



Collaboration — The future of innovation for the medical device industry



KPMG International

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Chris is the Chair of the Global Life Sciences practice at KPMG and has over 20 years of experience advising clients. He has a background in audit and was one of the founding Partners of the KPMG Transaction Services practice in Europe.

Chris works closely with life sciences clients around the globe to provide insight on the issues and trends impacting the sector. He has significant experience in large complex cross-border transactions including acquisitions, divestments, mergers and IPOs. His experience also includes a number of major transactions in the life sciences sector as well as a significant number of transactions in emerging markets.

Chris regularly meets with industry leaders and attends conferences in Europe and the Middle East, the Americas, Africa and Asia. He also routinely writes papers and comments on issues impacting the life sciences sector.



Ash Shehata

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Ash is a highly experienced healthcare professional at the cutting edge of information technology (IT) advances in the sector. In a career spanning more than 25 years, Ash has worked for some of the world's leading IT and consulting firms, using technology to drive improvements such as telemedicine, e-commerce, membership systems, customer service and healthcare management.

As Senior Executive Director Healthcare for Americas with Cisco, he was responsible for payers, providers and life sciences accounts including the Mayo Clinic, WellPoint, Cigna, Wellcare, Medtronic and Kaiser. Ash has led the development and deployment of telemedicine solutions with key clients and government agencies in the US and abroad.

Foreword

For the past 6 years, the KPMG Industrial Manufacturing sector has conducted an annual survey to uncover the most pressing issues facing our clients in the global marketplace. This year, KPMG International's 2014 survey of 386 manufacturers worldwide, included 55 medical device companies. The results demonstrate that these pressures are even more pronounced for companies in the medical device sector. In particular:

- Governments in developed countries are reducing their healthcare budgets, resulting in ongoing pressure to reduce costs and lower margins in manufacturing.
- The need to comply with increasing regulatory complexities in global markets is driving up costs and increasing the risk of costly compliance failures.
- Smaller medical device manufacturers have traditionally driven innovation in products and services, but they are being joined in an increasingly crowded field by larger companies in developing markets and by new players with technological and data analytics capabilities.

To respond to these pressures, leading medical device manufacturers are investing heavily in research and development, and appear to be

shifting their innovation strategies from incremental toward breakthrough innovation.

Pouring more dollars into research and development (R&D) alone, however, is not enough. As the survey results on the following pages show, medical device companies need to review their traditional approaches to innovation and take up new strategies designed to accommodate the rapidly evolving and globalized marketplace.

We realize the study has yielded the need for additional investigation in the following two areas: value-based pricing outcomes and product maturity models, which will have an impact on development costs.

We believe that medical device companies need to embrace more inclusive innovation models, collaborate more frequently and with a broader range of partners, and pursue greater integration with suppliers, development partners and healthcare providers. While there are signs that many companies are moving in this direction, those that lag behind stand to miss out on the rewards that the next wave of innovation will bring.

Examining the supply chain and optimizing for the future is not a matter of if, but when.

— **Chris Stirling**
Chairman, Global Life Sciences
Partner, KPMG in the UK

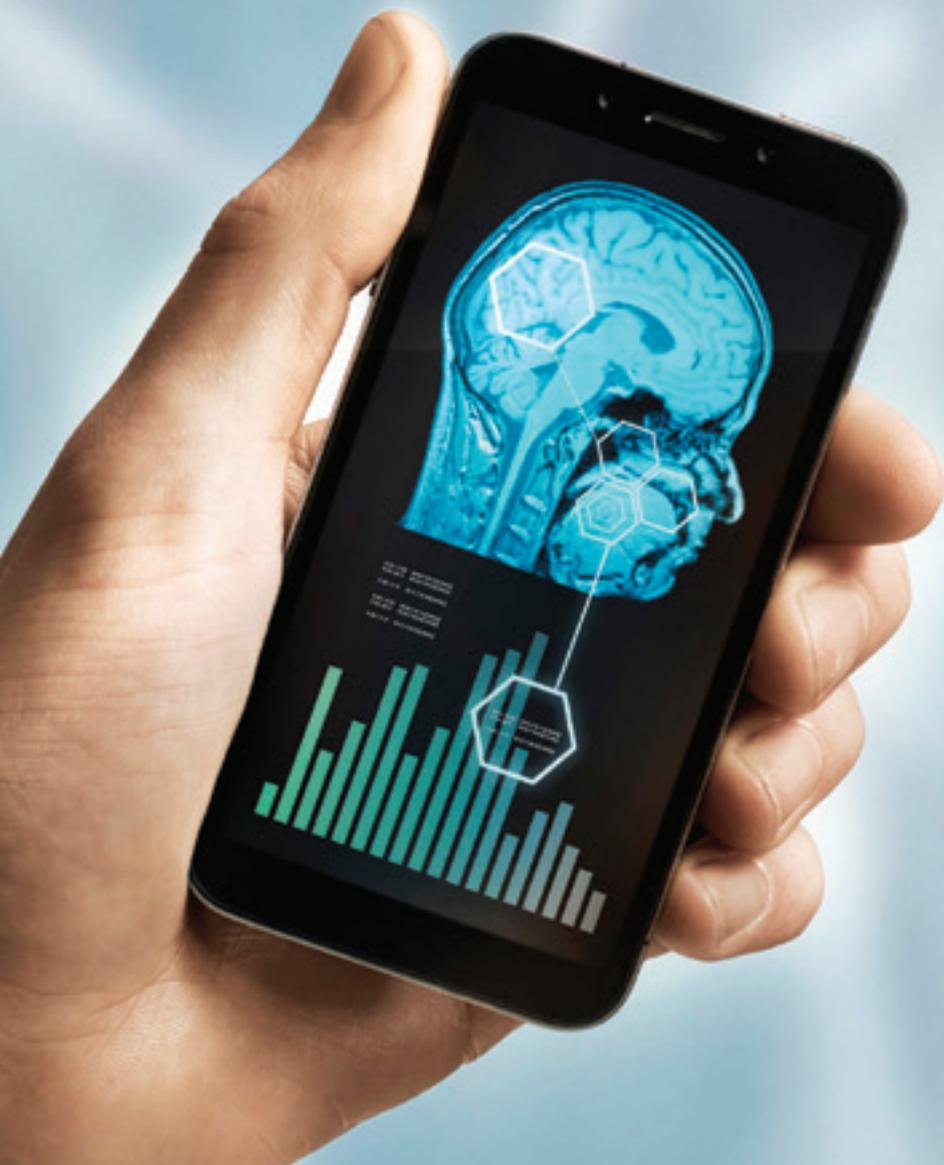


More than other manufacturing sectors, medical devices have a special stake in innovation; the nature of the business requires companies to elevate their performance to offer better life-enhancing and life-saving technologies.



