

Medtech companies prepare for an innovation makeover

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Health Research Institute



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Introduction

The medical technology industry was on the forefront of innovation for decades, but now return on innovation investment is declining. The very notion of medtech innovation needs redefining in a new health economy that is focused on higher expectations for value and convenience. Medtech companies must be ready to compete in the new environment or risk being displaced by companies that can show evidence that their innovations create value.

Executive summary

For decades, the medtech industry was on the forefront of innovation. But now as the health industry undergoes significant change, return on innovation investment is declining for most traditional medtech companies. Growth through purely product innovation has slowed substantially, and the benefits from incremental improvements to existing devices pale in comparison to the cost of making those devices. Profits are contracting, and total shareholder

returns have been declining during the past few years. The ability to continue serving existing customers and markets in a meaningful way is becoming increasingly difficult as customers expect more from the industry.

The mere concept of innovation needs redefining in a health ecosystem that demands and rewards new models for delivering better care at lower costs across a broad patient population. Medtech companies must get ready to compete in this new environment

or risk being displaced by competitors that can show evidence their innovations achieve the same high clinical standards but are faster, better, cheaper, and more integrated into a care delivery continuum that increasingly transcends geography. In many instances, these companies exist outside the traditional medtech realm.

With all this change there is opportunity. The medtech industry has always viewed innovation as the critical element of success, and its importance continues to grow. While 64% of executives surveyed by PwC's Health Research Institute (HRI) view innovation as a competitive necessity today, 81% believe it will be in five years. (See Figure 1 below.)

But the innovation machine is not working like it used to. Today adding nifty features to existing products is not enough to warrant a price increase. Customers—be they hospitals, accountable care organizations (ACOs), or even individual consumers—now demand more in financial, convenience, and health terms. Medtech companies must focus more on service and business model innovations that meet

Figure 1: The importance of innovation in medtech is growing

How important is innovation to the success of your company?

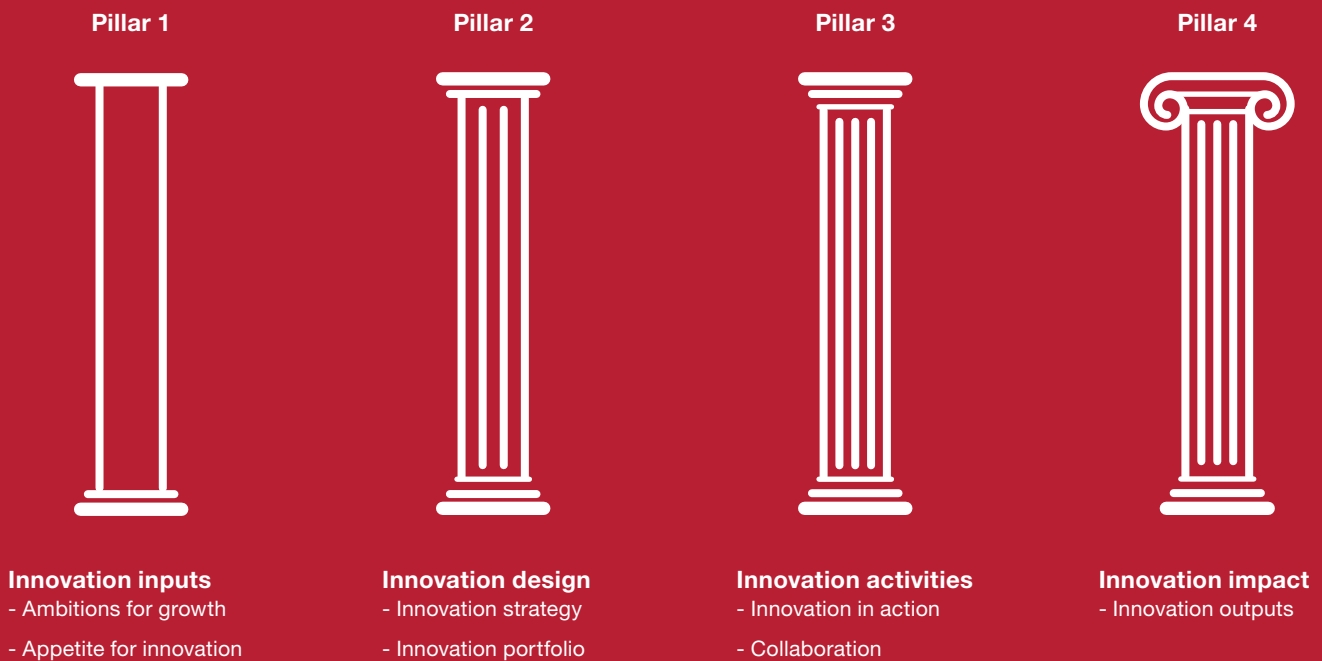
“Innovation is a competitive necessity.”



Source: PwC Medtech Innovation Survey 2013

The Medical Technology Company Innovation Scorecard: How medtech companies fare on innovation know-how

For its research, HRI developed an innovation scorecard to assess 36 medtech companies on four innovation pillars and seven innovation dimensions based on leading practices in innovation. The scorecard is a guide for executives to use as they develop and refine their innovation game plan. Please visit HRI's Medical Technology Company Innovation Scorecard microsite (pwc.com/innovationscorecard) to compare scores by company size and geography.



new industry demands rather than on incremental product improvements. If they don't, they risk fierce threats from new players eager to claim a part of this \$349 billion global market.¹

To assess the state of company-level innovation in medtech, HRI followed up on PwC's 2011 report, *Medical technology innovation scorecard: The race for global leadership*, which found the US leading the world in the medtech industry, but losing ground to other countries.² This year, more than 50 companies participated in

the research, including those doing business in in-vitro diagnostics, disposable medical products, medical equipment, diversified life sciences, implantable devices, as well as other healthcare companies and new players in the field.

HRI interviewed more than 30 top executives and conducted a survey in summer 2013 of more than 35 medtech companies, almost half of which reported revenues in excess of \$1 billion US dollars.

The research includes a web-based innovation scorecard that assesses companies based on leading practices in organizing, managing, and fostering innovation. (See *The Medical Technology Company Innovation Scorecard illustration above*.)

Key findings include:

- **The value of a device is no longer solely in the product itself.** While clinical efficacy is a must, the true value in medtech today is a company's ability to

provide information, services, and other assistance to customers to solve additional problems such as improving diagnostics, increasing operating room efficiency, reducing length of hospital stays, monitoring patients remotely, and keeping people out of the hospital.

- **New competitors are staking their claim.** At least 18 companies have entered the medtech space, and are driving innovation at the pace of technological, not healthcare, change.
- **New integrated services and business models that address clinician and consumer needs are becoming more important.** But, medtech executives were almost twice as likely as executives across all industries to say that product innovation was their top priority in the coming year (46% compared to 29%) and just 8% said that business model innovation was next year's priority.
- **Medtech executives expect a higher level of innovation over the next three years, but they lack formal processes to achieve their goals for new services and business models.**

Medtech executives expect more breakthrough and radical innovations in services and business models, but just 14% said that they coordinate and manage innovation processes for maximum efficiency.

