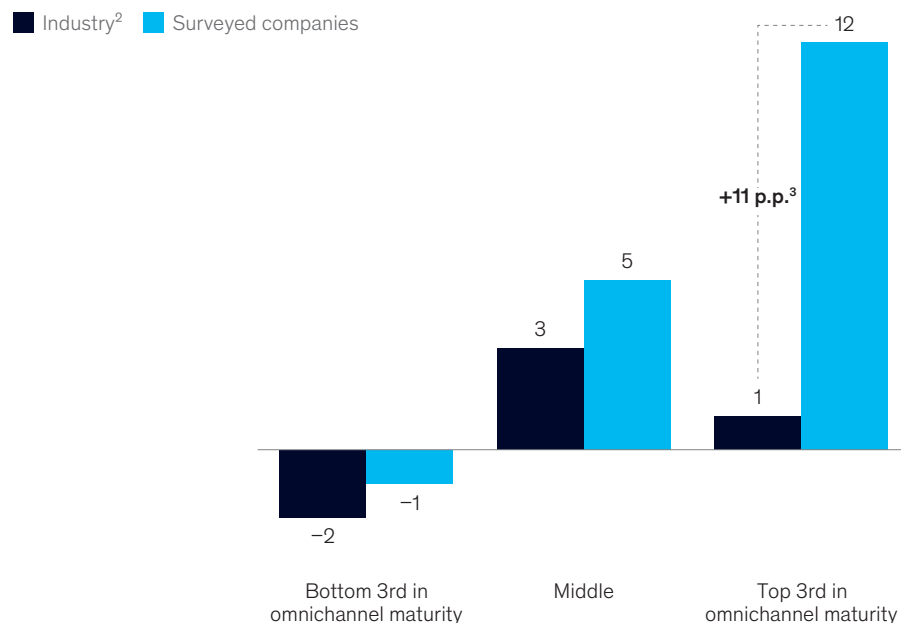
⁵ Ibid.

⁶ Ibid.

Exhibit 1

Omnichannel maturity is associated with stronger business performance and faster postpandemic recovery.

Revenue growth, 2021 to 2022,¹ %



¹From the 1st half of 2021 to the 1st half of 2022.

²Industries of participating companies included endoscopy, dialysis, drug delivery, imaging, general surgery, orthopedics, and orthotics.

³Percentage points.

Source: McKinsey Omnichannel Maturity Survey, 2022 (n = 1,900); McKinsey analysis of company filings

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research shows that medtech customers are demanding a modern engagement model.⁷

Subscription-based offerings. HCPs and procurement leaders also have higher expectations of digital products and solutions from medtech companies. Facing financial pressures, health systems are increasingly expressing a desire to shift their spending away from large capital purchases and toward subscription-based, as-a-service (XaaS) offerings. One director of pharmacy recently stated, “For my next purchase, I am going to do everything in my power to not buy any hardware in favor of an XaaS contract.”

Tech companies consistently double to triple their valuation multiples by shifting to XaaS products and solutions with recurring revenue streams via licensing or subscriptions.⁸ Companies that have adopted XaaS models have seen improved shareholder value, and capital markets tend to reward medtech companies that show strong growth of new business models and services.⁹ As a result, more medtech companies are harnessing the power of ecosystem selling and capturing value beyond core medical products by bringing solutions and services to market with XaaS models. Radiology companies are leading the shift to software solutions, but companies in other medtech categories are also making this transition.

⁷ Ibid.

⁸ S&P Global Market Intelligence data of ten information technology companies as of March 25, 2023.

⁹ Ibid.

Building a new commercial model

Meeting HCPs' rising expectations by providing differentiated experiences that improve engagement has been demonstrated to be an effective commercial strategy. Medtech companies that invested in omnichannel capabilities experienced two to three times higher revenue growth than their less-advanced industry peers.¹⁰ Beyond revenue growth, medtech companies that deliver omnichannel personalized engagement could increase their customer satisfaction metrics and improve selling efficiency.

When revamping their commercial models, medtech leaders can also keep several considerations in mind (Exhibit 2):

Master the basics

A strong set of foundational capabilities could be viewed as a self-funding insurance plan for the future. Medtech commercial leaders can start by identifying the most strategic customer stakeholder groups and their beliefs, motivations, unmet needs, and desired buying processes.¹¹ They can augment this research with data-backed insights including, for example, claims data analysis to estimate procedure volumes at different hospitals.

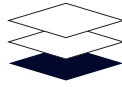
Based on this analysis, medtech commercial leaders could identify their highest-potential market opportunities and develop their customer segmentation strategies accordingly. This step

¹⁰ "How medtechs can meet industry demand," March 28, 2023.

¹¹ Hayden Lindskog, Maria Strom, and Christian Zerbi, "Using ethnography to translate behavior to value in medical devices," McKinsey, January 4, 2021.

Exhibit 2

A next-generation commercial model includes three layers of capabilities.



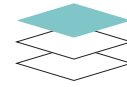
1 Master the basics

- deploying digital and inside sales channels in the right parts of the portfolio
- adopting and creating routines for customer segmentation, account planning, and the use of customer-relationship-management systems
- pricing processes followed and pricing performance measured on ongoing basis



2 Personalize omnichannel engagement

- improved customer journeys designed and deployed in areas where there is outside business opportunity
- automated recommendation engine for outreach and sales prioritization
- commercial functions collaborating through agile ways of working



3 Harness the power of ecosystem selling

- new business and pricing models to capture value of ecosystem (eg, as a service [XaaS])
- selling model distributed through network of partners
- best-in-class software sales force and customer success organization

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A strong set of foundational capabilities could be viewed as a self-funding insurance plan for the future.

includes deciding which parts of the portfolio to pursue with in-person (versus inside or digital) sales and supporting it with effective account planning and executive oversight.

Additional steps toward foundational capabilities include the following:

- Widely adopt a customer-relationship-management (CRM) system for daily use by in-person and inside-sales teams to holistically understand and address account and customer needs.
- Follow a pricing discipline to ensure that none of the hard-earned value identified during product and market development leaks during commercialization. Implementing tools and processes such as dynamic deal scoring¹² and pricing councils could help companies maintain this value-based approach to pricing.
- Create a measurement system to monitor performance down to the territory and account level and identify coaching opportunities. Dashboards using real-time data feeds could be

designed with relevant metrics for different groups, from individual sales reps to senior leaders.

Personalize omnichannel engagement

Once a medtech company has laid a stable, reliable foundation, leaders can layer on additional capabilities to create a true omnichannel experience.¹³ With multiple engagement channels in place (inside sales, digital, and in person), it becomes important for a medtech company to seamlessly put them together and deliver a meaningful customer experience (Exhibit 3). This starts with a deep understanding of the customer and designing journeys that not only align with customer preferences but can also be adapted in an agile manner based on customer actions and behaviors.

Medtech leaders who have built omnichannel models agree that several actions are important:

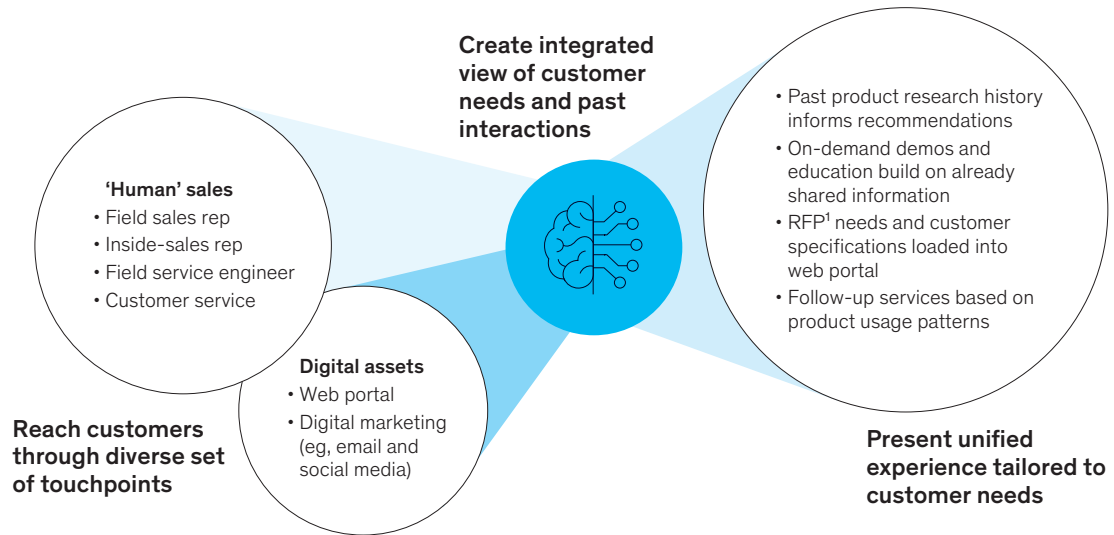
Lead from the top, and engage change agents. All the transformative technologies and processes that go into omnichannel primarily support sales reps and the new experiences they help create for their customers. Therefore, sales leaders and their teams have an integral role to play in leading the transformation.

¹²Dynamic deal scoring uses advanced analytics to assess deal quality in real time. When combined with incentives and governance, it could empower sales teams and increase deal values.

¹³"Omnichannel engagement in medtech: The time is now," McKinsey, May 19, 2021.

Exhibit 3

Omnichannel engagement orchestrates touchpoints and assets to create a seamless experience in line with customers' needs.



¹Request for proposal.

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Strategically choose the starting point and maintain focus on it. Work from this point to test and iterate new methods of engagement. In a McKinsey-led panel discussion at the 2022 AdvaMed Conference, commercial leaders identified several moments that can act as an impetus to redesign customer journeys with omnichannel and that can be tied to quantifiable business opportunities. These moments include launching a first-in-class product, launching a second-to-market product with room for growth, enabling procedure innovation (new standards of care), and entering a new care setting or customer segment.

Assemble a dedicated customer experience group. This group can study and identify the optimal ways to engage with customers based on their day-to-day activities and behaviors (ethnographic research) and can measure customer responses

to various efforts through behavior analysis and by eliciting feedback (customer satisfaction surveys).

Shift ways of working. Break down commercial silos to design campaigns across brands, coordinate channels, and learn along the way. A cross-functional campaign team can include representatives from digital marketing, product marketing, in-person and remote sales, commercial operations, and the communications and legal departments. Agile sprints could be viewed as a forcing mechanism to test and iterate tactics in early pilots; next, as journeys are validated, they may be scaled to the rest of the organization in a way that does not require the same agile iteration.

Build data science capabilities. This is a prerequisite for addressing the right customers at

Creating and capturing value beyond core medical products allows executives to further evolve their commercial models for a digital-first future.

the right time with the right personalized message and offering a relevant, tailored product or solution on all channels. Initially, an omnichannel approach might be manually operated or rules-based, but over time, companies could adopt more sophisticated AI and machine-learning models—including digital twins¹⁴—to glean more predictive and automated insights into customer engagement. Data insights and model outputs can inform marketing campaigns that fill the top of the sales funnel (such as through common marketing automation tools). The same insights can feed into a user-friendly alert or recommendation system, such as a pop-up function in the CRM system, that alerts sales reps to a recent customer engagement in digital channels and prompts an in-person follow up.

Harness the power of ecosystem selling

Creating and capturing value beyond core medical products allows executives to further evolve their commercial models for a digital-first future. Doing so requires advanced commercial capabilities. First, pricing capabilities should evolve to support XaaS models. This requires pricing XaaS to the value it delivers and developing differentiated subscription offerings to match varying customer needs. Second, the commercial organization needs to evolve to include new roles (such as digital talent

and reps skilled in XaaS selling) supported by new structures to motivate contract selling. Last, the ecosystem must be underpinned by an expanded customer success function to support solution adoption and drive stickiness.

One company recently harnessed the power of ecosystem selling by revamping its commercial organization and processes. Because the decision makers for the company's XaaS products and solutions are fundamentally different from those who make decisions for legacy products, the company created an overlay sales structure and hired teams with experience selling digital products and solutions. It then documented new processes to clarify internal roles at each stage of the customer journey, from lead generation to the first demo to implementation. It also created a RACI matrix mapped to the entire customer journey,¹⁵ enabling legacy product and digital solution sellers to work collaboratively. As a result of these efforts, combined deals tripled in value, compared with a legacy product deal or purely digital deal.

In another example, a global leader in specialized in vitro diagnostics recently started to develop and bring to market digital data, analytics, and

¹⁴ Digital twins are models that help estimate ROI of engagement tactics by simulating customer behaviors.

¹⁵ A RACI matrix is a diagram that identifies the roles and responsibilities of individuals at each point along the customer journey.

software solutions augmenting its core portfolio. By offering, for instance, algorithmic decision-support solutions using a machine’s test results in an “installation fee plus subscription” model, the company can drive commercial growth directly through its new digital solution. Moreover, it can drive instrument and reagent sales because the new solution gives it an edge over competitor

instruments. In addition, physicians—especially those who are less experienced—can use the instruments more frequently because the solution substantially improves the user experience and makes complex results easier to interpret (see sidebar, “A checklist for building a next-generation commercial model”).