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About the survey

- The 2014 KPMG International Global Manufacturing Outlook survey is based on a survey of 386 senior executives conducted by Forbes on behalf of KPMG International. Completed in early 2015, this year's survey included 55 executives in the medical device sector. Other sectors represented in the survey include: aerospace and defense, automotive, conglomerates, engineering and industrial products, and metals.
- Over fifty percent of respondents held C-level positions and a third represented organizations with more than US\$5 billion in annual revenue. Respondents were distributed evenly between the Americas, Europe and Asia.
- To shed more light on the survey's findings and their implications for medical device companies, we interviewed senior KPMG life sciences leaders across our network of member firms for further insights, including:

Gerald Dunstan

Director
Healthcare and
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Roger van den Heuvel

Partner
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Medical Device Sector
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Healthcare and
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KPMG in the UK

Competing through innovation: Priorities and challenges

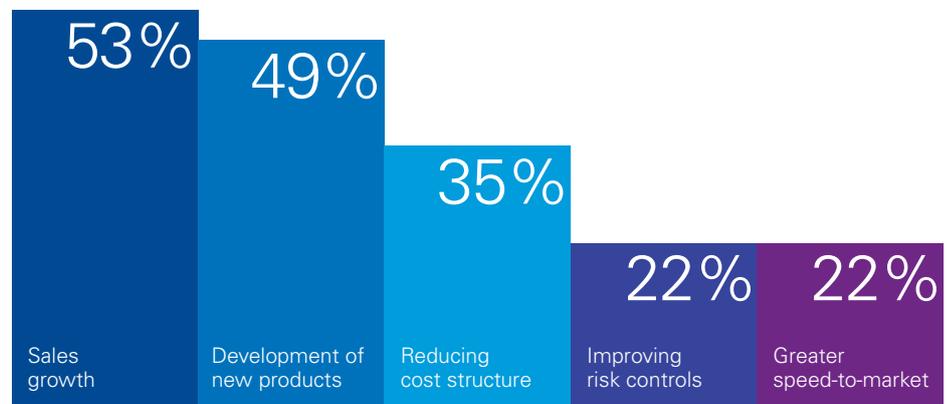
Faced with fierce competition and pressure to reduce costs across the healthcare spectrum, medical device manufacturers are banking on growth through breakthroughs in innovation and engineering.

The past decade has brought unprecedented change to the medical device sector, and the pace seems to be quickening. New regulatory requirements, fierce competition, and rapidly emerging technologies are creating new complexities and

challenges for those operating in the sector. As governments in many parts of the world seek to reduce healthcare costs, the pressure is on to produce products with lower price points, further squeezing profit margins.

Top strategic priorities

Figure 1: What are your organizations top three strategic priorities over the next 12 to 24 months?



Source: Forbes survey, January 2015

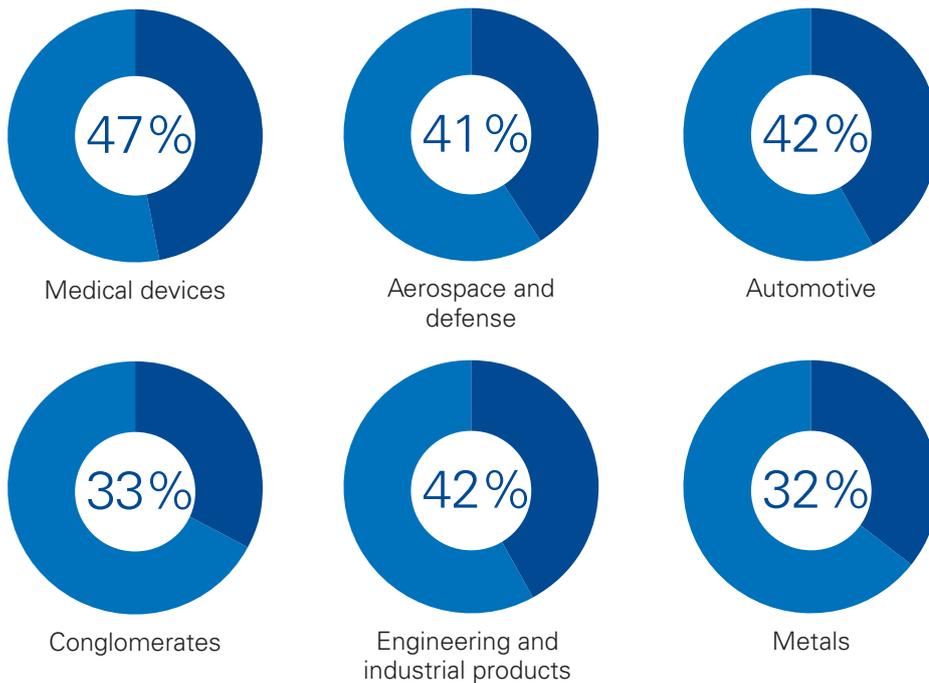
In this environment, it is no surprise that sales growth and new product development are the top two strategic priorities for medical device companies over the next 12–24 months, followed by cost optimization

(see Figure 1). Compared to other global manufacturers from the survey, medical device companies are far more likely to strategically prioritize R&D and product development than any other manufacturing industry.

According to the survey results, all manufacturing companies expect to increase their R&D spending as a percentage of revenues in the next 2 years, compared to the previous 2 years. Almost a quarter of all respondents say they spent more than 6 percent of revenues on R&D in the

last 2 years (see Figure 2). The number of medical device companies that expect to spend more than 6 percent of revenue on R&D/innovation is rising and exceeds the number of companies in the other industries surveyed that plan to re-invest this level of profit in R&D.

Figure 2: Percentage of respondents planning to spend greater than 6 percent of revenue on R&D/innovation in the next 2 years — results by industry



Source: Forbes survey, January 2015

While lower cost manufacturing opportunities will drive pressure on price, we believe innovation will be the catalyst for the way pricing impacts the market overall. The traditional market model of a low unit cost per product, allowing for greater market share, is shifting, as value-based pricing takes center stage within the healthcare ecosystem.