- **Medtech companies have been slower to apply new social, mobile, analytic, and cloud technologies that other industries have used successfully.** Half of medtech companies appear to be using such technologies to at least some degree to engage customers and patients in managing their health and to enable remote monitoring. But only 12% are using them aggressively to create new business models that center on clinical and consumer dynamics. With outdated and unresponsive information technologies, companies might miss opportunities to meet the needs and demands of the next generation of consumers.
- **Medtech companies are looking to open innovation as a key approach to drive future growth.** However, medtech executives admit finding the right external partners with whom to collaborate is difficult. Currently, they co-create

with customers or external partners on less than one-third of their products and services.

HRI assessed how prepared medtech companies are to innovate in a rapidly evolving health industry based on their innovation appetite, strategy, and activities, and found that moving forward they should:

1. **Be ambidextrous** by creating an innovation operating model that separates breakthrough and radical innovation from the incremental innovation necessary to support the core business.
2. **Collaborate to get closer to the patient** by integrating into the broader patient experience, the larger health ecosystem, and new payment models.
3. **Measure innovation in new ways** by using forward-looking metrics and connecting the dots for shareholders, who need help understanding the changing role and nature of innovation.

Medtech executives expect more breakthrough and radical innovations in services and business models, but just 14% said that they coordinate and manage innovation processes for maximum efficiency.

Redefining innovation in medtech

Medtech companies must show evidence their innovations are faster, better, cheaper, and more integrated into the care delivery continuum.

Medtech was on the forefront of innovation for decades giving the world—among other things—pacemakers to keep hearts beating, imaging devices to detect cancer, and surgical devices that reduce the need for highly invasive operations. Now the industry is transitioning from one that emerged from decades of breathtaking growth to a more mature one in which the product portfolio has become increasingly stable, predictable, and commoditized. (See *Medtech today: A maturing industry sidebar at right.*)

While the global medtech market is expected to grow 4.5% to \$455 billion from 2011 to 2018, there is less growth anticipated in developed countries.³

The venture capital community is also becoming pickier, resulting in fewer start-up companies for large medtech companies to purchase. “We don’t fund cool science without commercial potential,” said Steve VanNurden, former chair of Mayo Clinic Ventures and current president and CEO of the Fitzsimons Redevelopment Authority in Aurora, Colorado, which operates a bioscience incubator and accelerator program for early-stage companies. “There are a lot of really innovative technologies, and you’re just wowed by them, but they have no business model attached to them... and for that reason we couldn’t pursue them.”

A new health economy is on the horizon, expanding the medtech landscape. In the US, the pace and nature of innovation has changed in health for two key reasons: a new focus on value that has led to risk-based approaches for managing population health, and an increasingly savvy and demanding consumer. Medtech generally lacks experience in these areas.

Embedded in this new health economy is a focus on a holistic approach to health and disease, better diagnostics, more convenient care delivery, and a desire to make a closer connection to patients—preferably via digital and mobile technologies—either directly or through the risk-bearing, population-health focused hospitals and physicians that care for them.

The mere term innovation needs redefining in an environment that rewards value—measured in affordable patient outcomes and customer satisfaction—over volume. Formerly, the physician was the arbiter on what made a product innovative, but now the customer is changing. Hospitals are employing more physicians, and subsequently have newfound influence in managing physician preference purchases. “Traditionally, technology goes through one person, but it’s not one person here,” said Scott Young, MD,

Today’s business climate is characterized by increased regulatory approval requirements and government scrutiny that are contributing to greater uncertainty and an increasing cost for developing new products. A new medical device excise tax in the US is impacting the bottom line, and an increase in the number of medical device security breaches has recently motivated the Food and Drug Administration to act.⁴

Medtech also faces growing challenges driven by the blurring roles and responsibilities of health industry players and the increasing role healthcare consumers are playing in the industry. Analysis of performance metrics exposes an industry in flux:

Available venture capital is declining: Investment in venture capital funds decreased \$1.2 billion between 2007 and 2012, and the number of deals completed annually declined by 20%.⁵

Deal value and activity are waning: The annual deal volume measured 173 during 2007, and decreased to 57 during 2012. Similarly, deal value declined from \$51 billion in 2007 to \$29 billion in 2012.⁶

Revenue growth is slowing from double to single digits: Average annual revenue growth rate for the top 20 medtech companies (by revenue) dropped from 10.6% in 2007 to 4.93% in fiscal year 2012.⁷

Growth from existing markets is lagging: The highest growth is stemming from emerging and developing markets. The projected compound annual growth rate in the Middle Eastern, African, and Latin American medtech market is approximately 10% through 2018.⁸

Operating profit is flat: Pre-tax margins for the top 20 medtech companies increased only 0.4% between 2007 and 2012.⁹

“One of the complaints I’ve heard over and over is, ‘Why doesn’t my glucometer look like my smartphone?’ The reason people aren’t checking their blood sugar levels is because they have to carry around an extra thing that only does blood sugars, looks clearly like a medical device, and reminds them that they’re sick.”

— Andrew Atwell, Samsung

senior medical director and executive director of Kaiser Permanente’s Care Management Institute. “It’s this entire system that examines and evaluates the technology. It’s a high bar, a tough committee to get through.”

Kaiser’s committee screens new technologies on criteria covering safety, impact to workflow, and what data they generate. “We’re a system of care, and we are really good at engineering and optimizing care at Kaiser Permanente. So, we look at how devices fit into our systems of care: where does it fit, does it fit, or is it something so new, so radical that we need to think about adjusting the process for this device?” said Young. “It goes beyond traditional medical devices—all technologies go through the same scrutiny.”

Hospitals, physicians, insurers, pharmaceutical companies, and even companies new to healthcare are starting to collaborate in shared-risk care delivery models. According to HRI’s interviews with executives, some population health-focused systems—namely risk-bearing systems like Medicare or private insurer ACOs and health maintenance organizations—are already introducing themselves to medtech companies as new large customers.

Pharmaceutical companies team with medtech companies to deliver companion diagnostics—tests or imaging tools that enhance the likelihood of targeting the right therapy to the right patient in complex cases. For example, Roche Pharmaceuticals and Roche Diagnostics are working together on personalized medicine, following a commitment by the chief executive officer to pair 60% of the company’s pipeline drugs with companion diagnostics.¹⁰

Consumers—who are responsible for paying the tab on an increasingly larger portion of their health costs—are becoming more discerning about where and how they spend their money. They are starting to compare different venues for care and shop for what they believe is the best care facility at the lowest cost. They are also looking for ways to stay well, get well, or manage a chronic disease—but they need help.