A checklist for building a next-generation commercial model

Leaders can keep this checklist in mind as they embark on a commercial-model transformation (see table).

Considerations for building a winning medtech commercial model span people, process, and technology.

	People	Process	Technology
Ecosystem	<ul style="list-style-type: none"> • software-selling talent • customer success organization 	<ul style="list-style-type: none"> • as-a-service pricing • customer lifetime value measurement 	<ul style="list-style-type: none"> • real-time data collection technology for customer usage • next-gen recommendation engine based on real-time customer usage
Omnichannel	<ul style="list-style-type: none"> • data scientists • data engineers • customer experience group 	<ul style="list-style-type: none"> • linked actions across channels (agile) • customer experience measurement (customer satisfaction score) 	<ul style="list-style-type: none"> • data lake or cloud repository • recommendation engine in CRM (based on AI analytics) • marketing automation tools
Basics	<ul style="list-style-type: none"> • remote sales force (captive or through partnership) • digital marketers • data-driven sales operations 	<ul style="list-style-type: none"> • regular customer research • pricing council • disciplined use of customer relationship management (CRM) 	<ul style="list-style-type: none"> • CRM system • configuring pricing and quote tools

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Building commercial capabilities at the foundational, omnichannel, and ecosystem levels will take time and organizational conviction.

Conclusion

Building commercial capabilities at the foundational, omnichannel, and ecosystem levels will take time and organizational conviction. Propelling this evolution will require commercial leaders to articulate a compelling vision that employees throughout the enterprise can rally around, find champions who can use their influence to continually reinforce the vision, and

publicly celebrate even small successes to help create buy-in and support adoption.

The three layers offer a commercial model for the medtech industry's next act: foundational practices propel resilience, omnichannel keeps the customer experience at the center, and ecosystem selling is the force multiplier in a digitally powered future.

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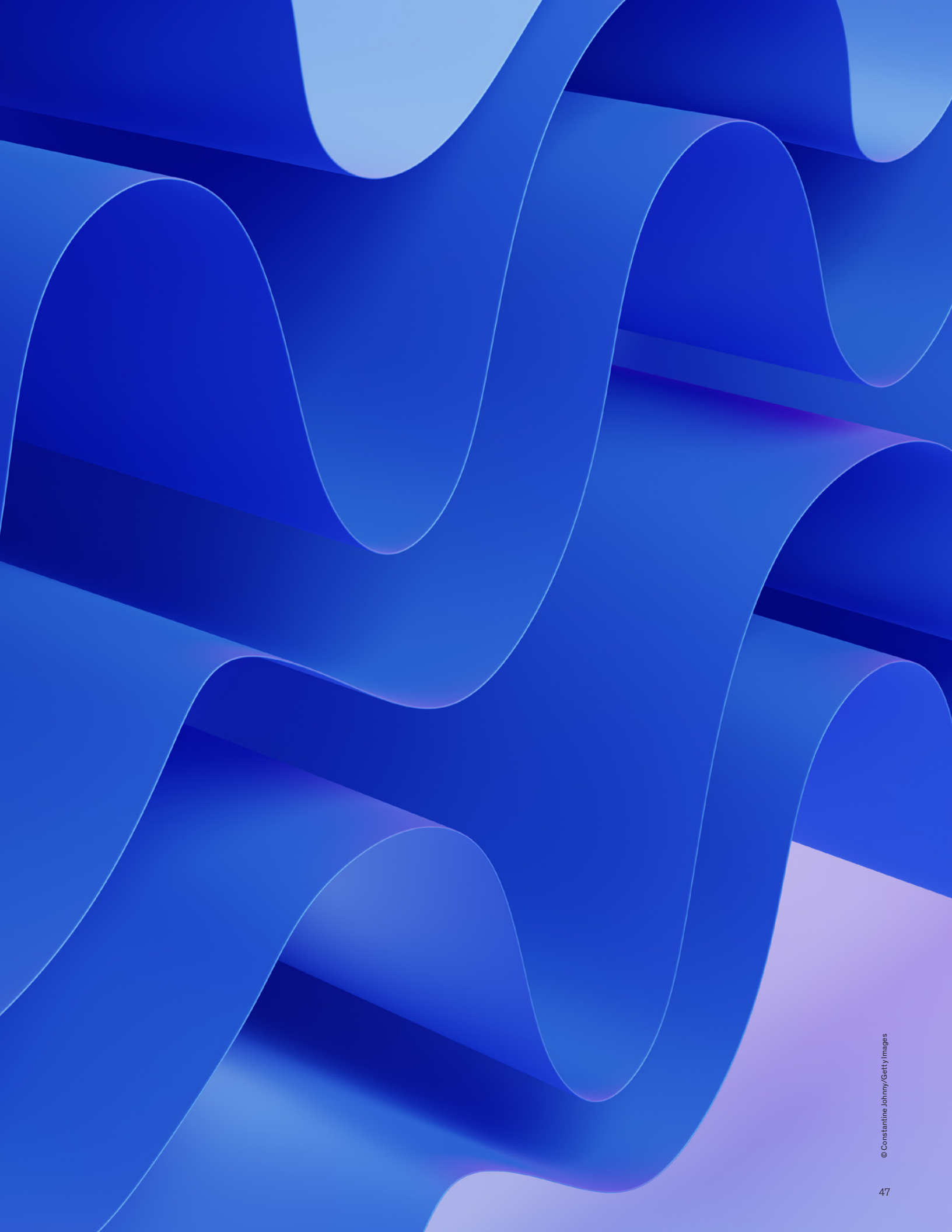
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6

Reimagining operations for the challenges of the next decade

As medtech companies emerge from the COVID-19 pandemic, leaders are scrutinizing operations to find ways to better serve patients and bolster competitiveness.

*by Mohammad Behnam, Tony Gambell,
and Orlando Ramirez Cardenas*



This chapter is a distillation of the 2023 compendium *Reimagining medtech operations: Bridging medical innovation to better patient care*.¹

Without operations groups, the medtech industry would consist of thousands of prototypes and zero patients treated. Operations functions—from procurement of raw materials to final delivery of products to end customers—allow an idea in an R&D lab to translate to patient impact, at scale.

Medtech operations have recently moved into the spotlight. When the COVID-19 pandemic suddenly disrupted the global healthcare delivery system, manufacturing organizations mobilized to more than quintuple the US national stockpile of ventilators.² During raw-material shortages in the second half of 2022, medtech companies continued to supply healthcare providers with the devices they needed to save lives, demonstrating their supply chain resilience.³

As medtech companies grow and devices become more complex, operations could be a source of differentiation. Top companies will scale their innovations quickly and supply their products and services reliably. Those that struggle will find themselves mired in increasing complexity.

Medtech companies can rethink their operations in targeted ways to become more reliable, robust, and profitable and to deliver better patient care. This includes a balanced portfolio of initiatives across the operations value chain.

Rebuilding supply chains with resilience

To prepare for the future, medtech companies can rebuild their supply chains with resilience as a new priority. Research from the McKinsey

Global Institute (MGI) suggests that while supply disruptions vary in terms of severity and lead time, a shock lasting more than two months occurs on average every 3.7 years; within a ten-year period, such shocks could cause some medtech companies to lose approximately 38 percent of one year's earnings (Exhibit 1).⁴

Medtech leaders can take a structured approach to building supply chain resilience. They can start by gaining real-time, end-to-end visibility into the supply chain (to the extent possible), including suppliers across tiers one, two, and three. They can then identify potential vulnerabilities and establish mitigation plans. Finally, they can create a resilience council to provide governance, regularly reassessing risks and stepping in quickly to make decisions when the need arises.

Capturing the full value of digitalization and Industry 4.0

Although medtech companies acknowledge the value of digital and Industry 4.0, capturing that value enterprise-wide remains a challenge. In boardrooms throughout the industry, discussions about digital solutions often focus on increasing commercial efficiency and improving R&D productivity (see chapters 2, 4, and 5 of this report). In our experience, though, digitalization use cases are also plentiful in operations, and the value can be substantial even with targeted initiatives that don't require a wholesale transformation.

A leading medical-device company recently digitalized its planning function, investing in real-time dashboards and building a fresh tech stack

¹ Mohammad Behnam, Tony Gambell, and Orlando Ramirez Cardenas, *Reimagining medtech operations: Bridging medical innovation to better patient care*, McKinsey, 2023. To request a copy, please email medtech_ops@McKinsey.com.

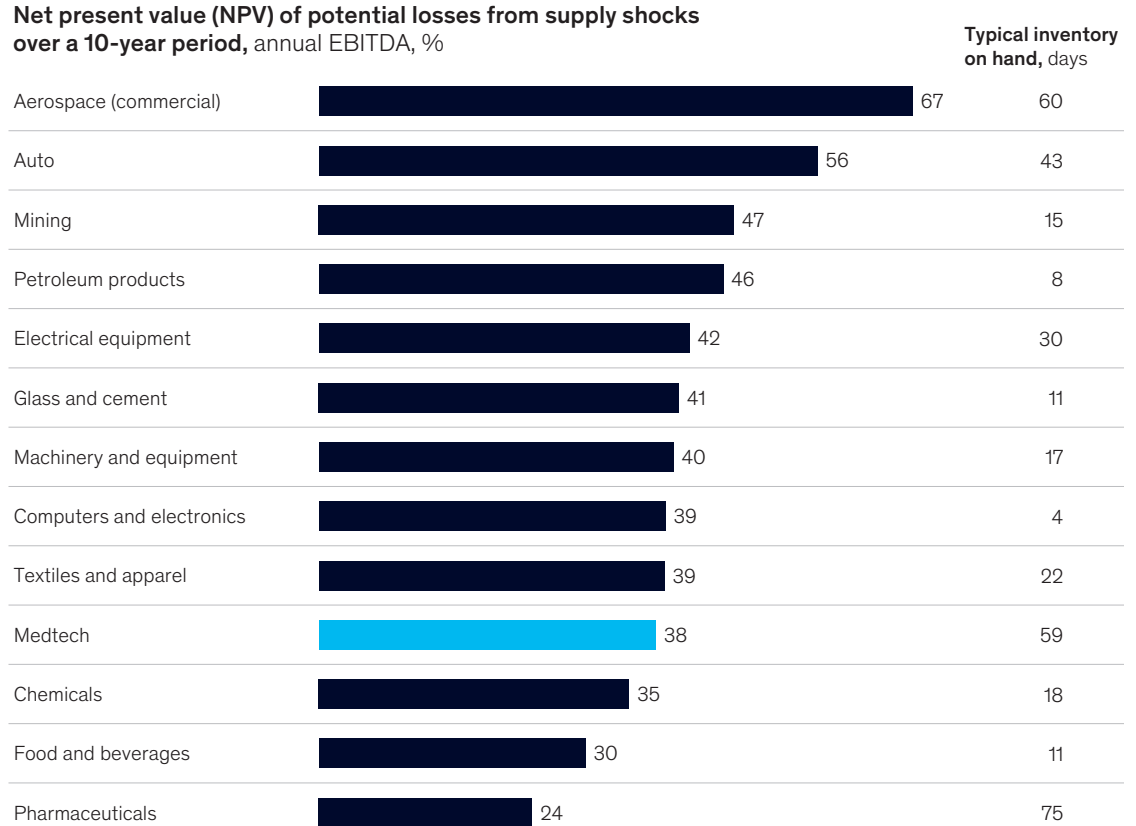
² Marie Baldisseri et al., "The US strategic national stockpile ventilators in coronavirus disease 2019: A comparison of functionality and analysis regarding the emergency purchase of 200,000 devices," *CHEST*, February 2021, Volume 159, Number 2.

³ For more on how to increase supply chain resilience, see Mohammad Behnam, Tacy Foster, Tony Gambell, and Shyam Karunakaran, "The resilience imperative for medtech supply chains," McKinsey, December 18, 2020.

⁴ Ibid; McKinsey Global Institute analysis.

Exhibit 1

Over a ten-year period, supply shocks could cost the average medtech company 38 percent of one year’s earnings.



Source: McKinsey Global Institute analysis

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to improve both forecast accuracy and product and material visibility. As a result, the company realized a 15 percent increase in forecast accuracy and recaptured \$60 million from inventory improvement. Companies with specific challenges such as lack of supply chain visibility, excessive back-order-supply delays, and inefficient inventory management should build targeted, user-friendly solutions to address them.

Driving innovation with a design-to-value approach

Medtech companies should seek to advance innovation—and unlock substantial top-line and bottom-line value—with a cross-functional,

customer-centric design-to-value (DtV) approach. DtV uses fact-based insights—into what end users and patients value in products and how other companies design offerings—to inform product design decisions. It also uses supplier insights to reduce costs in areas including packaging and raw materials.