The non-traditional pricing model is that a superior device, which allows for better outcomes, will create a market for premium-priced products that have demonstrably improved clinical results. R&D investments in the sector today are well-placed if they accommodate the increasing shift toward breakthrough innovation in the sector.

Medical device manufacturers are investing heavily in R&D, and are shifting their innovation strategies from incremental innovation toward achieving breakthrough innovation. This level of investment and distinct drive for breakthrough innovation is in contrast to the other manufacturers polled in other sectors.

Banking on engineering-led strategies

When asked about their strategic focus, the majority of medical device companies characterize their focus as being engineering/innovation led, followed by sales-led strategies (see Figure 3). Only a minority is led by manufacturing or supply chain prospects, and these types of strategies are less prevalent in medical device than other global manufacturing sectors.

As we discuss in this report, however, medical device manufacturers that focus solely on engineering- and/or sales-led strategies may be forgoing valuable opportunities for collaborative development within their supply chains.

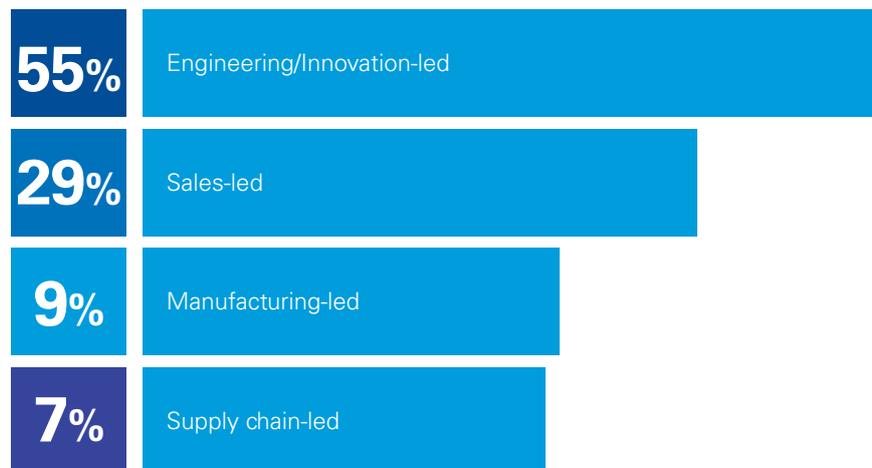
As outlined in our recent report, *Fast forward: Future proofing the life sciences supply chain* (kpmg.com/fastforward), any change in the supply

chain involves an element of risk, and life sciences companies are historically risk averse.

However, the health and well-being of consumers around the world depends on the accessibility and quality of life sciences products. This cautious approach makes business sense for an industry that requires complex infrastructures, capital-intensive R&D and long-term market strategies.

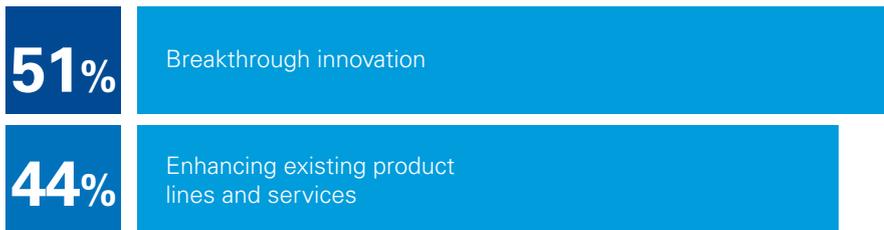
At the same time, risk can lead to opportunities for strong growth, product diversity and entry into new markets. We believe that taking the right steps today for future proofing the life sciences supply chain can balance risk with reward and turn an operational cost into a true competitive advantage for companies.

Figure 3: What term best categorizes your company's strategic focus?



Source: Forbes survey, January 2015

Figure 4: Which of the following best describes your organization's primary strategy for pursuing innovation?



Source: Forbes survey, January 2015



Case study

What counts as a breakthrough in medical device innovation?

Breakthroughs can take a number of different forms — whether as new products, new surgical techniques or cost-effective products for emerging markets. What many of the latest innovations have in common is that they transform the way medical devices reach the consumer.

A new heart valve by Edwards Lifesciences is a great example of the kind of breakthrough innovations that are transforming cardiovascular therapy. With transcatheter aortic valve replacement healthcare teams can insert a new valve within a diseased aortic valve without open heart surgery. This less invasive alternative can be performed through multiple approaches: transfemoral (through the leg), transapical (through the chest between the ribs) and transaortic (through the upper chest). The breakthrough is especially beneficial for patients at high-risk or too ill for open heart procedures.¹

3D printing is also fuelling a new wave of medical device breakthroughs — providing unprecedented design and manufacturing flexibility. Already, scientists have successfully replaced a child's vertebrae with a 3D-printed bone, and a man suffering severe head trauma was fitted with a 3D-printed titanium skull.² This technology holds special promise as a low-cost alternative for bringing products to developing markets.

Other breakthroughs involve new techniques such as, the combination of robotics and 3D visual systems for use in surgical procedures, new materials, like the development of a new coatings for hip implants that can prevent premature failures, and even new teaching methods such as, the use of Google glasses by a surgeon at Duke University to stream live feeds for training medical students in India.³

¹ For details, see <http://newheartvalve.com/treatment-options#2> (accessed April 29, 2015).

² Sources: *Business Insider*; *Reuters*.

³ Sources: da Vinci Survey Fast Facts (<http://davincisurgery.com>, accessed May 26, 2015), *MIT News*, *NYTimes.com*.

Biggest challenges for medical device manufacturers

Figure 5: What do you see as the biggest challenge for your business over the next 12 to 24 months?



Source: Forbes survey, January 2015

Medical device companies seeking growth in the near-term face an array of daunting challenges, with intense competition and pricing pressure at the top of their list. With profit margins being squeezed, improving efficiency in the R&D process is seen as the second biggest challenge (see Figure 5).

Rounding out the top three challenges for medical devices manufacturers are threats from increased regulation. With rising involvement of industry stakeholders and consumer advocacy groups, in addition to widely publicized safety concerns and product recalls, regulatory agencies are being compelled to take action in response. Medical device

companies surveyed say regulatory risks are a much higher priority than for other manufacturers. For example:

- In the past few years, medical device companies have had to act quickly to respond to the implications of key regulations such as the Medical Device Excise Tax. Now, medical device companies are grappling across the globe with obligations under the new Global Unique Device Identification and Serialization regulations (see sidebar).
- Start-ups, such as developers of health tracking apps, may have difficulty navigating the complex approval processes of the FDA and other regulatory bodies.