“One of the complaints I’ve heard over and over is, ‘Why doesn’t my glucometer look like my smartphone?’” said Andrew Atwell, senior manager at the Samsung Open Innovation Center. “The reason people aren’t checking their blood

sugar levels is because they have to carry around an extra thing that only does blood sugars, looks clearly like a medical device, and reminds them that they’re sick. Patients want consumer devices that do double-duty because they always have them with them and there’s no stigma associated with them.”

Medtech companies have never had a better opportunity to be the connective tissue that binds the healthcare delivery system to the patient. As hospitals and clinicians seek to deliver more health services in the home instead of the hospital, medtech companies can be key to bridging distance, time, and boundaries between clinicians and patients.

But going forward, the value of devices is no longer only in the actual product itself. It is in how companies integrate information and services to solve larger problems such as increasing operating room efficiency, reducing length of hospital stays, avoiding unnecessary readmissions, and improving patient adherence and satisfaction. Yesterday a cardiovascular device company may have sold pacemakers; tomorrow it ought to sell heartbeats per minute.

Medtech needs new services and business models to survive and grow

As breakthrough product innovation in areas such as electrical stimulation and catheterization has slowed during the past decade, the level of innovation in medtech has been heavily weighted toward incremental tweaks—think ‘paint it red instead of blue’—rather than toward radical innovations through which entirely new services and businesses are born. (See *Getting familiar with the three levels of innovation sidebar below.*)

HRI research found that no common definition of innovation exists now, and few companies include the notion of creating value in that definition. “I think innovation is when you find something that is disruptive—ten times the value or the efficiency at one-tenth of the cost,” said Clint McClellan, senior director of business development at Qualcomm Life. “Doing things better, cheaper, faster. To me, that’s innovation.”

Consider examples from other industries.

New services that augment the customer experience are ubiquitous in retail. For example, there are more reasons to visit a Starbucks, Peet’s Coffee or Caribou today than to get a caffeine fix. The experience and services extend well beyond drinking coffee to listening to music, surfing the web, and holding informal business meetings.

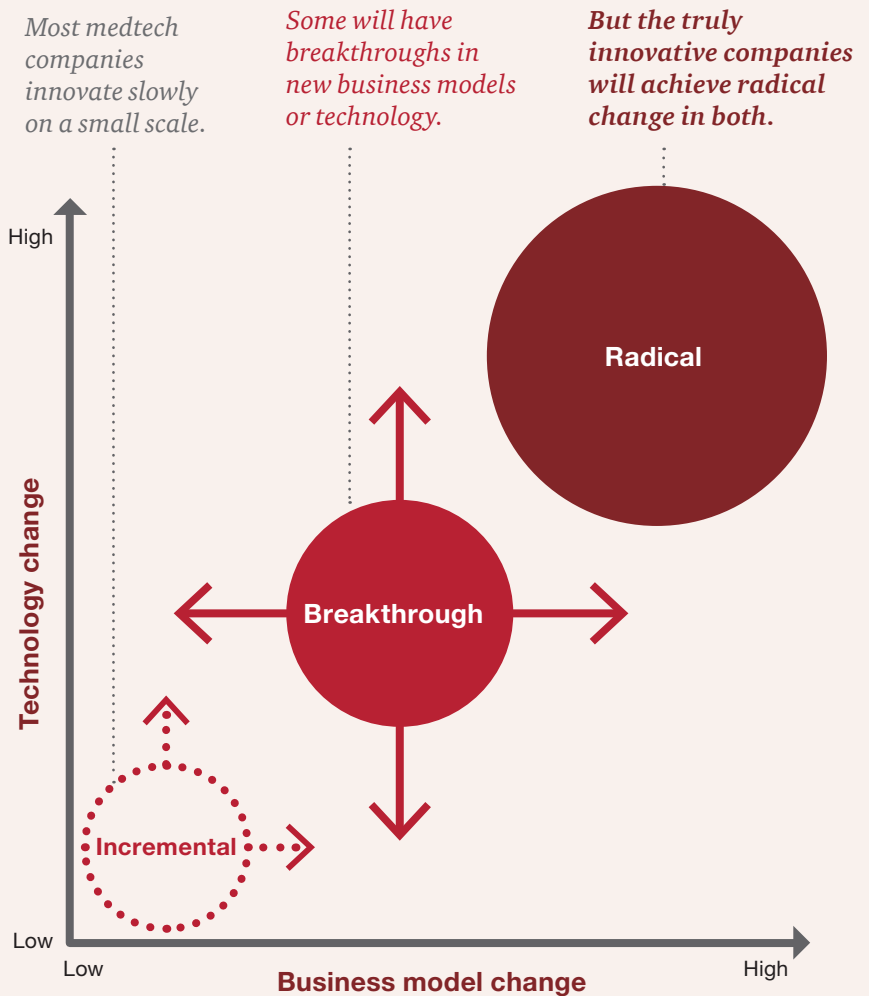
The financial services industry has thrived with business model innovation by completely changing the way consumers bank. Online and

Getting familiar with the three levels of innovation

PwC defines innovation as the creation and delivery of new value to consumers and companies that results in growth. An idea is truly innovative only when it produces new value, meaning customers are willing to pay for it.

True innovators will capture market share and be able to charge the highest prices. In the future, if a device company cannot tell the customer where and how it created value and for whom, its device may not be marketable.

This graphic shows how the degree of business model and technology change determine the significance of innovations.



mobile banking have resulted in faster service, heightened convenience, and more tools for budgeting.

New services and problem-solving capabilities will produce new buyers for medtech. Leading companies are placing bets on business model innovation and, in some cases, sharing the risk for commercial success by partnering with health system customers:

- Philips recently entered into a 15-year, \$300 million contract with Georgia Regents Health System

to design a new operating suite.¹¹ Philips will supply the health system with everything from medical equipment and training to maintenance and lightbulbs. A dozen Philips employees will work in-house at Georgia Regents to develop systems, offer ideas, and promote patient health. “Sometimes we tend to see vendors as marauders,” said David S. Hefner, executive vice president of Georgia Regents Health System. “We were looking for a partner to welcome as part of our enterprise-wide family

and help us craft better methods to care for our patients at a lower cost while improving their experience. So we no longer relate to Philips as simply vendors selling their wares. Philips is now sitting with our executive and physician teams devising new strategies, and we are also sitting with their executive team helping to craft the future of health care.”

- In Spain, Medtronic Iberica S.A. switched from selling pacemakers to becoming a key player in long-term coronary care, moving closer

Case study

Medtronic’s Cath Lab Program—Sharing risk for treating cardiovascular disease

Medtronic’s European division discovered that meeting customer needs and adding value to hospitals and patients involved a greater focus on innovation and a higher tolerance for risk and failure.