Although medtech companies have long relied on design excellence to meet ever-evolving patient needs, the industry has been less mature in using design to manage products through their life cycle to help ensure supply continuity, maintain quality, control cost, reduce portfolio complexity, and respond to changing market needs. Our experience suggests that applying a structured DtV approach could increase margins by 15 to 40

percent, improve user satisfaction, increase market share, and, ultimately, deliver better patient care.

Adopting a value-based approach to procurement excellence

Even before the recent spike in inflation, procurement had become increasingly important for leaders, and more chief procurement officers are adopting a value-based approach. Direct

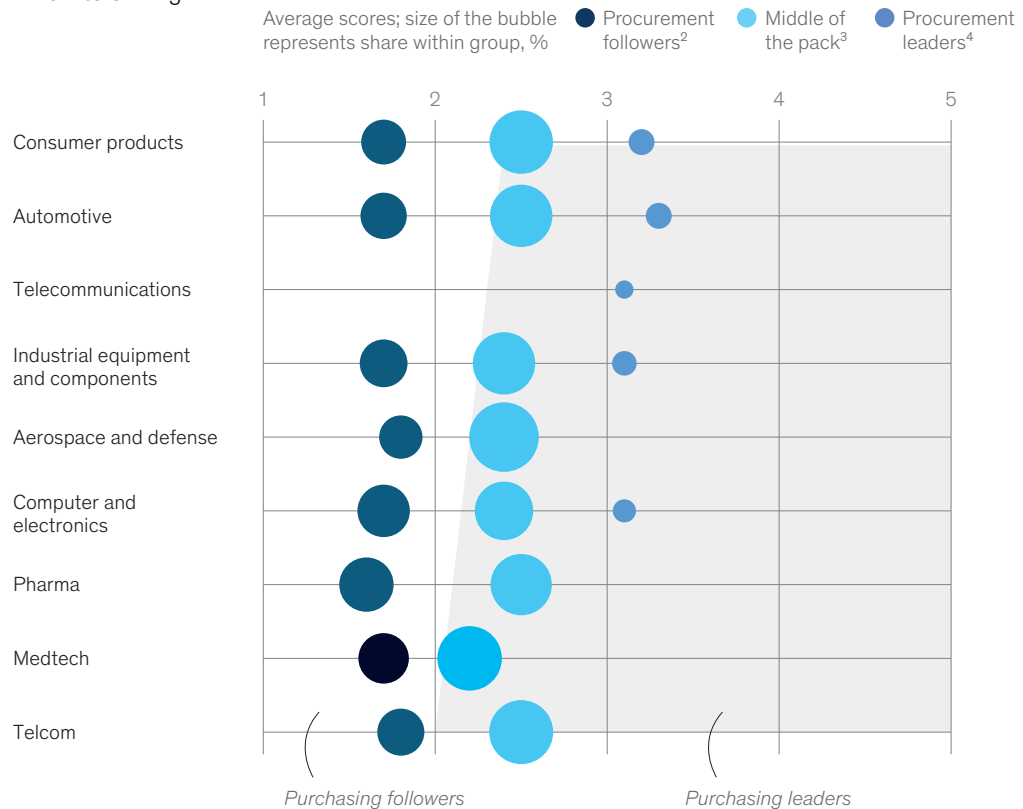
material costs typically represent about 50 to 70 percent of total cost of goods sold for medical-device products, yet procurement maturity varies widely. Whereas industries such as consumer products and automotive are accustomed to intense cost pressures, medtech companies have not previously needed to invest in building effective procurement processes and capabilities. As a result, many companies are still in the early phases of procurement maturity (Exhibit 2).⁵

⁵ Analysis based on McKinsey's Global Procurement Excellence Survey, November 2020, which included more than 1,100 procurement organizations across industries.

Exhibit 2

Procurement maturity varies widely, with medtech lagging behind other industries.

Average purchasing practice score,¹
scale: 1 = low to 5 = high



¹Scores based on McKinsey's Global Procurement Excellence (GPE) Survey.

²GPE3601 score < 2.

³GPE3601 score 2-3.

⁴GPE3601 score > 3.

Source: Analysis based on McKinsey's Global Procurement Excellence Survey, November 2020, which included 1,100+ procurement organizations across industries

Given the scale of the complexity, a manufacturing network transformation can be the ‘bold move’ that drives a step change in gross-profit performance.

However, medtech companies that invest in procurement excellence have been able to achieve a 10 to 15 percent reduction in external spending within 18 to 24 months, with sustained 4 to 5 percent year-over-year savings.⁶

Redesigning the manufacturing and distribution network

Manufacturing networks have become increasingly complex. M&A activity, new market access requirements (such as those included in the European Union Medical Device Regulation), and fast-changing global trade dynamics, especially between China (as a manufacturing hub) and Western nations, have combined with broad industry growth to put new pressure on networks. Given the scale of the complexity, a manufacturing network transformation can be the “bold move” that drives a step change in gross-profit performance.

Based on McKinsey experience, successful network transformations share a few characteristics. First, leaders are highly involved in network design to ensure a link to overall business strategy. Second, the design and execution teams are cross-functional, including manufacturing, supply chain, distribution, quality, regulatory, R&D, and commercial. Third, the team deploys

a fact-based but rapid approach to activities including aligning on the current state, building future scenarios, assessing each one using a holistic (not just cost-focused) set of quantitative and qualitative selection criteria, and developing a detailed implementation plan that highlights interdependencies between moves. Last, the team is championed by the most senior leaders with the authority to make the adjustments that will be needed during execution phases. Transformations that follow these guidelines have yielded cost reductions of 15 to 25 percent while also improving service levels and resilience.

Embedding quality into business processes

Technological advances have enabled a fundamentally new way to ensure quality by embedding it into virtually all business processes. A “smart quality” framework encompasses advanced technologies, modern process design techniques, and flexible ways of working (Exhibit 3). The framework includes five building blocks, each with its own application areas to generate value. This smart quality lens has the potential to dramatically improve quality assurance processes. And new digital and analytics technologies make it easier for quality teams to access data from

⁶ Ibid.

Exhibit 3

Smart quality drives measurable impact across all building blocks.

Direct sources of value			Enablers	
Smart quality controls	Smart quality assurance	Process and product mastery	Smart quality ways of working	Smart compliance foundation
<ul style="list-style-type: none"> • 50–100% increase in productivity and speed with optimized testing, paperless labs, process automation, and a shift to the shop floor 	<ul style="list-style-type: none"> • 25–40% increase in productivity and speed for key quality assurance processes • 25–35% increase in development efficiency and speed to launch 	<ul style="list-style-type: none"> • 30% increase in yield • 80% decrease in deviations and nonconformances • 25% decrease in cost in services and repair 	<ul style="list-style-type: none"> • Higher employee satisfaction from user-friendly processes and tools • 25% increase in impact from quality improvement initiatives 	<ul style="list-style-type: none"> • Better quality through collaborative redesign of quality management systems • Faster new-product and change approvals with broader access to data and records

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different sources and in various formats and glean insights from it, without replacing existing systems.

This shift requires the entire organization to embrace a quality culture (through both mindsets and behaviors), build requisite capabilities, and impose structural quality interventions. In our experience, a smart quality system could tangibly influence EBITDA, accelerate time to market by

more than 30 percent, and increase the capacity and responsiveness of manufacturing and supply chain by 20 to 30 percent.⁷

Doubling down on people

A medtech company's talent strategy is its most important enabler to achieve the next level of operational excellence. A 2020 survey of 50

⁷ Álvaro Carpintero, Tacy Foster, Evgeniya Makarova, and Vanya Telpis, "Smart quality: Reimagining the way quality works," McKinsey, January 25, 2021.

A medtech company's talent strategy is its most important enabler to achieve the next level of operational excellence

operations executives from 21 of the world's top medtech companies revealed that 28 percent believed there was a skills gap in the workforce, and an additional 58 percent believed they would see a gap within one to three years.⁸ Yet despite recognizing the skills gap, fewer than half of respondents said they had plans in place to address it. A well-designed and thoughtfully implemented talent strategy is critical to realizing sustainable impact from all other initiatives.

Medtech companies are at a pivotal moment and have a distinct opportunity to reimagine their operations. Leaders' efforts to achieve end-to-end supply chain visibility and smartly invest in people and digital tools could improve access to more affordable healthcare worldwide and continue to support healthcare providers in saving lives.

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⁸ McKinsey Future of Work Survey, 2020.

7

Committing to ESG as a differentiator

An environmental, social, and governance (ESG) strategy is not merely a compliance checklist item; it is an untapped opportunity for medtech companies to differentiate their devices.

by Maria Fernandez, Anjali Menon, Lucy Pérez, and Laura Poloni





The medtech industry has long delivered a positive impact to patients, communities, and the world at large through innovative devices. Now, environmental, social, and governance (ESG) considerations offer medtech companies the opportunity to expand their salutary influence beyond the scope of devices. Over the past few years, ESG has meaningfully affected medtech stakeholders and business outcomes:

- **Investors.** ESG funds own anywhere from 1 to 12 percent of outstanding shares of the top 30 medtech companies by market cap.¹ Multiple equity analysts now quantify ESG performance in their price targets: for example, Societe Generale rewards top-tier ESG performers with a weighted average cost of capital that is up to 0.6 percentage points better than that offered to bottom-tier performers (using their definitions).²
- **Customers.** At hospitals such as the Karolinska University Hospital in Stockholm, Sweden, tenders have assigned as much as 35 percent of the purchasing decision to ESG criteria.³ In England, the National Health Service (NHS) committed to net-zero emissions by 2045 with respect to goods and services from suppliers.⁴ And in Germany, ESG criteria have been present on as many as 55 percent of tenders in the last five years.⁵
- **Regulators.** The European Union has enacted regulations mandating corporate reporting on climate and environmental risk.⁶ The US Food and Drug Administration (FDA) is considering updating its guidance for the Breakthrough Devices Program to reduce disparities in health and healthcare.⁷ And the US Securities and Exchange Commission (SEC) has proposed climate disclosure rules.⁸
- **Employees.** In the United States, 58 percent of employees consider a company's social and

environmental commitments when deciding where to work.⁹ Likewise, promoting equity in the workplace—for example, with clear value propositions for different employee cohorts—could help stem attrition (which is rising, especially among women and people of color) and improve corporate performance.¹⁰

Despite this evidence of ESG's expanded influence on financial performance, its scope is still limited. For instance, ESG funds still account for a minority of investments, and ESG scores remain a minority decision factor in most hospital tenders, especially in the United States. As interest rates have risen and medtech valuation multiples have declined, many executives are considering two questions: Will ESG's influence in stakeholder decision making continue to increase? And where should we focus our ESG efforts to maximize our impact on humanity and business outcomes?

Stakeholders overwhelmingly answer the first question affirmatively, though medtech leaders will still need to closely monitor ESG targets, paths, and progress. For instance, although the NHS net-zero target date isn't until 2045, companies should track how the NHS plans to sequence its journey—including, for example, when buying requirements will become more stringent.

In response to the second question, companies should consider ESG as a new vector for differentiation in commoditized device categories. Hospital buyers and device manufacturers attribute ESG's limited influence thus far in tender processes to a lack of differentiation among medtech devices. Consider a medtech or hospital supplies category in which clinical outcomes among devices are similar. To differentiate themselves in an otherwise crowded tender process, companies could invest in product teardowns and ESG-friendly rebuilds or generate

¹ Based on McKinsey analysis of data on the largest 30 healthcare equipment and supplies companies with data available on Refinitiv, accessed April 25, 2023.

² Based on McKinsey analysis of reports published by Societe Generale on medtech companies, accessed through Refinitiv on April 25, 2023.

³ Based on McKinsey analysis of three tenders with data available at "KAROLINSKA INSTITUTET - Tenders," Merzell, accessed April 25, 2023.

⁴ "NHS England and NHS Improvement Board meetings in common—agenda and papers—30 September 2021," NHS, updated April 28, 2023.

⁵ "ESG criteria in tendering landscape shows wide variation between top-5 European countries," Pharmaceutical Technology, December 9, 2020.

⁶ Based on McKinsey analysis of the UN Principles for Responsible Investment's ESG Regulation Database, as of first quarter 2022.

⁷ "Select updates for the breakthrough devices program guidance: Reducing disparities in health and health care," FDA, October 21, 2022.

⁸ Hester M. Peirce, "It's not just Scope 3: Remarks at the American Enterprise Institute," SEC, December 7, 2022.

⁹ "2016 Cone Communications employee engagement study," Cone Communications, April 2016.

¹⁰ "Women in the Workplace 2022," McKinsey, October 18, 2022.

evidence to demonstrate the ESG superiority of their products (see table).