- Established companies expanding into new markets need to manage their third-party risk, particularly given the hefty fines for running afoul of the Foreign Corrupt Practices Act (FCPA) laws and economic sanctions.

As regulatory requirements change and evolve, medical device manufacturers need to understand the implications and prepare their response — defining the strategy for implementing regulatory driven change and developing technologies and processes necessary to enable timely and effective compliance across the globe. Companies also need to ensure they have the right internal competencies to keep up with increasing regulations and assess their impact.

Evaluating cost volatility of inputs

As medical device companies pursue growth through R&D and new product development, they would do well to evaluate potential cost volatility of inputs as part of the product design process. At the same time, they should ensure contingency plans are in place for their existing product lines in the event of extreme input cost fluctuations.

Such plans could involve identifying alternate supply streams and developing approaches to balance security of supply against holding inventory. Cost fluctuations should be factored into enterprise risk scenario modeling. Medical device manufacturers should also seek clear visibility beyond their Tier 1 and 2 suppliers to their entire supply chain so they can manage all their supply chain risks, including those arising from over-dependence on specific sources of inputs. Finally, they should consider the impact of potential regulatory changes

that could affect suppliers and result in input cost increases.

Taking steps like these will help medical device companies ensure they are not at the mercy of cost volatility. At the same time, it will open a window on future developments within new start-ups (e.g. in purchasing, partnering and collaborating), increasing the company's ability to spot opportunities for breakthroughs or significant product development.

This is just one example of the value that closer integration and collaboration between suppliers and other third parties can create. In the next section, we discuss the tremendous opportunities for medical device manufacturers to work with their suppliers and a host of new players on innovative projects and the range of models that are being used to facilitate and implement these partnerships.

Global Unique Device Identification Systems and Serialization

In the US, FDA rules require medical device labelers to submit data to the Global Unique Device Identification Database (GUDID) for the highest-risk medical devices and will soon expand to moderate risk (Class II) devices in September 2016.

Collection of this data poses a set of issues for medical device manufacturers, including where the data resides, how it is reviewed, and how it will eventually be disseminated to stakeholders.

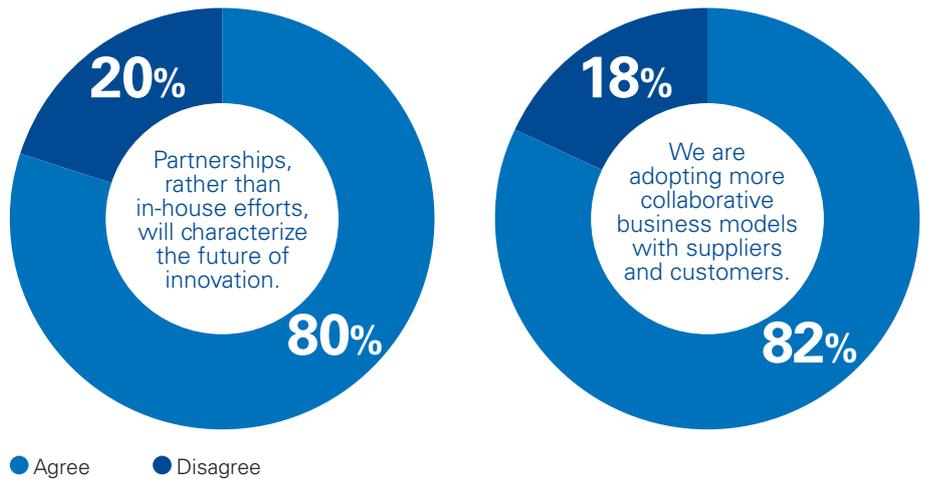
The accuracy of the submitted data is important to the success of the Unique Device Identification (UDI) system, which aims to reduce medical errors and improve the effectiveness of product recalls.

The collection and validation of the GUDID attributed data is bringing to light some of the data attributes that were never systematically collected or stored in any systems.

The future of innovation: Collaboration

Medical device companies predict partnerships, rather than in-house efforts, will drive the future of innovation and accelerate speed to market. Ongoing collaboration and innovation through partnerships in a highly competitive and specialized industry requires new business models for joint projects, new ways of making strategic investments, and new approaches to R&D that encompass a broader spectrum of partners and a more expansive mindset.

Figure 6: Please rate your agreement with the following statements. Either “agree” or “disagree.” Please select one response for each item.



Source: Forbes survey, January 2015

As medical device companies set their sights on growth through breakthrough innovation, the vast majority believe future innovations will increasingly come through partnerships, rather than in-house efforts (see Figure 6). In fact, medical device manufacturers

see entering new partnerships to drive innovation as the top growth driver (second only to increasing R&D spend, as discussed earlier), and the majority are already adopting more collaborative business models with suppliers and customers.

Why are collaborative development strategies on the rise? Medical device companies say the top three reasons for collaborating on innovation are:

- 1 speed to market
- 2 reducing risk
- 3 lowering cost.