“I was in a meeting, and I told people that Medtronic needs to switch from a medical device company to a healthcare company,” said Rob ten Hoedt, senior vice president and president, Europe, the Middle East, Africa & Canada. “If we want to be a part of the solution of the delivery of healthcare, then we need to risk-share, and we need to go into this market in a completely different way and with a completely different model. And I remember everybody looking at me like I was from a completely different planet.”

Medtronic realized it needed to expand its role in the care continuum by integrating information and services for diagnosis, treatment, and disease management. The company studied how it could improve the efficiency of technology delivered at the point of care, and it established a new business unit called Hospital Solutions. Soon the unit launched the catheterization laboratory (“cath lab”) management program in which Medtronic and hospital systems build in risk sharing for efficiency savings—guaranteed and underwritten—and clinical outcomes. The contract for the partnership outlines benefits and cost savings for both parties, and hospitals pay per procedure.

Medtronic sets up a new cath lab within a hospital, coupled with the latest technology and equipment, and maintains the facility. The medical device manufacturer also deploys a Medtronic team to help the hospital implement lean six sigma programs to improve efficiency. Hospitals can choose from a menu of other Medtronic offerings, including:

- Growth programs such as enhancing patient referrals
- Supply chain management
- Surgical or procedural kitting
- Benchmarking and quality reporting
- Cardiovascular information systems

Medtronic took big financial and operational risks with this endeavor, but not without reward. On average, efficiency savings range between 20% to 25% at partner hospitals. Patient throughput times and waiting lists have decreased. Physician and nurse satisfaction have improved, and patients are happier with their experience.

Medtronic runs more than 40 cath labs and is scaling the program and expanding its services to include post-therapy, home care, and monitoring. “Our Hospital Solutions group is clearly a business model innovation incubator that is now growing to become a business unit delivering these services,” said ten Hoedt. “We have developed the model ourselves and we are scaling up rapidly, also outside of Western Europe.”

to a business model that sells heartbeats. After hospital executives repeatedly pressured Medtronic Iberica executives for discounts on pacemakers, Medtronic took a different approach, applying leading practices and industry

knowledge to help the hospital system reduce operating costs.¹² Medtronic also has an innovative business model for cardiac catheterization laboratories in Italy. (See *Medtronic's case study* on page 7.)

- Covidien has introduced mobile and cloud technologies to help customers make faster, more informed purchasing decisions. (See *Covidien's case study* below.)

Case study

Covidien's mobile sales app—Making customers smarter purchasers

What started in 2011 as a marketing effort to give sales representatives a single tool to use when calling on clinicians is now in its fourth iteration and proving to be a powerful decision-making tool for clinicians.

Covidien's energy-based device business saw an opportunity to become a preferred partner of providers by using mobile and cloud technologies to improve how clinicians and hospitals make purchasing decisions based on peer-reviewed clinical data. It introduced a mobile application that creates a one-stop shop for all of Covidien's clinical marketing materials and analysis tools to make purchasing the company's surgical devices easier and faster. "We wanted to be proactive in making the purchasing process better," said David Wang, vice president of strategy, insights, and business development for Covidien Surgical Solutions. "We knew our sales representatives were spending a lot of time using multiple marketing tools to explain the clinical benefits of the same device, and we wanted to find a way to get the most out of conversations with physicians."

By making clinical evidence and analysis tools available to an increasingly mobile clinical workforce, the company is helping providers, value analysis committees, and procurement departments make faster, more informed purchasing decisions. The tool helps customers:

Get up to speed on prevailing evidence about Covidien's surgical devices

The app combines all published research papers and more than 300 peer-reviewed publications on Covidien's surgical devices. Covidien's core reference library relies on cloud technology so the latest literature and product pricing is available. Clinicians can search the literature for clinical evidence on Covidien's surgical devices and share article links with colleagues to build support for the purchase.

Simulate impact on patient care, operating room efficiency, length of stay, and cost

Covidien's clinical affairs team created easy-to-use tools for clinicians to see the impact of the company's devices on patient outcomes and the hospital's bottom line using data the hospital provides. For example, clinicians can compare the effect of the use of the company's vessel-sealing device—which evidence shows can reduce the amount of blood loss during surgery—to the use of sutures. Clinician can also estimate how long a patient will spend in the operating room and afterward in the hospital for recovery. Clinicians can customize the analysis by loading procedure and billing codes into the tool. They can also compare the pricing of similar or alternative products.

Expedite the purchasing approval process

Using the tool, clinicians can attach the customized analysis to a purchase request form and route it to the appropriate decision-makers for approval. Procurement personnel can approve the analysis and forward it to other hospital stakeholders or request a 90-day trial.

The tool has been used extensively and customer feedback about having a single place to find relevant information has been overwhelmingly positive, according to Wang. The app is also saving Covidien's sales representatives time, reducing administrative costs, and increasing sales. Covidien has plans for continued modification and expansion of the tool and is in the midst of taking the app to its vascular salesforce, bringing ease of interaction with Covidien to a whole new line of customers.

New entrants are staking their claim in medtech

Non-healthcare companies that have survived trials and tribulations similar to those medtech is experiencing now are capitalizing on their wisdom to cash in on the health industry. For traditional players, they can be friend or foe.

According to HRI research,¹³ at least 18 companies (five of which are US Fortune 100 companies and four of which are Global Fortune 100 companies), namely from the telecommunications and consumer electronics sectors have entered

the medtech space.¹⁴ Most recently, Verizon received the green light from the FDA for its remote health monitoring service that connects data from patient medical devices on a real-time basis to Verizon's cloud, allowing patients and clinicians to look at data trends. *(For other examples, see Figure 2 below.)*

HRI research found these companies are well-equipped to compete with and potentially displace some traditional medtech companies—or some of their offerings—because they have invested

heavily in understanding consumers, are more agile in responding to customer demands, and manage innovation more effectively.

Samsung has worked with organizations through pilot studies inspired by customer research. “We’ve caught providers by surprise,” said Samsung’s Atwell. “We go to a health organization and say, ‘If you had a clean sheet of paper and you were going to design a device that was going to remotely manage a patient’s chronic illness from their home, what would that look like, what would you wish it would do, and what kind of features do wish it had?’ They are caught off-guard and say they have never been given carte blanche to design that themselves.”