ESG performance starts with clear objectives

For companies to achieve business impact with ESG, investments must start soon. ESG initiatives can take many years to implement and deliver results, especially considering lead times in manufacturing, cross-industry competition for green materials, and the challenge of capability building. Given this, medtechs should choose ESG areas in which they can have the most impact. Our research suggests focusing on three objectives in the near term:

Achieve net-zero greenhouse-gas emissions and reduce waste along the value chain

For most industrialized nations, healthcare systems account for close to 10 percent of national greenhouse-gas (GHG) emissions—a higher proportion than either the aviation or shipping industry.¹¹ If the global healthcare sector were a country, it would be the fifth-largest GHG emitter on the planet.¹²

From 2020 to 2022, the number of medtech companies that set science-based targets for emissions reductions (a best-practice step) rose sharply (Exhibit 1). Despite more organizations setting targets, however, few companies have identified a clearly defined, qualitative and

quantitative approach to achieve the targets, and many face execution challenges.

A first step for companies is creating a marginal abatement cost curve (MACC) (Exhibit 2). The MACC provides a top-down view of potential investments in decarbonization levers (for example, product packaging redesign, use of clean transport, and use of renewable power) that could reduce an organization's emissions. The MACC ranks decarbonization levers in ascending order of cost per metric ton of abated carbon to enable companies to prioritize the levers to be implemented. The MACC also quantifies unabated emissions that will need to be addressed through new technical, strategic, and market opportunities.

The next step is to address the biggest opportunities identified in the abatement curve. Many companies pursue environmental improvements in three areas:

Design products and packaging for sustainability.

Up to 80 percent of a product's resource footprint is established in the R&D phase. The industry is exploring numerous compelling ideas to improve sustainability. For example, companies are seeking to increase use of postconsumer resin (also called postconsumer recycled) plastics and to evaluate alternative materials for Class I and Class II¹³ medical devices. They are also expanding efforts to reduce weight (so-called lightweighting), eliminate

¹¹ "Here's how healthcare can reduce its carbon footprint," World Economic Forum, October 24, 2022.

¹² *Health care's climate footprint: How the health sector contributes to the global climate crisis and opportunities for action*, Health Care Without Harm and Arup, September 2019.

¹³ "Regulatory controls," FDA, updated March 27, 2018.

There are numerous opportunities for differentiation across the environmental, social, and governance spectrum.

Environmental	Social	Governance
<ul style="list-style-type: none"> • Achieve <i>net-zero greenhouse-gas emissions</i> along the value chain • Reduce <i>material use and waste</i>, and achieve <i>minimum hazardous waste</i> across product life cycle • Minimize <i>water consumption, contamination, and waste</i> • Protect <i>biodiversity</i>, and limit consumption of <i>rare resources</i> 	<ul style="list-style-type: none"> • Maximize <i>access to medicines to reduce disease burden</i> • Invest and innovate to <i>address true unmet needs to reduce disease burden</i> • <i>Make a difference in relevant social</i> communities along the value chain • Conduct <i>business responsibly</i>, from drug development to usage 	<ul style="list-style-type: none"> • Promote <i>diversity and inclusion</i> in the workplace • Improve <i>long-term business resilience</i> and (climate change and epidemic) risk mitigation • Protect <i>data and privacy</i> • Foster <i>environmental, social, and governance transparency</i> and clear communication

materials of concern, and design for repair and disassembly (to facilitate the recycling of parts), thereby simultaneously reducing cost and carbon.

Decarbonize Scope 3 emissions through supplier collaboration and development of new materials.

Scopes 1, 2, and 3 are categories of carbon emissions that a company creates.¹⁴ Scope 3 emissions are not directly in medtech companies' control, yet they account for 60 to 70 percent of total industry emissions.¹⁵ Achieving targets for reducing Scope 3 GHG emissions will necessitate engaging with upstream suppliers (and their tier-n suppliers).

The value, however, comes not only in reducing emissions but also in adopting circular business models. Based on McKinsey analysis, about 15 to 25 percent of emissions could be abated with

actions that have a positive net present value. These actions include addressing product packaging, reducing use of plastics containing acrylonitrile butadiene styrene, buying zero-carbon aluminum, instituting closed-loop recycling, switching to 100 percent recycled cardboard, and using battery-powered electric vehicles (BEVs) for transport.

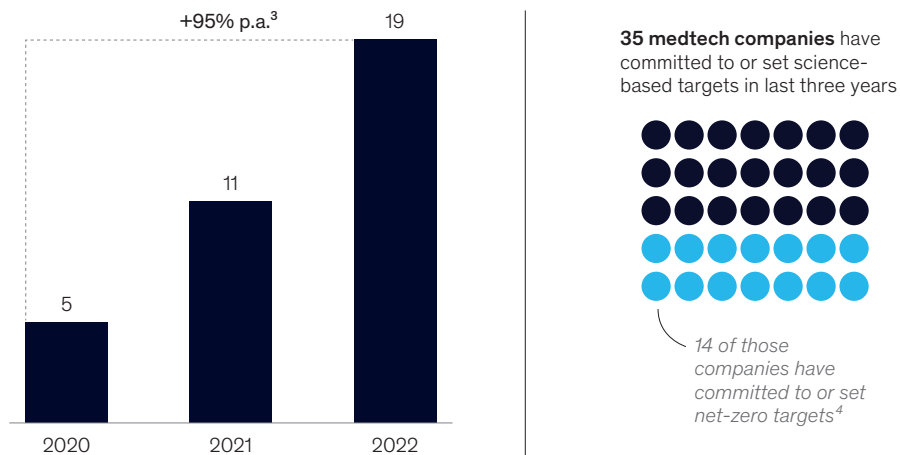
Build capabilities in marketing and sales. Steps to achieve this objective include implementing a data collection, management, and reporting system to readily access sustainability data for use in responding to tenders; helping marketers incorporate the environmental impact of products into customer value propositions; and upskilling sales teams to facilitate sustainability discussions while building relationships and introducing new products.

¹⁴ "What is the difference between Scope 1, 2 and 3 emissions, and what are companies doing to cut all three?," World Economic Forum, September 20, 2022.
¹⁵ Based on CDP 2022 data for all medical-equipment companies reporting Scope 3 emissions (n = 35). Scope 3 emissions are considered to stem from upstream suppliers and their tier-n suppliers, which are purchased goods and services, capital goods, upstream transportation and distribution, and downstream transportation and distribution.

Exhibit 1

An increasing number of medtech companies are setting emissions targets.

Number¹ of medtech companies that have committed to or set science-based targets,² new sign-ups each year

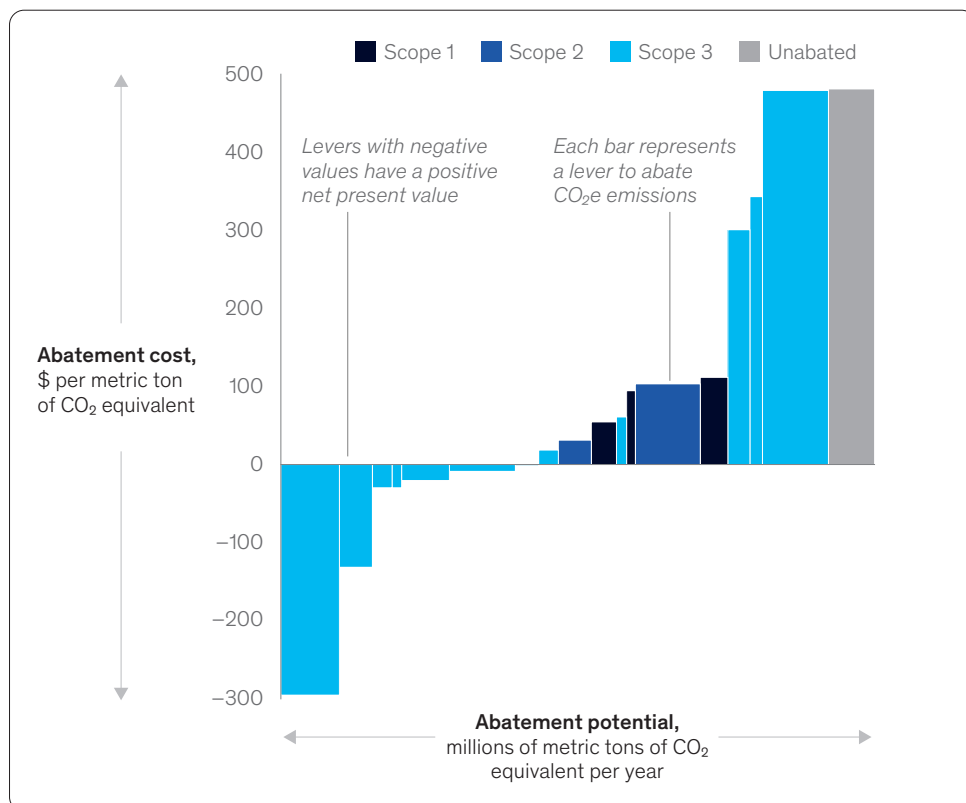


Note: There were no companies with Science-Based Targets initiative (SBTi) targets (committed or set) prior to 2020.
¹Indicates number of new targets set per year from medtech companies, including companies that have made a commitment to set a science-based target, as well as those that have set targets with temperature alignment (ie, the degree of global temperature increase compared to preindustrial levels that targets are aligned to).
²A company is committed to setting science-based targets if they have submitted a commitment letter to the SBTi. A company is considered to have targets set once the targets have been validated by the SBTi.
³Per annum.
⁴Net-zero targets require validation of both near- and long-term targets.
 Source: "Companies taking action," Science Based Targets initiative, accessed December 5, 2022

Exhibit 2

Marginal abatement cost curves are critical to establishing a pathway to net-zero emissions.

Illustrative marginal abatement cost curve (MACC)



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Address health inequities by maximizing device access to reduce disease burden

Despite continued advancements in healthcare, health inequities exist and can manifest in a variety of ways: limited access to care for patients; innovation efforts insufficiently aligned with the global burden of disease; and underserved communities in which health systems fail to engage subpopulations commensurate with need, to name a few.

For example, there is a significant mismatch between commercially available devices and disease burden in low- and middle-income

countries (LMICs). By 2030, noncommunicable diseases (NCDs) may be responsible for five times more deaths than infectious diseases in LMICs, yet less than 15 percent of commercially available devices address NCDs in these regions.¹⁶

The problem is not only geographical; it can also be reflected in our devices. For example, a study of racial bias in pulse oximetry in the United States found that pulse oximetry devices failed to detect occult hypoxemia in Black patients three times more frequently than in White patients, therefore putting Black patients at greater risk of misdiagnosis.¹⁷

¹⁶ Amir Sabet Sarvestani and Kathleen H. Sienko, "Medical device landscape for communicable and noncommunicable diseases in low-income countries," *Globalization and Health*, July 2018, Volume 14, Number 65.

¹⁷ Robert P. Dickson et al., "Racial bias in pulse oximetry measurement," *New England Journal of Medicine*, updated February 2021, Volume 383.

Leading medtech companies are making public commitments that reflect their social-impact aspirations and are implementing health equity strategies primarily in two areas:

Democratizing access and affordability of products to reach new and diverse markets.

Medtech leaders are taking proactive steps to ensure their devices are accessible to end users across diverse geographies and demographics in developed and developing markets. This begins with developing a holistic, data-driven understanding of care delivery globally and within specific markets and improving parity at each step of the care journey—from closing the gap in misdiagnosis and late diagnosis to designing novel solutions to improve affordability and expand access.

Embedding health equity into pipeline development.

Unmet needs can differ at the subpopulation level. Leading medtech companies are factoring these unmet needs into pipeline development strategies and designing and testing products in a manner that addresses the diverse needs and preferences of the patients and healthcare personnel that use them. These considerations typically include ethnicity,

age, gender, height, weight, pathological background, socioeconomic, geography, language, and accessibility. Additionally, companies should consider tailoring product development to conditions in markets with more fragile or incomplete supply chains.

Promote diversity, equity, and inclusion in the workplace

Increasingly, we find that the most diverse companies recognize diversity, equity, and inclusion (DEI) as more than a social-justice imperative; they also see it as a core enabler of growth and value creation. These diversity leaders are pulling ahead of the rest, and they are more likely to financially outperform their peers (that is, companies in the top quartile for gender diversity on executive teams were 25 percent more likely to have above-average profitability than companies in the bottom quartile).¹⁸

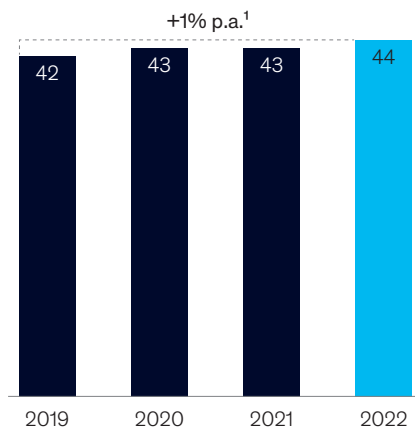
Medtech companies have made improvements in DEI, but women and minorities are still underrepresented compared with other industries. Although the life sciences industry has been successful in attracting women at the entry level, representation drops off sharply in the pipeline to senior leadership (Exhibit 3). Women in medtech

¹⁸Sundiatu Dixon-Fyle, Kevin Dolan, Dame Vivian Hunt, and Sara Prince, "Diversity wins: How inclusion matters," McKinsey, May 19, 2020.