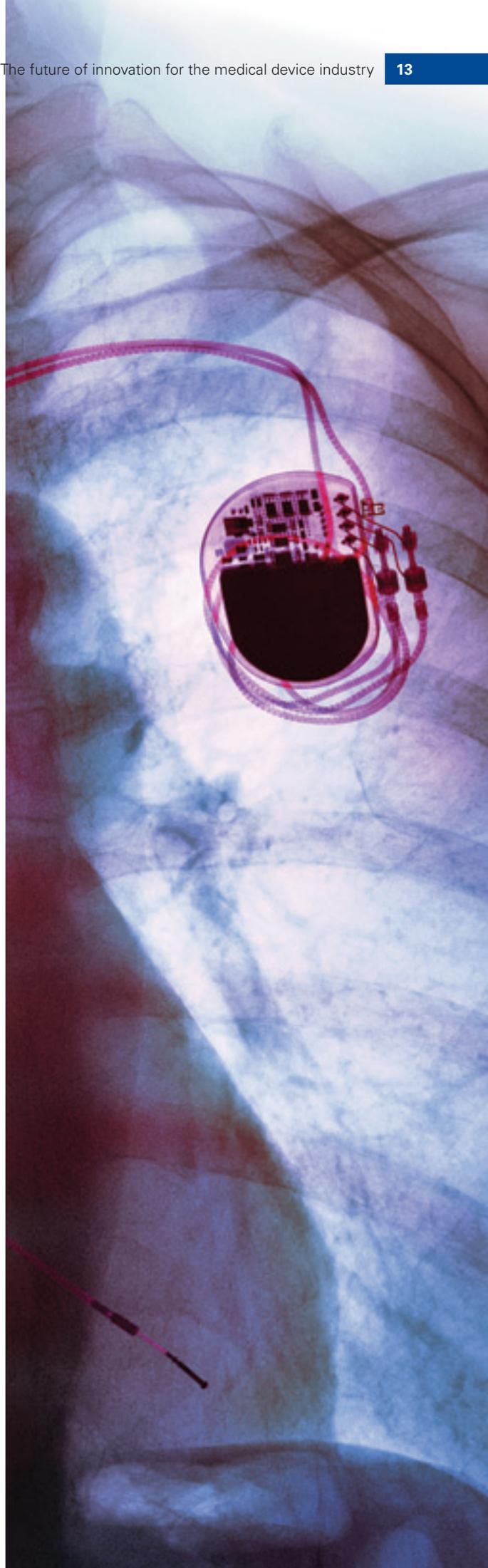
Viewed together, these three reasons suggest established medical device companies may be seeking partnerships with smaller, more agile companies that have more streamlined R&D processes and are thus able to bring new products to market more quickly.

The survey results show that the time horizon for product innovation for medical device manufacturers tends to be longer than other manufacturing companies, with about two-thirds of them targeting 3–5 years, compared to half of the other manufacturers surveyed. Less than 20 percent of medical device companies target a shorter, 1–3 year horizon.

Further, medical device companies name efficiency in R&D/product development as one of their biggest challenges, and a quarter of them also struggle with keeping their business models competitive. Innovation through collaboration can help address these challenges.

Moreover, decreasing costs while increasing innovation through collaboration creates a win for companies when a product merits a higher price in the market based on patient outcomes.

Companies that think less about the cost of the product and more about the cost of the solution will be better positioned in conversations with healthcare systems. Many medical device products come with a suite of services; by focusing on the value of the clinical expertise that is provided alongside a product, companies that focus on people and technology collaborations as part of their transformation are more likely to succeed in the evolving marketplace.





Collaboration across a network of partners can significantly accelerate the development and delivery of innovative solutions to customers. Effective network collaboration requires an organization to act as an orchestrator to develop common frameworks, protocols and processes that allow contributors to efficiently collaborate. Flexible economic models incentivize the partner network to collaborate and result in the creation of innovative solutions no one organization can do on their own.”

— **S. Singh Mecker**
Partner, Innovation and
Alliances Leader
KPMG in the US

New collaboration models focus on smaller players

According to the survey, 82 percent of respondents are pursuing more collaborative business models with suppliers and customers. Looking ahead, we expect to see continued merger, acquisition, separation, inversion, in-license and alliance activity in the sector — with a focus on smaller and/or non-traditional players.

With better access to technology and new markets, smaller, low-cost manufacturers have begun to dominate medical device innovation. Compared to larger companies, small companies are more adaptable, better able to identify market niches and have more innovative potential. In the US, smaller companies (i.e. having fewer than 50 employees) account for 80 percent of the 6,500 companies in the medical device sector. Small companies account for 95 percent of the 25,000 companies in the medical device industry in Europe. In fact, most of the 10,000 patents filed by medical device companies in Europe in 2012 were filed by small medical device companies.^{4,5}

Large global players stand to lose market share as low-cost players gain a foothold in local markets and expand into developed markets. For example, one Chinese manufacturer of low-cost imaging and monitoring equipment has been growing revenue annually by 25 percent over five years, and now 21 percent of its revenues are from developed markets, primarily the United States.⁶

By collaborating with smaller players, large medical device manufacturers can tap their innovative power while helping smaller companies expand their market reach, and access a broader network of suppliers, customers and development partners. All parties benefit from diversified risk and the sharing of R&D costs.

Traditionally, medical device manufacturers have sought to expand their range of products and services by acquiring and collaborating with targets that offer products and services that complement the medical device company’s product platform. Now, such collaboration is occurring not only through traditional acquisitions and formal partnerships but also through asset swaps, carve outs, and transaction collaborations across the industry. Research and development licensing is on the rise, as well as outsourcing to contract research organizations (CRO).

As their collaborative activities progress, medical device companies have ongoing opportunities to deepen their partnerships, harness the variety of skills across their network, and enhance the understanding of unmet medical needs. Realizing these benefits will require companies to promote an open culture that encourages scientific dialogue and sharing non-proprietary findings.

⁴ “Safer, timely and life-changing: medtech innovation is good for patients and policymakers alike,” *Eucomed*, 2014.

⁵ “The Medical device Industry in the United States,” *SelectUSA*, 2014.

⁶ “China’s Most Promising Medtech Companies,” *European Medical device Technology*, 2014.

Case study

Medtronic takes collaboration to new heights

The world's largest medical device company, Medtronic, is working to reshape the way the world manages chronic disease and conditions through innovation and global collaboration. Medtronic operates from more than 250 manufacturing facilities, sales offices, research centers, education centers, and administration facilities that serve customers and patients in 120 countries.

To help patients manage their health across the entire continuum

of care — from prevention and diagnosis to treatment and ongoing management — they are integrating devices with information technology and biologics that broaden their functionality. For example, Medtronic's new heart rhythm devices automatically and wirelessly transmit information through a home monitor to a secure website accessible from the physician's office — making it easier for physicians to manage a patients' conditions long-term.⁷

One component of Medtronic's strategy is to partner with smaller, entrepreneurial companies in developing markets. This allows Medtronic to reduce its R&D spend, leverage the local company's knowledge of the market and access a partner's existing sales and distribution network. In China, for example, Medtronic opened an R&D center in partnership with Shandong Weigao Group Co. Ltd. to develop orthopedic technologies and devices for the local market.

⁷ For details, see <http://www.medtronic.co.za/about-medtronic/our-story/index.htm> (accessed May 14, 2015).





World-class supply chain performance will rapidly become a powerful differentiator for medical device companies.