Figure 2: New entrants to medtech

| New entrant | Entry date | What it offers | What it does |
|--|--------------|---|--|
| Samsung | 2013 2012 | NeuroLogica ¹⁵ S Health ¹⁶ | Expands Samsung’s medical imaging business via portable CT scanners Software integrated with mobile devices that allows users to track nutrition, exercise, and weight |
| Verizon¹⁷ | 2013 | Converged Health Management | FDA 510(k) cleared remote health monitoring solution that connects data from patient devices to Verizon’s secure cloud on a real-time basis, allowing both patients and clinicians to easily access information |
| AT&T¹⁸ | 2012 | Remote Patient Monitoring (RPM) | Blue-tooth enabled devices that collect biometric data and transfer patient information to designated clinician or caregiver |
| Canon¹⁹ | 2013 | “Healthcare Optics” | R&D operation in Massachusetts with a focus on robotic-assisted surgery, cardiovascular disease detection, brain imaging, and miniature endoscopy tools |
| Qualcomm Life²⁰ | 2011 | Connectivity Platform | Wireless health solution that aggregates and integrates patient data from disparate devices, applications and services. The platform provides a scalable infrastructure to manage interactions across a patient’s continuum of care. |
| Reebok, MC10²¹ | 2013 | Checklight | Wearable device with attachable sensors that detects the severity of head trauma in contact sports |
| Verizon and Motorola²² | 2013 | VML 700 LTE Vehicle Modem R1.1 | Motorola Solutions modem utilizing Verizon’s 4G LTE network that is able to securely access the system storing patient data and relay vital statistics/video to hospital while ambulance is en route |
| Sony and Olympus²³ | 2013 | Sony Olympus Medical Solutions | Joint venture combines Sony’s experience in digital imaging and Olympus’s optical manufacturing savvy to produce medical devices |
| Sony²⁴ | 2013 | Venture capital | \$10 million investment in Rainbow Medical, an Israeli medical device incubator |

Atwell believes this is out of the norm for the health industry, but something Samsung is able to do easily for non-regulated devices that can enhance traditional medical devices. He said the company can generate products quickly by rapidly prototyping because that is the way the company develops its cameras, phones, music players, and other products.

New entrants to medtech that responded to the HRI survey were more likely to:

- Regard themselves as true innovation pioneers
- Have derived a greater percentage of annual revenue from major new products and services launched during the past year
- Formally manage innovation processes
- Implement business model innovation to create new services rather than a single product
- Tap social media to support innovation efforts
- Have plans to collaborate with competitors during the next three years to deliver innovative products and services
- Take advantage of government funding and other external incentives to support innovation

Arguably these newcomers can be business partners to traditional device companies since they typically have the infrastructure that can deliver value to the providers and insurers that use and pay for their products.

Key findings on innovation practices in medtech

On average, medtech executives responding to the HRI survey estimated that they would produce a 41% increase in revenue during the next five years—a lofty goal considering that they also said that only 17% of their annual revenue was derived from major new products and services launched during the past year. They expect more of this growth to come from the existing organization (65%) rather than through mergers and acquisitions (35%).

Many of the leading device companies have been active acquirers of technology, using their skill, footprint, and strong marketing channels to refine and distribute acquired products. But with less venture capital available for start-up companies, they need a different strategy.

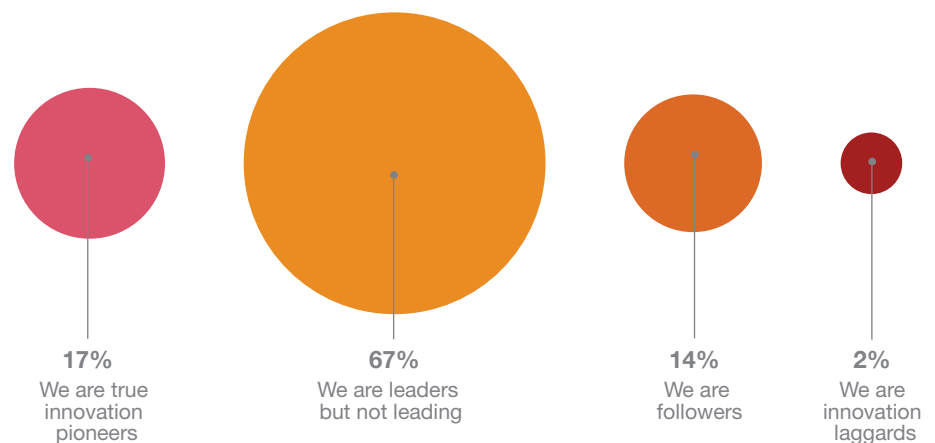
Significance and focus of innovation

Just 17% of medtech executives believe that their companies are true innovation pioneers, compared to 21% of telecommunications executives and 24% in the pharma sector. (See Figure 3 at right.) Forty percent of medtech executives said developing the right innovation strategy to achieve growth targets was their greatest concern, and three-quarters said taking innovative ideas to market quickly and on a large scale is challenging.

For most medtech companies the focus on product innovation remains king, at least in the short-term. Medtech executives were almost twice as likely as executives across all industries to say that product innovation, as opposed to service or

Figure 3: Medtech companies' appetite for innovation

Which of the following statements best describes your company's appetite for innovation?



Source: PwC Medtech Innovation Survey 2013

“Innovation hasn’t been an area that has been industrialized, but we believe it can be.”

— Sue Siegel, GE

business model innovation, is their top priority in the coming year (46% compared to 29%), and just 8% said that business model innovation or customer experience was next year’s priority.

The winds appear to be shifting, albeit modestly. The medtech executives HRI surveyed anticipate a more balanced focus on incremental, breakthrough, and radical innovation

during the next three years than what they say exists today (which several executives told HRI in interviews averaged from 10-30% breakthrough or radical and 70-90% incremental). Executives anticipate the most radical innovations to be in improving customer experience and technology platforms to support future development, not in business models or services. (See Figure 4 below).

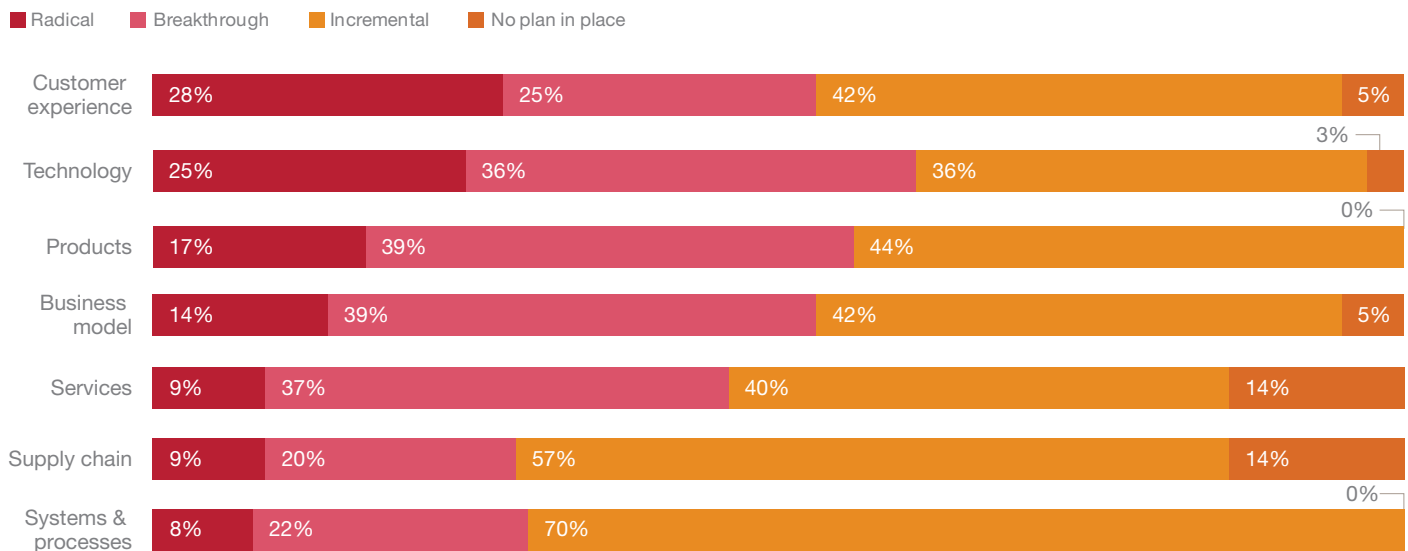
Use of social, mobile, analytic, and cloud technologies