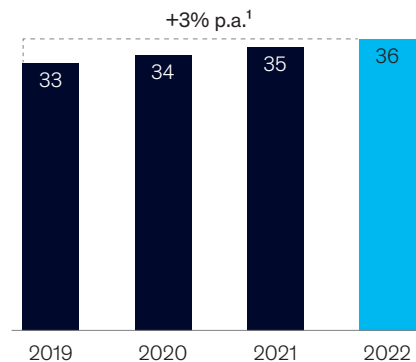
Exhibit 3

Representation of women in medtech is slowly improving but remains low.

Women employees overall, %



Women in management positions, %



Note: Includes 47 medtech companies that report across both metrics. Data retrieved May 20, 2023.
¹Per annum.
 Source: Refinitiv

account for 56 percent of entry-level employees but only 28 percent of C-suite leaders.¹⁹ The medtech industry also faces a lack of racial diversity: Black people account for just 3 percent of those in medtech leadership roles in the United States²⁰ despite making up more than 13 percent of the population.²¹

Progress toward achieving diversity goals requires a systematic business-led approach and bold, concerted action toward inclusion.²²

A business-led approach to DEI. Leading companies are taking a systematic approach to DEI, including setting quantitative goals to diversify their workforces and ensure their organizations reflect the diversity of the communities in which they operate. Best-in-class medtech diversity leaders, for example, have committed to placing women in 45 percent or more—and people from ethnically diverse groups in the United States in 30 percent or more—management positions globally within five years.

Taking bold steps to strengthen inclusion.

Addressing inclusion requires an organization to enable equity of opportunity through fairness and transparency; promote openness by tackling bias and discrimination; and foster belonging through support for all kinds of diversity. Sponsors and allies play a critical role alongside policies and programs in advancing and retaining diverse talent. This will be important for a company's value proposition to prospective and current employees.

An ESG plan helps bring the ambition to life

Delivering on ESG ambitions can be challenging, but first movers could be rewarded.²³ Although many leaders consider ESG a priority, most organizations face risks from poor execution or don't have a robust plan to enable value creation

from ESG. Companies should use a four-step approach to guide their ESG journey:

Understand the relevant ESG context. This entails achieving a thorough understanding of the full scope of the company's (positive and negative) ESG-relevant activities, the material sustainability topics in the sector, what competitors are doing, and what matters to stakeholders. This analysis can help the company identify its "superpowers" and vulnerabilities.

Define the company's contribution. Set sustainability goals and prioritize sources of differentiation from competitors. Develop a go-forward sustainability strategy, including themes and priority initiatives. Determine KPIs, and set quantifiable targets.

Engage broadly. Develop stakeholder engagement and communications plans; integrate ESG into the investor relations strategy; and establish a reporting strategy and cadence.

Sustain the ESG commitment. Implement an ESG program broadly by rolling out ESG initiatives tied to themes. Ensure the organization, incentives, and operating model are set up to deliver on the ESG ambition, and continually track progress and impact.

Moving forward, medtech leaders will likely view ESG in one of two ways: either as a set of far-off compliance regulations that their companies will need to follow one day or as an opportunity to create new positive impact for companies, communities, and shareholders and as a source of differentiation. Only by taking a systematic approach and adopting a clear path forward can medtech companies ensure that they maximize the value creation opportunity with ESG.

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¹⁹"Women in the Workplace 2022," October 18, 2022.

²⁰Greg Slabodkin, "Medtech industry starts to face lack of diversity, execs of color," MedTech Dive, August 12, 2021.

²¹"Population estimates, July 1, 2022 (V2022)," US Census Bureau, accessed February 13, 2023.

²²"What is diversity, equity, and inclusion?," McKinsey, August 17, 2022.

²³For instance, green leaders among EU chemical companies have seen their enterprise multiples increase by a factor of two to five, while laggards' multiples have remained flat. For more, see "Playing offense to create value in the net-zero transition," *McKinsey Quarterly*, April 13, 2022.

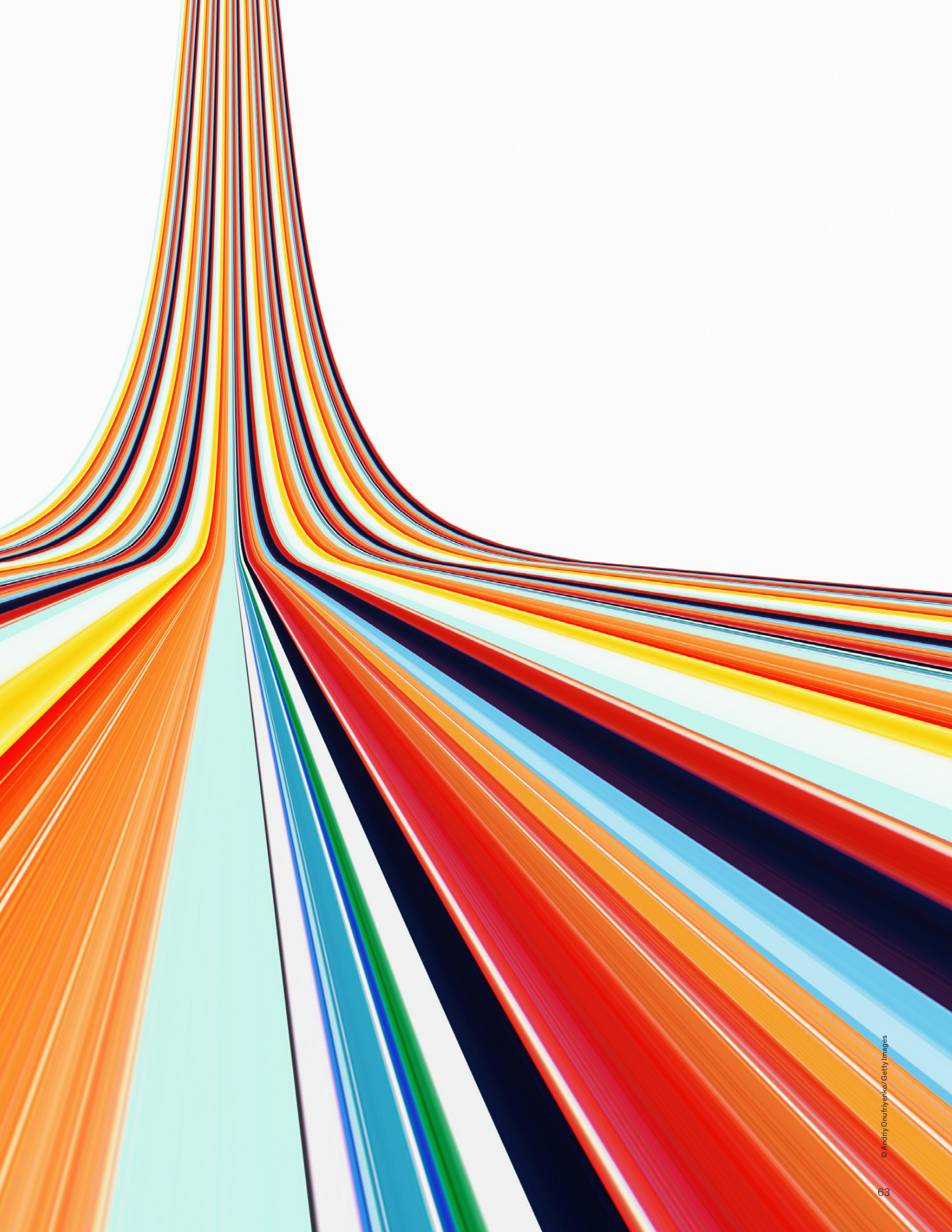
8

Updating the post- COVID-19 playbook for M&A

M&A could help the medtech industry boost value creation, but only if companies can adapt their dealmaking approaches to changing macroeconomic conditions.

by Gerti Pellumbi, Peter Pfeiffer, Tommy Reid, and Carolina Trombetta





A decade of growth acceleration has paradoxically left medtech companies in a difficult position. The industry has grown by 50 percent since 2012,¹ making it harder for companies—particularly larger ones—to organically improve their performance. This presents a challenge for companies eager to create value in an industry that has not outperformed the public market since 2019.

M&A—mergers, acquisitions, and divestitures—can reliably and rapidly improve a company’s performance outlook. M&A can help organizations serve more patients in more ways, enabling them to access new patient pools, scale for better commercial operations, divest distracting and underfunded businesses, and add new capabilities in digital or R&D.

But reconfiguring a corporate portfolio is a daunting task. Companies eyeing M&A will have to negotiate overarching macroeconomic uncertainties and tightening capital markets. Notably, earnings growth—rather than simply top-line growth—is increasingly important to

company valuations.² (See chapter 1, “Medtech’s value-creation imperative.”) This shrinks the pool of attractive potential targets to companies that have the right combination of growth and profitability.

In this context, medtech companies can adjust their approach to M&A. They can reconsider the value of large deals, adjust their priorities in programmatic M&A, increase investments in early-stage companies, and proactively pursue divestitures. Medtech companies that do these things well could fast-track value creation.

A promising environment for M&A

Despite macroeconomic volatility, market conditions for medtech M&A are positive. First, prospective acquisitions are getting cheaper after years of ballooning valuations. Valuations for the highest-growth targets have retreated to their lowest point since 2018 (Exhibit 1).

Conversely, divesting companies are likely to attract many willing buyers in both private and public equity

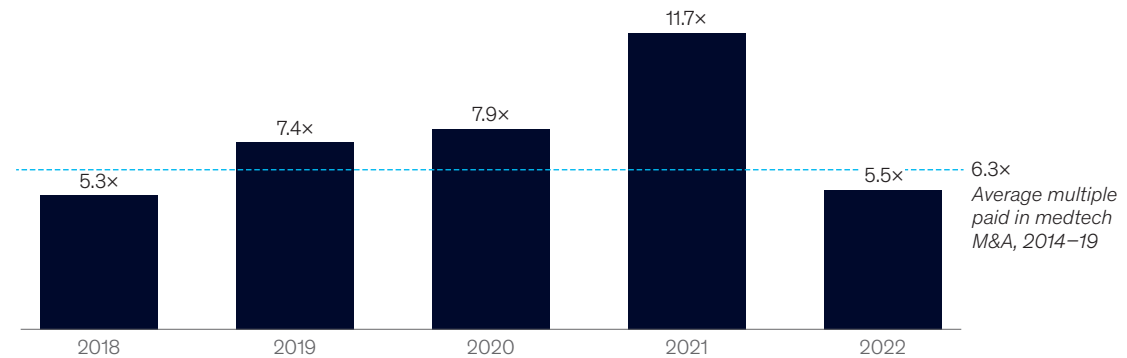
¹ Health Resources International 2012 and 2021 medical devices and diagnostics reports.

² For more on valuations in medtech, see “Accelerating growth in medtech: The next surge in portfolio,” McKinsey, May 10, 2022; and Sue Huey Chuah, Ralf Dreischmeier, Gayane Gyurjyan, and Alex Monnard, “How medtech companies can create value with new-business building,” McKinsey, January 7, 2022.

Exhibit 1

High-growth medtech companies have quickly become more affordable.

1-year forward revenue multiple for high-growth small-cap and midcap medtechs¹



¹All medtech companies with a market cap between \$0.1 billion and \$10.0 billion and with growth expectations exceeding 10% CAGR (22 in data set), as of May 20, 2023. Source: S&P Global

Medtech companies can continue to use M&A as a tool to create value; however, decision makers should adjust their approaches to potential transactions.

markets because of a sedate IPO market. Only five medtech companies debuted in the public markets in 2022, compared with 23 per year, on average, in each of the five previous years.³

To be sure, the specter of a recession may dampen M&A activity: medtech M&A dropped by 20 percent during the recessions of 2001 and 2008,⁴ and US interest rates now sit at their highest level in 15 years.⁵ However, these factors are not the same barriers they may have been in the past. Recent McKinsey research shows that fewer than 10 percent of medtech CEO respondents would defer M&A because of a recession. In addition, the 30 largest medtech companies currently hold more than \$200 billion of dry powder in cash or cash equivalents.⁶

Despite the likely high demand for M&A activity, willing buyers may discover that the supply of attractive assets is lower than they had imagined. This is a recent change and is driven by a new equation for value creation; margin expansion is now more than twice as important to company valuations as it was in 2019.⁷ As a result,

profitability (or the ability to increase it) has risen in importance to prospective buyers. (For more, see chapter 1, “Medtech’s value-creation imperative.”)

McKinsey analysis of the 125 largest US- and EU-based medtech companies by market capitalization shows that weighing profitability more heavily culls the number of viable targets (Exhibit 2).