— **Roger van den Heuvel**
Partner
KPMG in the Netherlands

Investing in supply chain agility

The rise of new markets, the rapidly evolving technology landscape and the shift toward personalized medicine is driving more product variety, shorter product life-cycles, and smaller volumes. Medical device companies can meet these challenges by investing in more closely integrated supply chains and by working with their suppliers to increase their agility and drive innovation. In fact, KPMG member firms see supply chain agility as critical

to the future success of all life sciences companies, including medical device manufacturers.

In the next 5 to 10 years, we predict that supply chains that support centralized, high-volume manufacturing of a few products sold to mass markets may be supplemented or even replaced by the distributed manufacturing of a larger number of different products in smaller volumes for niche markets.

Pursuing growth in developing markets

With the intense pressure on costs and shrinking margins, achieving growth is especially challenging for medical device companies in mature markets. One strategy is to increase sales by entering new, developing markets, such as Asia. In many cases, this requires the company to devise inventive ways of re-designing the product so it can be offered at a lower price point that the market will accept.

Other companies look to bring their products and services to developing markets at reduced prices through licensing agreements for marketing, distribution and sales. Third-party manufacturing agreements are also an option, although this creates risks in terms of securing intellectual property, especially as some developing countries

have weak legal mechanisms for protecting proprietary knowledge and processes.

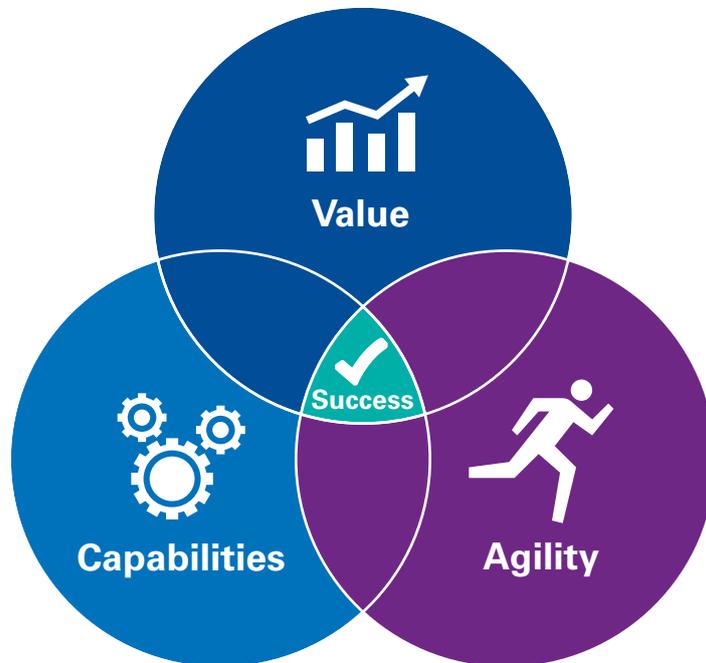
Along with opportunities to reach new customers and increase sales, developing markets can be advantageous locations for conducting R&D, with fewer barriers to entry, lower input costs and fewer regulatory hurdles (e.g. for getting products approved or conducting clinical trials). However, companies taking this route should conduct thorough due diligence before entering arrangements and set processes for evaluating their risk in the new market on an ongoing basis. This should extend to considerations involving indirect tax obligations, supply chain security, and investment and intellectual property protection.

Getting future proofed — three key levers for medical device companies

As the life sciences industry shifts from volume-based to value-based models centered on patient care and wellness, medical device companies

can future proof their organizations and their supply chains by establishing an ongoing process of redefinition in three areas — agility, capabilities and value.

For more information on future proofing the life sciences supply chain, kpmg.com/fastforward.



Value

Medical device companies can adapt to shifting healthcare models by improving their capacity to:

- use data analytics to enable faster, more efficient product development and targeted pricing
- identify emerging customer trends on a continuous basis
- expand service offerings through strategic partnerships.

Agility

Improving agility allows medical device companies to readily:

- adapt to variations in demand
- support shorter supply cycles
- recalibrate strategic plans in the face of market, price and supply volatility
- realign plans to benefit from new manufacturing platforms and processes
- adopt new business models that share resources, support flexible outsourcing, and rebalance ‘pull’ versus ‘push’.

Capabilities

Medical device companies can meet future challenges by strengthening their abilities to:

- complement internal capabilities with external resources and suppliers
- foster cross-functional knowledge management, by creating online capability teams
- develop close partnerships in local markets
- leverage data as an asset through predictive analytics.



New technologies can offer new ways to protect intellectual property in third-party arrangements. With 3D printing and cloud computing, for example, you can let third-party manufacturers download specs to fabricate products on demand in any location. At the same time, you can keep the ‘secret sauce’ — the product designs and know-how — safe in the cloud.”

— **Ash Shehata**
Global Healthcare
Center of Excellence,
KPMG in the US

Broadening the spectrum of development partners

Leading medical device manufacturers are collaborating with a much broader range of players. As new technologies and data analytics capabilities create opportunities for advances in surgical, diagnostic and healthcare monitoring techniques, medical device companies need to work with partners that bring knowledge and capabilities beyond the traditional medical device toolkit. For example, these potential partners include:

- telecom companies, who have expertise enabling better connectivity of smart healthcare devices
- insurers and governments, who can collaborate in developing

data dictionaries and enabling broader data collection and analytic techniques

- high tech companies, who can help propel advances in healthcare-related hardware and software (e.g. wearables and related health tracking apps).

For many medical device companies, collaboration in these areas requires a change of mindset. Product development can no longer be viewed as purely within the realm of science. While science is key, the new wave of medical device advances is also being driven by technology and marketing considerations, consumer preferences and data innovation.

Designing for tomorrow

Success requires not only broader capabilities but also a more forward-thinking development approach. With most medical device manufacturers having 3–5 year development life cycles, new products have to be designed to fit technologies that will be in place 5 years from now. Whereas today, many healthcare diagnostics and monitoring uses tablets and smartphones for interfaces, smart watches could supplant them in the next few years, and other technologies, such as optical implants⁹ and digital tattoos, might not be far behind.

Another important aspect of designing for tomorrow is the suite of consultants required to support the delivery of complex medical devices.

Surgical products, for example, require highly trained Medical Doctors or Medical Scientific Liaisons to be present during surgery and help with any

technical questions that may arise around product usage. This service goes beyond product delivery to clinical expertise.