Overall, medtech companies have held steadfast to more traditional mechanical and electrical technologies and have been slower to apply the new social, mobile, analytic, and cloud technologies that other industries have used successfully to create new business models.

“Who ever thought you could see a house, decide on a house, and purchase a house without ever visiting the house?” said Sue Siegel, chief executive officer of GE Healthymagination. “All of these new technologies are making different business models possible.

Figure 4: Medtech executives surveyed anticipate a more balanced focus on incremental, breakthrough and radical innovation over the next three years

How significant will your innovations in the following areas be over the next three years?



Source: PwC Medtech Innovation Survey 2013

Healthcare is just catching up to that convergence and revolution of bringing technologies together to actually make different solutions possible—make healthcare more affordable, make it more accessible, increase the quality, and certainly the patient engagement.”

Half of medtech organizations appear to be using social, mobile, analytic, and cloud technologies to engage customers and help patients managing their health and remote monitoring. Yet few are using these technologies aggressively to create new business models, especially those that focus on value outcomes. Only 9% of medtech executives said that they have used these technologies to create comprehensive services for which they are paid based on value, outcomes, and performance.

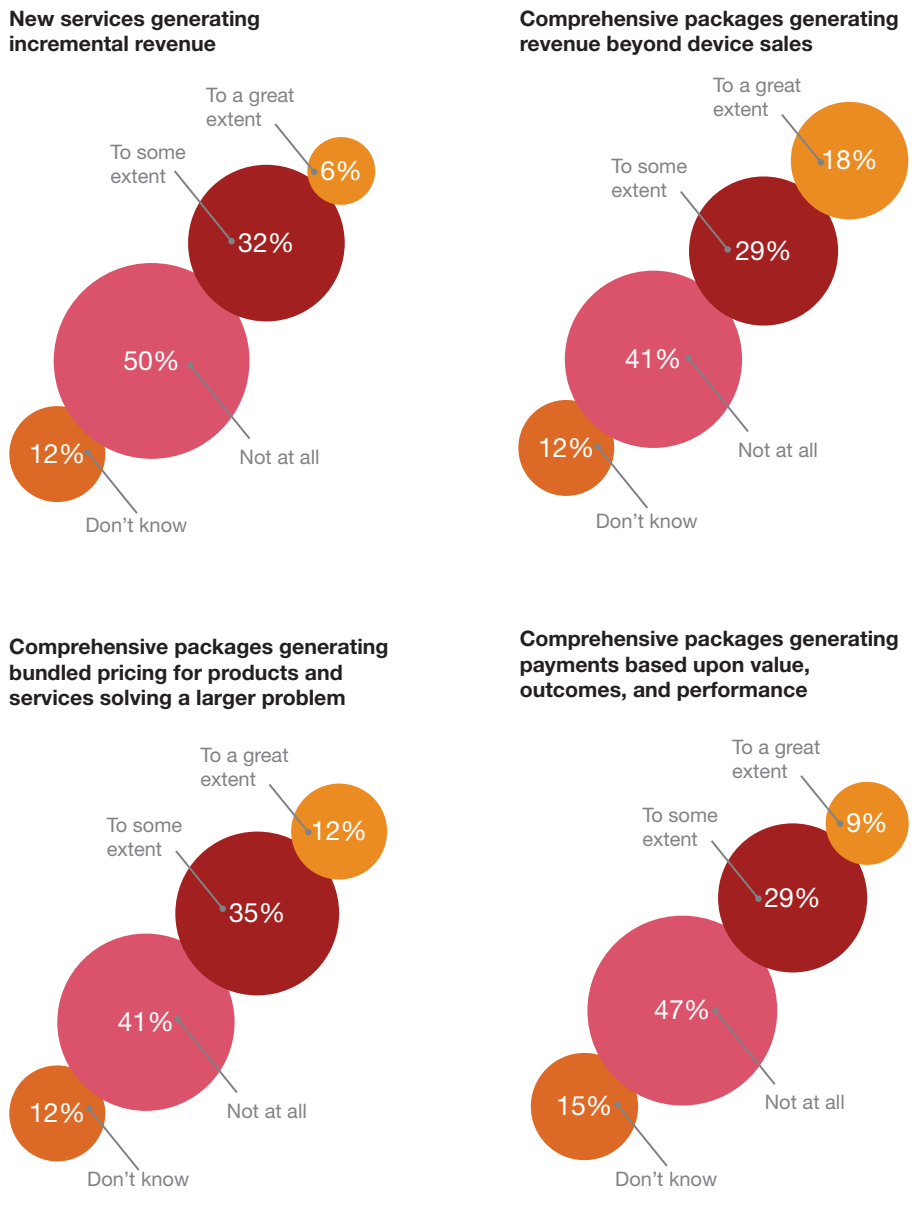
One issue is lack of reimbursement structures, which has been a problem for remote patient monitoring despite evidence that it improves patient care. (See Figure 5 at right.) Only 18% of medtech companies said they are very focused on using these technologies to integrate patient-generated data into clinical workflows and electronic health records.

How innovation is managed, staffed, and paid for

Medtech companies can create new business models internally or through acquisition (e.g., Medtronic’s recent acquisition of Cardiocom). Either way, they need to have the proper structures and processes to house high-impact ideas and innovations, invest in their development, roll them out to the rest of the organization,

Figure 5: Medtech companies use of social, mobile, analytic, and cloud technologies to create new business models

To what extent has your organization leveraged social, mobile, analytic and cloud technologies to create any of the following new business models for products and services?



Source: PwC Medtech Innovation Survey 2013

and take them to market. However, only 14% of medtech executives said their companies have a formal way to manage these activities for maximum efficiency. (See Figure 6 below.)

Most medtech companies have formal processes in place to manage product innovation across R&D, manufacturing, supply chain, and marketing, but they lack processes for service and business model innovation, which stretches outside their core business.