More than half of the companies (65) boast high growth rates in addition to significant revenue bases, but less than a quarter (27) are high growth and offer potentially accretive margins. Capping the size of the target at \$20 billion shrinks the hypothetical target list to 20.⁸

A shift toward profitability and selectivity in medtech M&A

Medtech companies can continue to use M&A as a tool to create value; however, decision makers should adjust their approaches to potential transactions.

³ Elizabeth Cairns and Lisa Urquhart, “An annus horribilis for medtech flotations,” Evaluate, January 13, 2023.

⁴ McKinsey analysis of S&P Global Market Intelligence medtech M&A activity data, 2001 and 2008, accessed May 20, 2023.

⁵ As of May 20, 2023, per the Federal Reserve.

⁶ McKinsey analysis of S&P Global Market Intelligence data, accessed May 20, 2023.

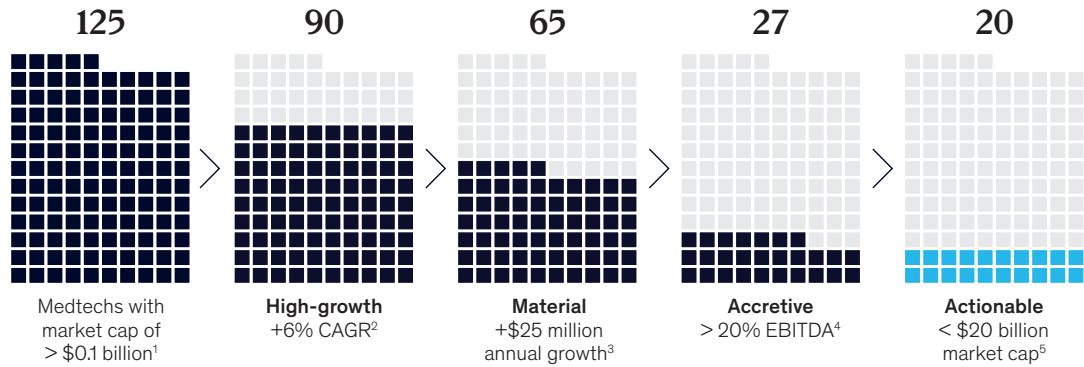
⁷ Based on McKinsey analysis of S&P Global Market Intelligence data of top 40 companies by market cap, as of May 20, 2023.

⁸ McKinsey analysis of S&P Global Market Intelligence data, accessed May 20, 2023.

Exhibit 2

Only 20 medtech companies under \$20 billion qualify as high-growth, profitable targets.

Number of companies passing each filter¹



¹S&P Global as of May 20, 2023. All companies with "Healthcare Equipment" classification. Others may be available and not included in this analysis.
²Projected CAGR from 2022 to 2025.
³From 2022 to 2023 (estimated).
⁴For 2022.
⁵As of May 20, 2023.
 Source: S&P Global

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Reconsidering the value of large deals

McKinsey research has shown that big deals have also historically involved big bets and big risks. They offer significant upside potential but with a risk of distraction, customer confusion, and slowing revenue growth.⁹ In an environment that rewarded organic growth more, large transactions seemed less appealing than simply growing the existing business.

But two factors may change the importance and role of large deals. First is the rising importance of margin improvement relative to valuations. Large deals can provide scale, which can improve companies' cost positions: the 20 largest medtech companies by revenue boast a median EBITDA margin of nearly 11 points more than the next largest 20.¹⁰ Companies can especially benefit when a particular geography or business unit is underperforming on profits, with the merged business offering an opportunity for new scale, capabilities, and cost synergies.

The second factor is the evolving relationship between medtech companies and their customers. Because of the increasing adoption of value-based care and the rise of new digital ecosystems (see chapter 4, "Bringing hardware and software together into digital health ecosystems"), health systems consider medtech companies to be end-to-end partners rather than simply providers of devices. Large deals can help medtech companies integrate offerings across portfolios, making it more likely that a health system will designate a medtech company as a partner of choice.

Although the higher cost of debt may hamper bigger deals in the near term, more companies should consider these opportunities as a way to respond to new conditions in the industry. Indeed, some medtechs have already taken action. Two midsize orthopedics companies recently merged, in part to use their newfound scale to provide higher service levels to customers. Done right, such M&A deals could transform companies, improve their ability to

⁹ "How one approach to M&A is more likely to create value than all others," *McKinsey Quarterly*, October 13, 2022.
¹⁰ McKinsey analysis of S&P Global Market Intelligence data, accessed May 20, 2023.

partner with customers, and create cost efficiencies that facilitate value creation.

More-selective targeting in programmatic M&A

Programmatic M&A—to achieve specific corporate objectives through a strategic series of deals—is evergreen.¹¹ As approaches to value creation shift, prospective buyers should be more selective.

Of course, though margins have become more important, innovation will continue to be paramount for value creation. In acquisitions that target specific innovations or new capabilities, acquiring companies will likely want to prepare strategies that mitigate potential margin dilution. Growth-focused acquisitions that expand the core might also be more valuable than those that help the parent company access adjacencies. Consider how the public markets reacted favorably to a 2023 programmatic acquisition in AI imaging equipment and software that boosted the combined entity's growth trajectory and its ability to use its scale to forge and maintain customer relationships.

More capital dedicated to digital offerings

In earlier chapters, we discuss the momentum of software innovation and the value of digital health

ecosystems. M&A can help companies transform their digital innovation prospects and “short-circuit” yearslong development cycles. Consider Stryker's acquisition of Vocera in 2022 and GE HealthCare's 2023 announcement to acquire Caption Health; both deals will help the acquiring companies expand their value propositions beyond the benefits of their physical products.

More-creative transaction structures

As profitability and cash management continue to gain importance, companies will likely explore transaction types outside of traditional M&A or divestitures—including co-acquiring companies alongside private equity firms or raising external capital to fund R&D programs—in exchange for product royalties. These deal structures offer a lower-risk way for companies to participate in M&A or innovation, reducing their own profit-and-loss or capital constraints by sharing costs with or shifting them to outside partners. For M&A, companies can increasingly select this option if the cost of debt proves to be too much of an impediment. For R&D, companies should consider external capital as a way to fund programs or studies that would otherwise not receive sufficient funding from internal sources. These types of deal structures

¹¹ McKinsey analysis of S&P Global Market Intelligence data, accessed May 20, 2023.

Though margins have become more important, innovation will continue to be paramount for value creation.

Compared with the assets of a smaller company, a large portfolio size makes it more difficult for these companies to find strategic moves that materially alter their trajectories.

are increasingly common in the pharmaceutical sector. For example, Royalty Pharma has made 15 investments since the beginning of 2021.¹² In medtech, Blackstone Life Sciences announced a \$337 million product investment in Medtronic to expand development of diabetes technologies.¹³

More divestitures

As the medtech industry has grown over the past decade, many companies now find their portfolios large, diverse, and unwieldy. Compared with the assets of a smaller company, a large portfolio size makes it more difficult for these companies

to find strategic moves that materially alter their trajectories. A company with \$10 billion in annual sales would need to generate \$500 million to \$600 million of new revenue and \$100 million to \$180 million of new profit—equivalent to creating a new midsize medtech business every year—just to keep pace with market growth.

Divestitures allow companies to adjust their portfolios and reset the valuation trajectory for the remaining company and the divested business unit, which may have received insufficient funding and attention under its former parent. Divestitures

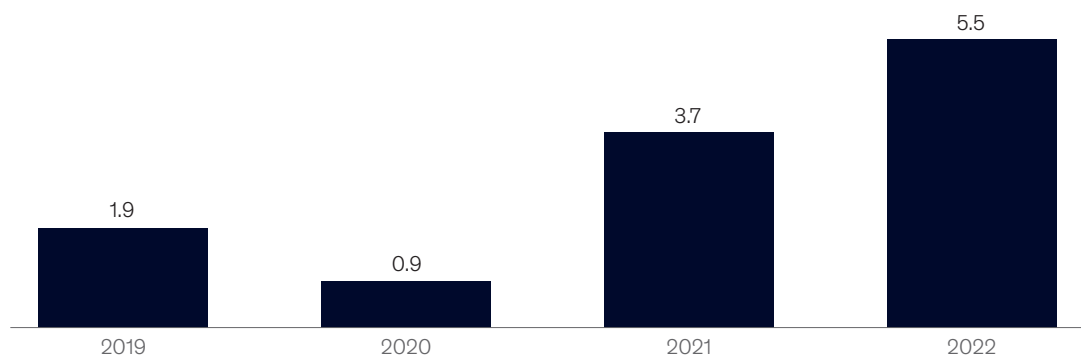
¹² "Portfolio," Royalty Pharma, accessed May 20, 2023.

¹³ "Medtronic announces a \$337 million product investment from Blackstone Life Sciences to expand development of future diabetes technologies," Blackstone, June 12, 2020.

Exhibit 3

Divestitures have nearly tripled since 2019.

Medtech divestiture value, \$ billion



Source: S&P Global

McKinsey & Company

can relieve companies of segments with lower strategic or financial value, freeing management to concentrate on the core business. Meanwhile, divested businesses are better positioned to dedicate leadership attention and resources to their own performance. The proceeds from divestitures can also fund potential acquisitions or growth initiatives, allowing the company to forgo the need to raise the now more-expensive debt. Divestitures are already on the rise. In 2022, medtech companies sold off almost three times as much business (as measured by value) as they had in 2019 (Exhibit 3). The trend does not show

signs of slowing: three of the top 15 medtechs have announced plans to divest businesses worth more than \$9 billion in revenue as of May 2023.

Medtechs' challenges with value creation amid current economic conditions suggest that an acceleration in M&A could be beneficial. Leaders should explore possibilities—and act—while the pool of growing and profitable assets and keen buyers is still relatively plentiful.