Technology and remote access to this type of human capital may increase the value of the overall solution that companies are providing to a health issue, in particular in emerging or more remote markets. This also means that companies need to look beyond short-term solutions that reduce unit manufacturing costs, and think about changing their distribution, sales and support channels to impact the overall ‘solution cost’ of such a product in the market.

This also presents an opportunity for differentiation, as those companies that provide a robust service and solution offering with improved clinical outcomes will be more likely to gain the attention of the key players in the evolving healthcare ecosystem, and garner the market price they deserve for the value they can offer.

⁹ “B.C. doctor says perfect vision possible with Bionic Lens,” *CTVnews.ca*, 18 May 2015.

Case study

Innovation hubs nurture innovation through community

Innovation hubs are growing more popular as a way to promote research and innovation in a variety of fields, including life sciences. They take the model of business and resource support offered by traditional business incubators a step further by injecting an element of community. Hubs tend to be self-organizing and communally directed, enabling innovation and entrepreneurship by encouraging engagement and exchange of ideas among members. Donor and sponsor support is often directed toward projects and programs that align with the community's own evolving priorities.⁹

Here are snapshots of three of the world's largest hubs devoted to innovation in healthcare technology.

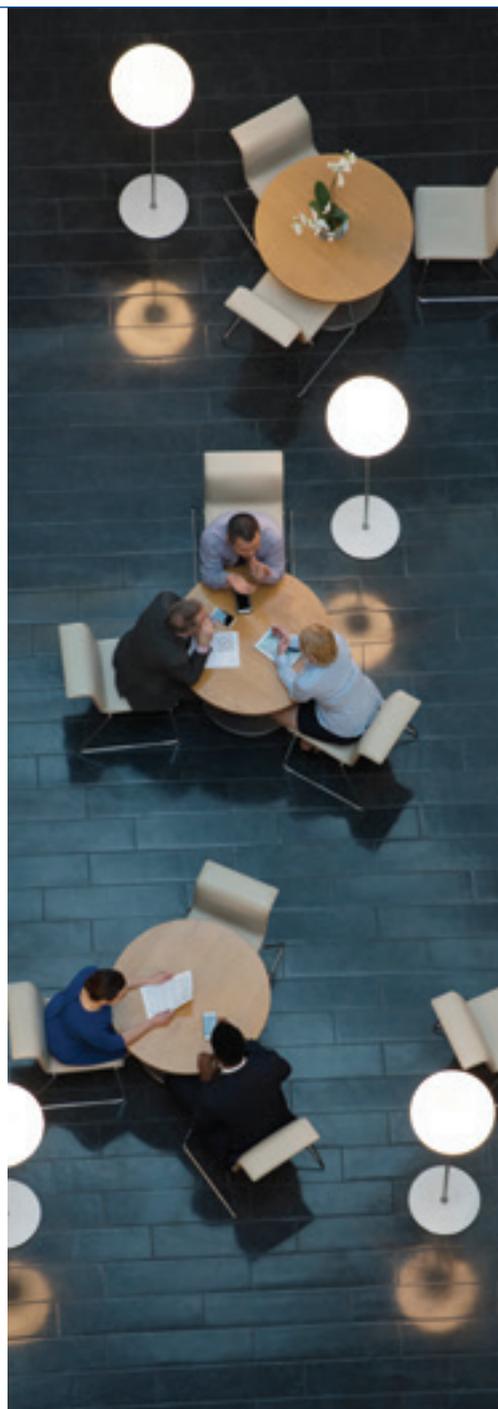
The MaRS Discovery District, opened in 2005, this 1.5-million-square-foot complex is located in the center of Canada's largest research cluster in Toronto. MaRS (which stands for medical and related sciences) works with an extensive network of private and public sector partners to help entrepreneurs launch and grow innovative start-up ventures focused on three areas it says will drive the future: health, work and learning, and energy. As an independent registered charity, MaRS convenes partners from the corporate, small business, government, academic and research sectors to foster collaboration and the convergence of ideas.¹⁰

A*STAR — the Agency for Science, Technology and Research in Singapore is a public service agency that oversees 18 biomedical sciences and physical sciences and engineering research entities, located in or near several R&D epicenters. The agency provides intellectual, human and industrial capital to its partners in industry and supports extramural research in universities, hospitals and research centers, and with other local and international partners.

One A*STAR hub, a complex of skywalk-connected buildings called Biopolis, is a live/work facility dedicated to biomedical research. It offers goods and services ranging from retail, food and beverage to banking, along with facilities for scientific conferences, symposiums, seminars and lectures.¹¹

The **San Diego iHub** aims to build on the greater San Diego region's existing innovation infrastructure and collaborative culture of by creating 'convergence clusters' devoted to three areas: mobile health, biofuels, and solar energy. These clusters are designed to promote new partnerships, shorten the commercialization process, and attract funding for technology.

As the world's largest wireless business cluster and an emerging hub for pharmaceutical research and medical device start-ups, the region has become a vital center for collaboration, acceleration and convergence for the wireless and life sciences industries and the advancement of digitally enabled medicine.¹²



⁹ For more details on the unique characteristics of innovation hubs, see Nicolas Freiderici, "What is a tech innovation hub anyway?," Oxford Internet Institute, University of Oxford, September 16, 2014 at <http://cii.oii.ox.ac.uk/what-is-a-tech-innovation-hub-anyway/> (accessed April 29, 2015).

¹⁰ For details, see <http://www.marsdd.com/about/story/> (accessed April 29, 2015).

¹¹ For details, see <http://www.a-star.edu.sg/About-A-STAR/Overview.aspx> (accessed April 29, 2015).

¹² For details, see <http://business.ca.gov/Programs/Innovation/iHubSanDiego.aspx> (accessed April 29, 2015).



Case study

Johnson & Johnson Innovation Centers focus on early-stage innovation

Within Johnson & Johnson (J&J) Global Innovation Centers, the tagline ‘creating new healthcare solutions never gets old’ rings true for this 129 year old global medical device, pharmaceutical and consumer goods company.

J&J has taken a new approach to partnering aimed at advancing early-stage innovation. Within regionally based centers in Boston, California, London and Shanghai, teams of J&J science and business experts collaborate with innovators to convert scientific advances into healthcare solutions.

By working with scientists and entrepreneurs at universities, academic institutes and start-up biotech companies, and by employing collaborative and flexible deal structures, J&J aims to identify and invest in a wide variety of pre-clinical proof of concept innovations.