The HRI survey found medtech companies spend, on average, 8% of revenue on innovation. Executives characterizing their companies as true innovation pioneers said they spend between 15% and 25%, and new entrants such as telecommunications companies reported spending 11%. How they are spending their innovation dollars tells the real story. HRI interviews found that money for breakthrough and radical innovation is vulnerable, and

within that funding, most companies do not appear to be directing money specifically for business model innovation. Many large medtech companies such as GE, Covidien, and Medtronic have built corporate venture capital arms to fund internal and external startups. However, the HRI survey found that just 7% of executives regard these groups as an approach that will lead to the most growth for the company.

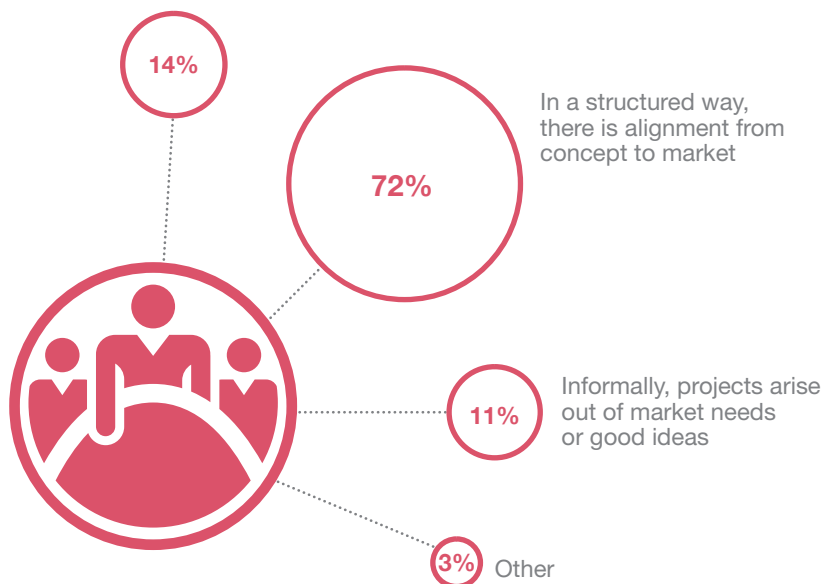
The staffing commitment to innovation is varied, and in developing a culture of innovation, medtech executives said they are most concerned with fostering an environment in which failure and risk are reasonably tolerated. Few medtech companies have dedicated staff who take on highly innovative projects or who focus specifically on business model innovation.

At Edwards Life sciences, Stan Rowe, chief scientific officer, pursues engineers with a broader appreciation for the industry. “What I want my R&D engineers to know is all the regulatory requirements, all of the quality requirements,” he told HRI. “Yes, I want you to be a great engineer, but I also want you to understand the market, referral patterns, the imaging necessary, the standard of care, all of the competition, and then you can be a great engineer.” Though it makes hiring more difficult, Rowe said Edwards engineers “feel empowered and they are so much more effective with that level of scope in their purview.” (For more information on talent, see HRI’s *New Chemistry*.)

Figure 6: Most medtech companies do not manage innovation activities for maximum efficiency

Which of the following best describes the way that your company manages its innovation processes?

Formally, all innovation activities are coordinated and managed for maximum efficiency



Source: PwC Medtech Innovation Survey 2013

Figure 7: Level of co-creation in medtech

What percentage of your innovative products and services are co-created with customers?

Innovative products and services are co-created with customers?

33%



Source: PwC Medtech Innovation Survey 2013

Innovative products and services are developed jointly with external partners?

22%



Collaboration

Although medtech executives are beginning to appreciate that innovation must occur outside of traditional research and development units, they co-create—that is, they involve customers or external partners from idea generation to execution—on one-third or less of their products and services. (See

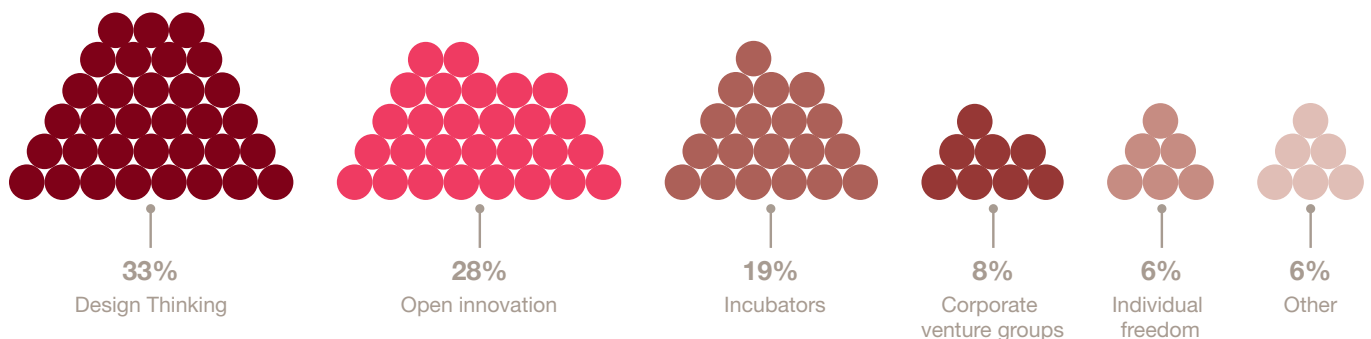
Figure 7 above.) “R&D engineers will make 10,000 decisions in a year, but how many of them have the patient at the center of that decision?” asked Rowe. “So to have cross-functional groups that work together with a focus on the patient is really critical.”

Most medtech companies identify “open innovation”—external and internal people generating and

commercializing ideas together—as one of the top two approaches that will generate the most growth. (See Figure 8 below.) Nearly 81% of executives have plans to collaborate with strategic partners during the next three years, but more than half said a major challenge is finding the right partners. How they collaborate with these partners will be key.

Figure 8: Open innovation is gaining traction in medtech

Of these approaches, which do you think will lead to innovations that drive the most growth for your company?



Source: PwC Medtech Innovation Survey 2013

What this means for your business

Innovation is critical to long-term success, but it can take many forms depending on a company's culture, stakeholders, and customer-buying behaviors. The innovation process is fundamentally different from most other business activities and requires a different logic, infrastructure, and style of management. Following are three ways medtech companies can

create an innovation engine that will help them manage truly game-changing innovation and find new sources of revenue.

1. Be ambidextrous

Companies must operate as a "lean startup" while concurrently maintaining lean six sigma discipline to sustain the core

businesses. These approaches and mindsets are very different, and applying the same discipline to both activities will not generate desired results in either discipline. (See *GE Healthymagination case study below*.)

Most companies rely on lean techniques to provide efficient, consistent, predictable outcomes across the organization.

However, in a truly innovative environment, lean thrives on a high volume of experiments and failures funded by small amounts

Case study

GE Healthymagination: Industrializing innovation

GE's \$6 billion commitment to improve quality, access, and affordability for healthcare consumers marches to a unique drumbeat. Born in 2010, healthymagination is the incubator the company created to nurture truly innovative ideas to the point of commercialization. It directs resources to venture investing, incubation, and thought leadership.