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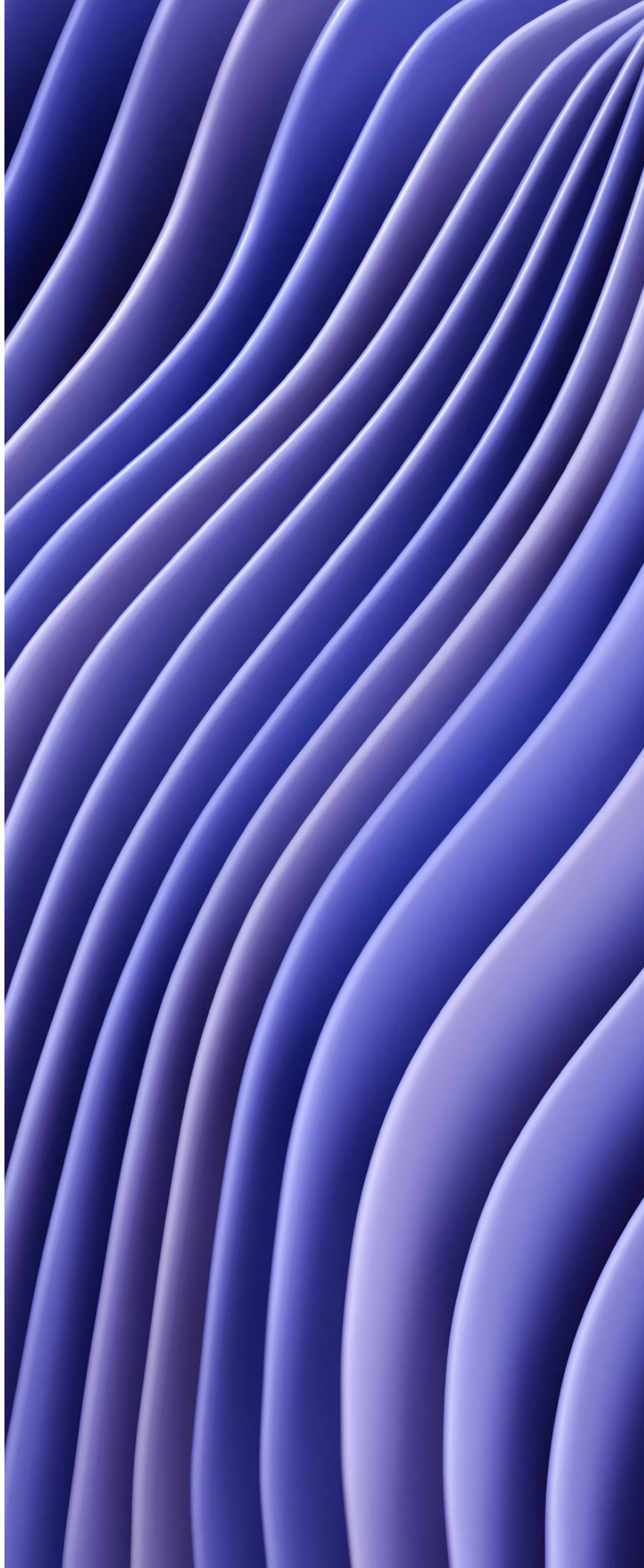
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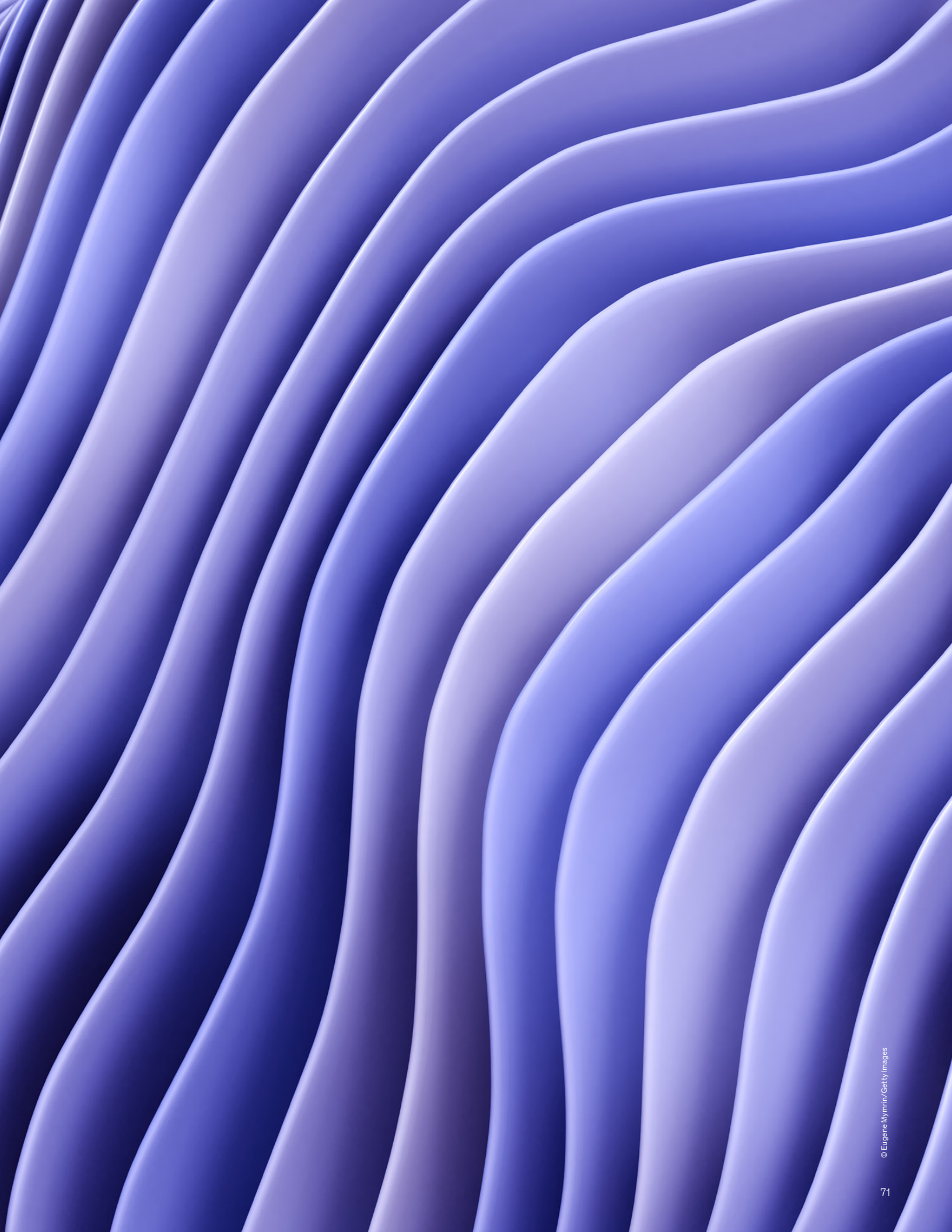
9

Competing in China: Medtech multinational companies' way forward

China will continue to be a critical market for medtech multinational companies despite market uncertainties. Big moves are in order.

This article is a collaborative effort by Kiki Han, Franck Le Deu, Jody Tian, Wei Wei, and Kevin Wu, representing views from McKinsey's Life Sciences Practice.





Many medtech multinational companies (MNCs)

have established leading positions in China—the second-largest and fastest-growing medtech market globally—by introducing a steady stream of new products and continually raising clinical standards. For some MNCs, China has become a top contributor to their overall growth. Today, the five largest medtech MNCs generate an aggregate 10 to 15 percent of their global revenue from China.¹ Leaders have also invested heavily in localized operations and supply chains. For instance, one large global medical-imaging company's four factories in China produce 40 percent of its global ultrasound units and more than half of its CT and MRI equipment.²

The stakes in China are high for medtech MNCs, and the market demands leadership attention; however, the growth path has become more complex and challenging. First, an increasingly multipolar world requires companies to reconfigure their global business footprints.³ Second, in China specifically, companies are facing escalating pressure in pricing and reimbursement, pressure to localize sourcing and production, and an increasingly competitive local medtech industry.

These considerations are daunting for medtech MNC senior leaders, but China is still a market with sizable opportunities. It will not only continue to contribute to global growth but also remain a critical point of access to innovation, manufacturing capabilities, and local capital, all of which can help fuel the continued growth of medtech MNCs.

MNCs should develop new value chain capabilities to explore new business models, advance commercial and operational excellence, and boost resilience. These actions will take substantial effort for medtech companies, but they are nonetheless essential to address current challenges and capture future opportunities.

An increasingly fraught path for medtech companies

Commercial pressures are mounting for medtech MNCs operating in China because of a variety of factors.

Volume-based procurement (VBP). VBP, aimed at lowering unit prices through centralized tendering,⁴ is becoming common for medical consumables and in vitro diagnosis (IVD) products.⁵

Although VBP had previously been focused on high-spend, reimbursable categories, it has now expanded into noncritical care products such as dental implants.⁶ VBP tenders based on provincial alliances are further boosting purchasers' efficiency and bargaining power in parallel with national VBP.⁷

These tenders pose a threat to MNCs' traditional business models and growth strategies. A review of past VBP tenders at the province, multiprovince, and national levels shows that they have reduced prices in hospitals by 50 to 90 percent.⁸ Accurately anticipating the rollout of VBP has been difficult, and informed business planning has accordingly been more challenging since the inception of VBP.

New reimbursement schemes. These schemes—for diagnosis-related groups (DRGs) and diagnosis intervention packages (DIPs) for inpatient services, for example—are likely to result in additional changes in hospital spending behavior. According to government plans, DRGs and DIPs will be implemented in all hospitals and cover 70 percent of basic medical insurance spending by 2025.⁹ Under these schemes, hospitals are more likely to choose lower-priced products to control costs.

Localization pressure. Pressure from Chinese government authorities to localize in China threatens MNCs' positions. The Made in China 2025 industrial policy and the dual-circulation

¹ McKinsey analysis of annual reports of five largest multinational medtech companies by market capitalization, with data available.

² Computerized tomography (CT) and magnetic resonance imaging (MRI).

³ For more, see *The China imperative for multinational companies*, McKinsey Global Institute, January 2023.

⁴ "Volume-based procurement is shaking up high-value medical devices market in China," Medical Device Network, January 28, 2022.

⁵ "Volume-based procurement has become institutionalized," State Council of the People's Republic of China, February 12, 2022.

⁶ "Interprovincial alliance of oral implants procurement proposal results," State Council of the People's Republic of China, January 11, 2023.

⁷ "Volume-based procurement," February 12, 2022.

⁸ McKinsey analysis of results from provincial and national medical device proposals.

⁹ "Notice of the National Healthcare Security Administration on printing and distributing the three-year action plan for DRG/DIP payment method reform," State Council of the People's Republic of China, November 2021.

Many general managers of medtech MNCs' China businesses remain confident about the opportunities in China.

strategy are both aimed at advancing domestic manufacturing capabilities in high-tech, high-value industries, including medtech.¹⁰ A growing number of government entities of different levels have heeded guidance encouraging the purchase of locally made equipment and consumables.

Local competition. Competition from China-based medtech companies continues to intensify. With their entrepreneurial energy, funding, agility, and knowledge of the local market, China's domestic medtech companies are accelerating launches, expanding and upgrading their portfolios, and issuing fast-follower products to MNCs' offerings. For instance, several categories, such as transcatheter aortic valve replacements, were launched first in China by local companies.¹¹ More than 20 local IVD players are currently introducing laboratory automation systems to the market.¹² Local purchasing priorities give local companies opportunities in categories in which MNCs lack local manufacturing. As a result, local companies have gradually developed brand recognition and captured market share across categories. Chinese medtech companies' market share has surpassed 50 percent for products in categories such as medical imaging and many types of orthopedic and cardiovascular devices.¹³ Moreover, having gained scale and experience in their home market, these

companies are now looking to expand beyond China, bringing more competition to global markets.

China remains an attractive market and is critical for global success

Many general managers (GMs) of medtech MNCs' China businesses remain confident about the opportunities in China. A recent McKinsey survey of 20 medtech GMs revealed that these in-country medtech leaders expect quick postpandemic recovery and solid growth in the high single digits for their China businesses in the next few years. Fourteen of the 20 also expect continued investments into China from their parent company. None reported plans to scale back their China businesses.

To senior executives based out of their companies' global headquarters, these China GMs' predictions of growth and investments may seem optimistic. In reality, some parts of the market may no longer be commercially sustainable for all participants. On the other hand, China will continue to be a major source of global growth. It remains the second-largest and fastest-growing market for medtech, and the central government has a strong imperative to support the healthcare industry. Planned healthcare expenditures are projected to grow from \$1 trillion in 2020 to a "Healthy

¹⁰ For Made in China 2025, see Douglas Irwin, "The return of industrial policy," International Monetary Fund, June 2023; for dual circulation, see Hung Tran, "Dual circulation in China: A progress report," Atlantic Council, October 24, 2022.

¹¹ Cai Wenjun, "Shanghai medics develop innovative synthetic heart valve," SHINE, July 12, 2022.

¹² "More than 20+ local IVD companies have the ability to research and develop fully automatic laboratory assembly lines," National In Vitro Diagnostic Network, October 9, 2022.

¹³ For more about orthopedics implants, see *Orthopedics devices market report*, Sina, June 23, 2021; and "Orthopedics devices competitive overview," Sina, July 8, 2021; for medical imaging, see *Medical imaging devices market report*, Sina, November 4, 2022.

China 2030” goal of \$2.4 trillion.¹⁴ Based on underlying factors such as demographic shifts and urbanization, China’s medtech market will likely grow at a 5 to 10 percent CAGR and double from about \$70 billion in 2021 to \$110 billion to \$165 billion by 2030 (Exhibit 1).

An ongoing presence in China will also be essential for MNCs to secure access to innovation and manufacturing capabilities. Local companies are not only launching fast-follower products but also producing and commercializing research breakthroughs, sometimes on a global stage. For instance, one Chinese medtech company’s noninvasive bladder cancer test gained a breakthrough device designation from the US Food and Drug Administration (FDA) in 2021.¹⁵ In manufacturing, a mature and deep local supply chain—from raw materials to complex components and skilled labor—provides a robust ecosystem for medical device development.

And then there is capital. Capital in China can cofund growth. Consider that the number of private equity and venture capital investments in medtech in Greater China grew from about 200 in

2017 to 330 in 2021.¹⁶ Cumulative deal value more than quadrupled, from about \$772.0 million in 2017 to about \$3.4 billion in 2021 (Exhibit 2).¹⁷ The total market capitalization of publicly listed Chinese medtech companies reached \$355 billion in 2022. At the same time, transaction volume dipped in 2022 because of COVID-19, leaving more dry powder to spend in 2023.

Succeeding as an MNC in China in the future

Many medtech MNCs are in the process of reviewing their strategic options in China. They should start by asking two questions: What are the stakes in China for the global business? And how well is the business positioned to succeed in China in the future?

Explicitly or implicitly, the answers to these questions have guided MNCs’ distinct strategic approaches in the Chinese medtech market. Now, they can inform MNCs’ future choices. (For an overview of possible approaches, see sidebar, “Four courses of action for MNCs to define their strategic posture in China.”)

¹⁴ “Healthy China 2030” planning outline issued,” State Council of the People’s Republic of China, October 25, 2016.

¹⁵ For more on breakthrough devices, see “Breakthrough Devices Program,” FDA, last updated March 28, 2023.

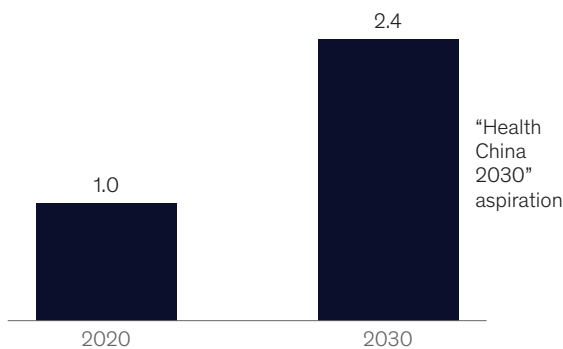
¹⁶ “Private equity and venture capital closed deals, medtech, Greater China,” IT Juzi, accessed April 28, 2023.