J&J’s Traditional Business Development division continues to lead its business development activities in later stages, including late-stage licensing, commercial collaborations (regional and local), acquisitions and alliance management.¹³



Innovation and working with promising external parties can not only feed the product pipeline but also tap into new ways of thinking.”

— **Gerald Dunstan**
Director
Life Sciences Strategy
KPMG in the UK

Integrating product and service delivery

Another way medical device manufacturers are increasing profits through collaborative relationships is by taking on a larger role in integrating the delivery of products and services. Medical device companies are taking on activities traditionally performed by distributors and group purchasing organizations (GPO). By cutting out the intermediaries and directly selling their own products — and, increasingly, those of their development partners and even competitors — to

healthcare organizations, medical device manufacturers can dramatically reduce costs while developing closer relationships with their customers.

By one estimate, eliminating the supplier-funded GPO model in which purchasing organizations receive a percentage (commonly 2 to 3 percent) of revenues generated under the contract would save public and private healthcare organizations more than \$35 billion annually.¹⁴

¹³ For details, see <http://www.jnj.com/partners/innovation-centers> (accessed April 29, 2015).

¹⁴ “GPOs Driving Up Hospitals’ Medical device Costs, Say Manufacturers,” *Health Leaders Media*, October 2010.

Key takeaways

The pace of innovation will continue to accelerate as new innovations and players revolutionize product development, manufacturing processes, and business models. Failure to embrace a collaborative approach to innovation will likely threaten medical device manufacturers' competitiveness.

- 1** Medical device manufacturers are making bigger bets on R&D initiatives, but sustained success depends on creating broader, more inclusive innovation models and collaborating with a broader range of partners to capitalize on opportunities. It also means companies need to scrutinize their own approach to value-based pricing models and product maturity models, which will have an impact on long-term development costs.
- 2** Medical device companies that focus solely on engineering- and/or sales-led strategies may be forgoing opportunities within their supply chains. Supply chain agility is critical to the future success of all life sciences companies; new markets and the rapidly evolving technology landscape are expected to drive more product variety, shorter product life cycles, and smaller volumes.
- 3** Sustained success requires a more expansive, forward-thinking development approach. Product development is no longer purely within the realm of science — technology and marketing considerations, consumer preferences and data innovation are also driving advances. With most medical device companies having 3–5 year development life cycles, new products have to be forward-thinking and designed to fit technologies that will be in place 5 years from now.
- 4** Given the challenges of achieving growth in mature markets, medical device companies can increase sales by entering new, developing markets. Along with opportunities to reach new customers and increase sales, developing markets can be advantageous locations for conducting R&D, with fewer barriers to entry, lower input costs and fewer regulatory hurdles.
- 5** With better access to technology and new markets, smaller, low-cost manufacturers have begun to dominate medical device innovation. By collaborating with smaller players, large medical device companies can tap their innovative power while helping smaller companies expand their market reach, deal with regulatory challenges and access a broader network of suppliers, customers and development partners.



How KPMG can help

KPMG member firms can help you in your quest to enable a more expansive and inclusive approach to product and service innovation and to realize the rewards of collaborating with a broader range of partners. The KPMG Global Life Sciences practice is dedicated to assisting businesses of all sizes to identify opportunities and take advantage of industry developments.

Our life sciences professionals work with all top 20 global pharmaceutical

companies, the top 10 medical technology companies, and almost half of the top 50 biotech firms. They also stay in front of current trends and issues, providing relevant insights and advice to help organizations address their specific business challenges.

KPMG member firms help clients around the world to increase the efficiency of their business and operating models through enhanced professional project management, cost-efficient

organizational structures and streamlined reporting and approval processes.

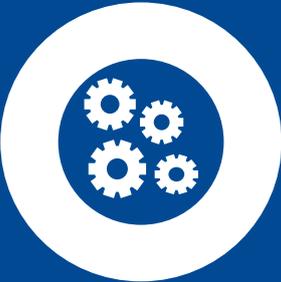
With our combination of life sciences and financial expertise, we can introduce a tested scientific and business rationale to complex large-scale projects, helping to improve the return on investment within an organization, and support sustainable growth.

A sample of capabilities across the life sciences sector



- Compliance
- Sensitive issues/ investigations
- Information protection
- Revenue protection
- Audit quality assurance
- Third party audit

Regulatory change



- Regulation driven transformation
- Research and development (R&D) transformation
- Back office transformation/ operational excellence
- New commercial business models
- Mergers and acquisition (M&A), disposals, joint ventures and alliances
- Taxation

Business model transformation



- Data and analytics
- Cloud technologies
- Customer relationship management (CRM)
- Enterprise performance management (EPM)
- Cyber security

Technology enablement

Global Life Sciences thought leadership

KPMG International generates industry reports and research across a wide range of topics that have direct relevance to clients' businesses. These global publications discuss current issues and implications for our client's business and represent the kinds of insight available in our library of resources.



Fast forward: Future proofing the life sciences supply chain

Future proofing the life sciences supply chain will require redefining it to be more agile, capable in order to increase the value of untapped assets and expertise.



The post Base Erosion and Profit Shifting world

This report focuses on providing a viewpoint for multinational life science companies to address the Base Erosion and Profit Shifting (BEPS) Action Plan being completed by the OECD.



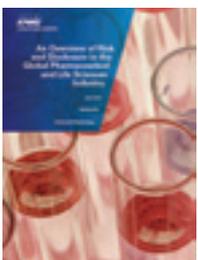
More than medicine

This provocative report examines a number of emerging opportunities for the life sciences industry to use its talents, scale and data to partner with healthcare systems to support transformative change and create new growth for the sector.



Growing the pipeline, growing the bottom line

This report looks at the research challenge through the eyes of senior R&D executives from some of the world's leading pharmaceutical companies. Their responses towards productivity, attitudes towards risk, organizational structure and governance offer some valuable insight for increasing innovation.



Risk and Disclosure in the Global Pharmaceutical and Life Sciences Industry

KPMG's analysis of financial filings shows the continuing drive to improve shareholder value through innovative therapies in the face of the ongoing price pressures, the patent cliff, and regulatory requirements.



Healthcare & life sciences in China: Towards growing collaboration

This report focuses on the rapid evolution of the pharmaceuticals, medical devices and drug distribution sub-sectors in China in the midst of hyper growth. As the industry is maturing and offering a more level playing ground, the report outlines opportunities for firms working in China to become faster, smarter and more collaborative.

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