"It isn't that we are creating the inventions or coming up with all of the ideas, but we're putting the engine into place to manage innovation and bring all of these ideas together and have the ability to fail, early and fast," said Sue Siegel, GE corporate officer and chief executive officer of Healthymagination. "We are experimenting and piloting new ideas, spending less money, to produce successful outcomes."

Healthymagination operates outside of GE's core business unit structure, and is designed to take risks and commit to longer-term ventures. Healthymagination's projects have a three-year or longer horizon. This allows healthymagination the ability to explore new trends, develop pilot programs, without the quarterly reporting pressures to shareholders.

Once novel ideas are proven worthy and ready for commercialization, healthymagination transfers them to the core business units to take them to market. "Healthymagination is all about bringing GE's scale to transform healthcare around innovative disruptive solutions. Industrialization is the process of being able to repeat and then scale," said Siegel. "Innovation hasn't been an area that has been industrialized, but we believe it can be. If we crack this, I think we can crack this for a lot of people, not just GE."

Partnership cannot be overemphasized in healthymagination's approach. The incubator collaborates with GE's Global Research Center, forms alliances with startups via GE Ventures-Healthcare, and works with the university clusters and entrepreneurial incubators that have seen ideas work in other industries and want to apply them to healthcare. "It used to be that the value of companies derived from what they themselves could invent," said Siegel. "I think that the world has changed. It is how you partner in this new era that is going to really determine the winners over time."

of capital to create products that are tested in the market quickly, fail fast and frugally, and trigger a rapid learning loop to accelerate innovation.

Innovation is all about the concept of fast, frugal failure. “Innovation is a way of life,” said Kaiser Permanente’s Young. “You see this in continual improvement efforts, but also in things like our Garfield Center, where we mock up exam rooms, apartments, hospital rooms, and even operating rooms. And then we try things and we break them right there. We want to break them on something that looks like a movie set before we actually try it in real life.”

At the Garfield Center, Kaiser has designed new medication administration steps for nurses, maternity suites, operating room flows, and apartment layouts for elderly patients. It also uses the center to test new products and technology.

When Aetna acquired iTriage in 2011, it allowed the mobile health company to maintain its start-up mentality. “As stated by one of my colleagues, our intent is not to have mama bear roll over on the cubs,” said Martha Wofford, vice president and head of CarePass from Aetna. “You have to try to keep some separation from the core business and from some of the process. You have to ask: ‘How do you organize around innovation to spur it on? How do you protect these longer-term investments that are truly innovative if you won’t see results in a quarter or two?’”

The challenge is to manage the healthy creative tension between incremental improvement projects and highly innovative projects in the face of many corporate antibodies.

2. Measure innovation in new ways

Companies must manage the innovation cycle differently than the operating cycle. Most medtech executives are challenged to develop new innovation metrics. For highly innovative projects, companies cannot budget the same way they do for incremental projects because the first effort will probably fail. Companies need new methods for accounting and tracking the mechanics for fostering innovation at an operational level. Finance teams can play a role by applying a venture capital and portfolio management approach as opposed to a capital and operating approach.

Leading companies are starting to build new forward-looking innovation metrics that are based on a realistic rate of advancement with a long-term investment window. For example, this could include the number of initiatives that have moved forward toward development and a more generous project failure rate.

Companies should determine how to articulate shareholder value over the long-term. Executives must tell the story of where the company is going with its innovation investments—how they fit into the overall vision and how they resonate with major trends

Create an innovation engine

The innovation process is fundamentally different from most other business activities and requires a different logic, infrastructure, and style of management.

1. Be ambidextrous

Companies must operate as a “lean startup” while concurrently maintaining lean six sigma discipline to sustain the core businesses.

2. Measure innovation in new ways

Companies must manage the innovation cycle differently than the operating cycle.

3. Collaborate to get closer to the patient

Medtech companies must look increasingly to external customers, partners, and even competitors to help them generate valuable insights and widen the funnel of ideas flowing into the organization.

in the larger health ecosystem. Today’s health issues will not be fixed overnight, but executives can give board members and shareholders confidence that they have aligned the company’s vision to these realities and put the right governance, people, and processes in place to execute the innovation strategy.

3. Collaborate to get closer to the patient

Out of all health industry players, medtech companies arguably have had the least insight into patient outcomes and satisfaction. Their business-to-business relationships did not create a burning need

Less than one-fifth of medtech executives believe their companies are innovation pioneers

to master patient or consumer understanding. To get closer to the patient, medtech companies must first understand the shifts that are motivating their health industry counterparts to act differently.

Payments to hospitals and insurers are now partially tied to patient satisfaction scores, so leading health systems have begun to think of the patient as a consumer.

“We focus on person-centered care, recognizing that a patient is really somebody that is in our hospital or other site of care, but they are people that have lives outside of the healthcare system,”

said Michael McGarry, a director on the Innovations Accelerator Team at Ascension, a Catholic health ministry with more than 70 hospitals in the US. The accelerator team is responsible for evaluating technologies and developing new models for delivering healthcare. “They have families and communities that they go back to. How we build a relationship with those we serve in a meaningful way that extends beyond our hospitals is a question we’re continually seeking to answer.”

Insurers and other emerging risk-bearing organizations such as ACOs are relying on evidence beyond

just medical value for drugs and devices.²⁵ To justify their continued use, medtech companies must show why their devices are better than the alternatives by objectively documenting their value using information technology.

Some companies are already looking for workers with broader health industry experience, such as those with skills in health economics outcomes research.²⁶ But medtech companies must also look increasingly to external customers, partners, and even competitors to help them generate valuable insights and widen the funnel of ideas flowing into the organization. Open innovation can increase the volume, velocity, and value of innovation and thus increase a company’s scalability.

Conclusion

Medtech companies finally have the ability to make true their company charter—to improve the life of the patient—by bridging the gap of time and distance between patients and clinicians. They can create new and distinct sources of revenue by innovating and changing their interactions with customers and by monitoring patients more closely,

in real-time, in their daily lives. The most successful medtech companies in the new health economy will be catalysts for change and critical problem solvers that create value for clinicians as they diagnose and treat patients. They will create innovation that appeals to consumers and their new expectations for a positive patient experience.

All medtech companies need to determine how much to innovate, where to innovate, and how to innovate. The entire care continuum should determine medtech companies’ roles going forward.

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About this research

The research for this report included in-depth interviews with more than 30 top executives from companies in diagnostics, disposable medical products, medical equipment, diversified life sciences, implantable devices, as well as other healthcare companies and new players. HRI also commissioned a survey in summer 2013 of more than 35 medtech companies, almost half of which reported revenues in excess of \$1 billion US dollars.

The research includes a web-based innovation scorecard that assesses companies based on leading practices in organizing, managing, and fostering innovation.

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