¹⁷ Ibid.

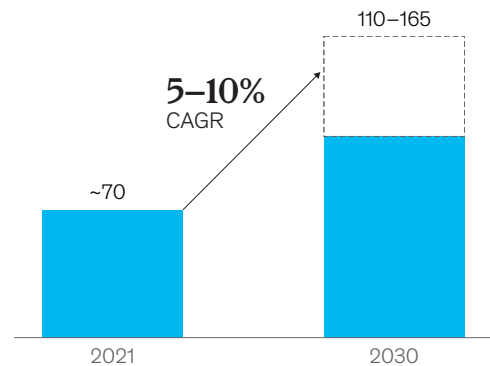
Exhibit 1

The medtech market in China is projected to double from 2021 to 2030.

China healthcare expenditures, \$ trillion



China medtech market, \$ billion



Source: State Council of the People’s Republic of China; McKinsey analysis

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Four courses of action for MNCs to define their strategic posture in China

Multinational companies (MNCs) can evaluate their current value at stake in China and how their strengths stack up against the competitive environment—their right to win in the market. Companies can expect to fall into one of four archetypes, each with a distinct set of options (exhibit).

Selectively accelerating—such as adopting an asset-light model to expand business in China in attractive segments or focusing on a part of the global portfolio that is competitive in China, potentially including developing China-specific

offerings. One consumer-facing MNC focuses its investments in China on flagship locations and e-commerce while using distributors to expand the rest of its footprint.

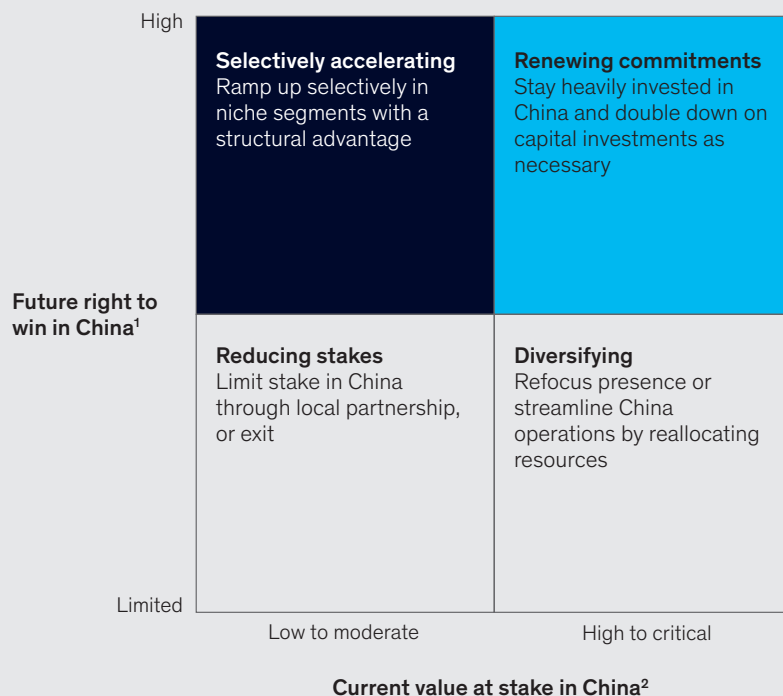
Renewing commitments—such as expanding the value of the company's global business model in China, with local adaptations. For instance, some MNCs localize their production in China and may even localize the majority of their value chains to compete the way Chinese companies do. A large high-value consumables company is investing

tens of millions of dollars in a fourth manufacturing base in China to produce its core portfolio.

Reducing stakes—such as selling parts (often a large part) of a company's China business to local companies or investors.

Diversifying—such as hedging supply chain risks to build resilience outside China. For instance, some companies manufacture in an alternate locale in addition to China. Others may shift their operations to focus on high-value segments.

Multinational companies in China can evaluate themselves along two dimensions.



¹Including market share, product differentiation, cost competitiveness, government relations, etc.

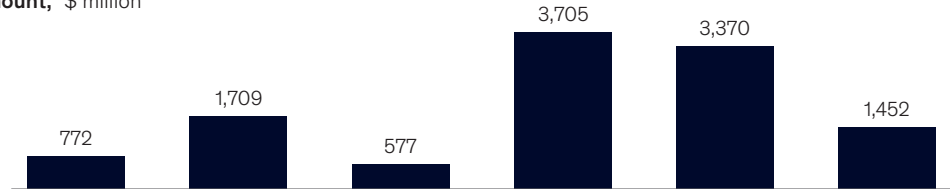
²Including China revenue, profit, and growth contribution to global figures, multinational companies' value chain in China, etc.

Exhibit 2

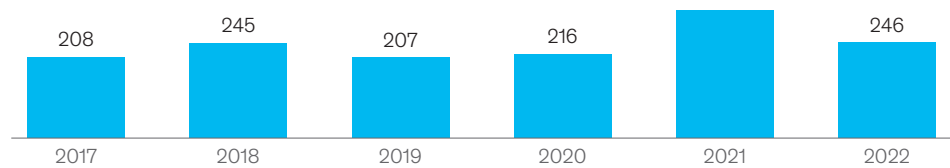
Medtech deal volume and deal values have grown in China.

Private equity and venture capital transactions in medtech in Greater China, 2017–22¹

Transaction amount,² \$ million

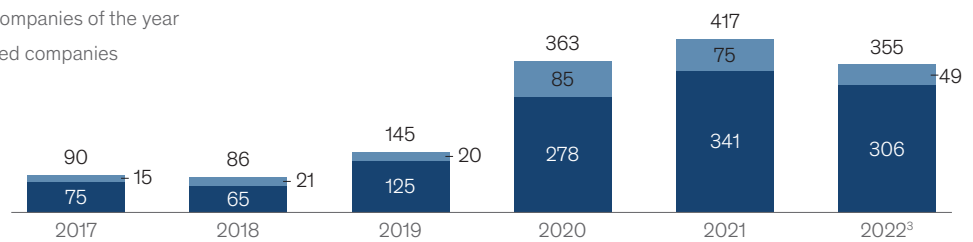


Number of transactions



Market value of listed Chinese medtech companies³

■ Newly listed companies of the year
■ Previously listed companies



Number of newly listed companies of the year

13 6 14 22 43 28

Note: Figures may not sum, because of rounding.

¹Includes transactions in mainland China, Hong Kong SAR, and Taiwan China captured in IT Juzi database; \$1 = 6.72 renminbi.

²Calculated only if precise deal size is enclosed within IT Juzi.

³Including medtech raw-material suppliers; reagent, device, and consumable manufacturers; and service providers listed on the Beijing, Hong Kong, Shanghai (STAR included), and Shenzhen stock exchanges, as well as Nasdaq; market value as of end of each year 2017–22.

Source: IT Juzi; S&P Global; Wind; McKinsey analysis

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Companies that have built sizable businesses in China in line with its market potential will likely choose to renew their commitments. Doing so involves strengthening and expanding local value-chain capabilities, exploring new business models for China, and pursuing commercial and operational efficiencies.

However, many companies—for at least portions of their portfolios and operations—may need more nuanced strategies. These companies would need to evaluate the viability of their product offerings

and the related commercial models and make deliberate choices about where to allocate or withdraw their finite resources.

To be sure, this kind of strategic decision making is difficult, partly because of the fast-moving market context. It’s also difficult because many leaders have had decades of experience with China as a reliable all-around growth market. Adjusting to and communicating objectively about each business’s updated strategy in China and the rationale behind it will likely take time and require thoughtful

fact-based and trusting conversations between global and local leadership.

A fresh look at value creation in China

As medtech MNCs revisit their China strategies, they are striving to achieve a balance that allows them to tap into current and future opportunities while managing uncertainties that are hard to quantify. Often, this boils down to the questions of how local the organization needs to become across the value chain to succeed and whether that degree of localization is feasible and desirable from the parent company's overall viewpoint.

Five questions can help leaders frame a holistic discussion on China while opening the aperture beyond traditional strategic moves.

How interdependent is China and the global business?

China's contributions to a medtech MNC's revenues and profits can be readily quantified. However, deeper analyses often reveal less obvious interdependencies. For instance, one medtech company analyzed the effect of product volumes destined for the China market on cost of goods sold (COGS). It found that without the China volumes, COGS of some products would increase by as much as one-third, adversely affecting competitiveness and profitability far beyond China. Many companies will find their supply chains deeply intertwined with China-based manufacturing sites—and even more so with Chinese suppliers of intermediate goods and products. Mapping out the streams of value and goods is a prerequisite to an informed strategic discussion on China, and it demands dedicated analytical effort for most medtech companies.

Which portfolios actually create value in China?

VBP has catapulted some product categories into commoditization; the attractiveness of others has been steadily eroded by local competition. Sharp reprioritization of portfolios is likely in order, but deciding what to let go is often a difficult decision. Local organizations may feel the need to maintain complete product lines in certain therapeutic areas to serve their customers and sustain their

commercial organizations. At the same time, innovative pipelines are often lagging behind from a China perspective: new products may not be earmarked for an early launch in China, and regulatory processes may also not fully tap into the options of accelerated approvals that exist for innovative products. At both ends, bold decisions are required to reshape portfolios for profitable growth in China.

Who is the optimal owner of portfolio assets?

For several decades, as MNCs shaped China's medtech sector, leaders believed it necessary to maintain full ownership of portfolio assets. Today, upon closer analysis, many companies might find that for some parts of their business—a certain product category, geography, or customer segment—different ownership may make the most sense and create more value. For example, commoditized products may be margin dilutive from an MNC's point of view; however, a local distributor with a different commercial model and different cost and overhead structure might well generate economic value from them. A medtech company could, therefore, license parts of its portfolio to create incremental value for itself and keep products available for patients and healthcare professionals. To be sure, this discussion gets more fraught when considering larger parts of portfolios or entire business units. In some other industries, entire China businesses have been carved out, enabling them to operate under different ownership and in line with local market requirements. Although such moves have yet to take place in medtech, an open discussion on ownership and entity structure in China should be part of any strategic discussion.

Which partners can best help the company compete and succeed in China?

Many MNC medtechs have relied on their own resources and capabilities to build their businesses in China. Today, trying to do things alone may be unnecessarily limiting. Medtech companies need to serve a broader market than in the past, including county-level hospitals. A vibrant local industry has sprung up; China's digital ecosystem is rapidly evolving; and local investors are looking for attractive business ideas to fund. In this environment, medtech leaders should routinely

be asking this question: Which local partner (or partners) could help us achieve our business objectives? Companies that apply this principle sometimes find attractive solutions, ranging from asset-level licensing and complementary portfolios to joint ventures that provide funding and market access. These partnerships also create a shared interest in business success with a local entity whose secondary effect is welcome and appreciated.

How can China's innovation potential be harnessed?

China is still a net recipient of medtech innovation: MNCs often create innovative products elsewhere and then bring them to market in China. This is gradually changing, however, as China is increasingly becoming a center of medtech innovation. Medtech MNCs can tap into this innovation in many ways. For instance, products invented in China might be licensed to complement product portfolios. Chinese medtech companies are also potential M&A candidates. For instance, Boston Scientific acquired a majority stake in Acotec in 2022, incorporating a locally made portfolio of cardiovascular intervention devices.¹⁸ Additionally, China's digital ecosystem abounds with innovation. Consider the large consumer health platforms operated by China digital giants and the advances China is making in the field of remote healthcare. These are but a few examples of product and business model innovation playing out in China's medtech and healthcare industries that can be harnessed by MNCs to set themselves up for success in China and beyond.

Mind the basics: Elevating commercial and operational efficiencies and compliance

Beyond these strategic considerations, best practices in commercial and operations will remain a source of competitive advantage for leading companies.

The market context in China requires many medtech MNCs to operate with lower prices, higher volumes, and broader footprints. Companies that respond well to these conditions are those that quickly transform the traditional high-touch model into one that emphasizes efficiency and agility and leverages omnichannel engagement.

Last, it is important for companies to stay up to date on evolving policy frameworks. For instance, China's evolving data privacy and data security laws mean many MNCs need to adjust the ways they collect, store, and process data originating in China to ensure regulatory compliance. Likewise, the regulatory framework for local manufacturing, local procurement guidelines, and pricing and reimbursement policies continues to evolve, calling for MNCs to strategize and operate in China with agility.

Despite structural uncertainty, China will continue to be the second-largest medtech market in the world. Serving this market and tapping its vast potential will remain squarely at the top of many medtech senior leaders' global agendas. Although there are many ways to succeed, success is more likely to come to those that act quickly.

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¹⁸ "Boston Scientific announces strategic investment to acquire majority stake of Acotec Scientific Holdings Limited," Boston Scientific, December 11, 2022.

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