About RTI Innovation Advisors

RTI Innovation Advisors helps clients turn insights into new products, services, and technologies that have meaningful human and business impacts. For over 50 years, we’ve helped innovation-driven organizations—Fortune 500 companies, government agencies and global foundations—produce sustainable results. Our clients choose us to solve their most complex business challenges because we know what works.

When you work with RTI Innovation Advisors, you have access to the vast network and resources at RTI International, an independent, non-profit research institute dedicated to improving the human condition. Anchored within RTI, we bring to our clients support from international offices in Africa, Asia, Latin America and the Caribbean, the Middle East and North Africa and across the United States; project experience in over 140 countries; expertise in 250 disciplines; hundreds of industry specialists and researchers; and decades of combined experience.

Think of us an extension of your team—we work alongside you to explore possibilities, vet technologies, and enable innovation. We’re here to help you embrace your most exciting opportunities and solve your toughest challenges.

About the author

Leslie leads RTI Innovation Advisors’ health practice. She is passionate about entrepreneurship and innovation with experience that spans academic research, pharma/biotechnology, and healthcare delivery. She has worked with executive teams from multi-national organizations and startups alike to design growth strategies, create alternative business models, and evaluate emerging clinical and care delivery technologies. Additionally, she spent several years addressing innovation and how healthcare organizations build their own sustainable innovation competencies. Leslie is a speaker and facilitator on the future of healthcare, enabling technologies, disruptive innovation, and emerging business models, domestically and abroad. Leslie received her Ph.D. in microbiology at Northwestern University, completed postdoctoral research training at the University of Maryland’s Center for Vaccine Development and received a B.A. in Biology from DePauw University.

Leslie Wainwright, Ph.D.
Innovation Advisor, Health Sector Lead
Healthcare is undergoing unprecedented change...

...both in terms of emerging technological approaches to prevention, diagnosis, and treatment of disease; and in terms of cutting-edge models of care delivery that ensure broader access to affordable, high-value care.

Add into the mix exponential advances in connectivity, augmented reality and artificial intelligence, and it becomes clear that the industry is at a tipping point where the future will be markedly different from the past.

Medical device companies have the opportunity to build fully integrated software, hardware and engagement-based devices. For some, the development pipeline is already populated with such projects, or partnerships are being developed with start-up companies to expedite time-to-market. For others, they are watchfully waiting, perhaps hoping to fully extract all value from current lines of business before looking towards the future. Spoiler alert—R&D leaders must decide how to position their organizations for future success, albeit during times of extreme uncertainty, high risk, but hopefully high reward. These are indeed the best of times and the most challenging of times.

Innovation folklore haunts companies afraid of moving too early or responding too late to innovation opportunities. Past R&D development was based on a cadence of R&D advances that was siloed, linear and bureaucratic. Today’s research environment is generating advances at a far faster pace since global connectivity to other research programs and research data has improved, converging technology advances are driving collaboration, and both transparency and non-traditional players are challenging regulatory impediments.

To compete, R&D leaders must determine how to stay ahead of the traditional innovation ‘S’ curve, or better yet, reshape the curve altogether.
Getting the most from the compendium

Our perspectives are designed to be provocative and practical. Several of our Innovation Advisors have offered their insights and shared their real-world experiences.

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THE BEST OF TIMES, THE WORST OF TIMES: TRENDS POTTING DURING TIMES OF RAPID CHANGE
Bill Taylor, co-founder of Fast Company and noted author, has observed that today the challenge for leaders at every level is no longer just to out-hustle, out-muscle, and out-maneuver the competition.

Instead, the work is harder and far more complex; the challenge is to out-think the competition, to develop unique points of view about the future, and to help your organization get there before anyone else does. Bill’s observations were made over six years ago when global connectivity, data generation, and scientific/technology advances were a fraction of what they are today. By every measure, the pace of change is being redefined, which places added pressure on R&D leaders to develop highly impactful products and services, and to do so more quickly.

As RTI Innovation Advisors, we work with a variety of technology companies across the healthcare continuum. We help R&D leaders better understand emerging trends [and investigate market hype] that impact both the development of new medical products and their uptake by patients and clinicians. We contextualize our trendspotting around technical, market, and user insights and look for important cross-connections.

Our goal is to give guidance on which opportunities to explore and offer a perspective on how quickly they need to be pursued. “I see companies struggling to explore opportunities more broadly, validate technologies more quickly, and understand customer needs more fully. These companies need to understand and interpret these changes much more quickly and effectively,” says Tom Culver, an RTI Innovation Advisors colleague who has been advising R&D executives on emerging technologies for the past 15 years. I too have seen R&D teams overwhelmed by the demands of near-term projects such that they can’t take the time, or afford to redeploy the talent, to focus on the future.
Trendspotting is most impactful when trends are contextualized relative to technical, market and user insights.

We constantly monitor the ecosystem for new insights in these three dimensions—technology, users, and market—to identify emerging needs and opportunities. “These three insights are collectively important and are an important nexus to viability, desirability, and profitability,” remarks Tom. We, as RTI Innovation Advisors, routinely work with R&D leaders to scan the horizon for emerging trends and innovations to ensure that teams are keeping up with the pace of change.

**INNOVATION TRENDSPOTTING FRAMEWORK**

Through our work, we’ve created a catalog of important emerging trends that are shaping the future of healthcare.

**Market trends**

- **Vertical and horizontal consolidation**
  
  The hospital and healthcare insurance landscape shifted substantially in 2017, illustrating the blurring line between healthcare providers, insurers, and other industry players. The most notable merger was that of CVS and Aetna, but others occurred as well and further reinforce the desire for larger players to own more of the healthcare value chain. There is also on-going speculation about how Amazon’s entry into healthcare will shift the balance of purchasing power for both commodity and specialty goods. For R&D leaders, the impact of both vertical and horizontal consolidation likely means that there are not only fewer buyers, but larger, highly leveraged buyers who will work hard to drive down costs.

- **Consumer/user-oriented trends**

  - **Keep me healthy, keep me home**
    
    As baby boomers continue to age, they will force change. Through access to better information, patients and their families feel more empowered and will increase their

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INNOVATION TRENDSPOTTING FRAMEWORK
expectations for how caregivers engage with them. Specifically, they will have heightened demands for how caregivers leverage data to proactively manage patient engagement and care delivery, how they can receive services in their community or at home, and at a time that is convenient for them. They will expect care to be delivered by diversified care teams, with more activity being driven by non-physicians. Finally, they will expect cost/quality transparency and will make care decisions based on this information. For R&D leaders, this translates into the importance of ethnographic research and patient journey mapping. Losing sight of the changing demands of end users heightens the potential of launch products that miss the mark.

Technology-oriented trends

- **Convergence of products and services**
  The convergence of pharma, device, and IT technology platforms expand drug/device functionality in unprecedented ways. The launch of Proteus as the first FDA-approved digital pill was a hallmark moment, illustrating how technology platforms are colliding and combining. No longer will there just be implanted or wearable devices, chemical or biological therapeutic interventions, or analytical monitoring tools. Instead, they will become integrated platforms that appear seamless to end users. Frankly, the possibilities are endless and represent a bold new future for medical technologies. For R&D leaders, this means that you can’t ‘go it alone.’ Partnership or acquisition of different types of technologies will be required to compete as we embark on this brave new world. Between healthcare providers, insurers, and other industry players. The most notable merger was that of CVS and Aetna, but others occurred as well and further reinforce the desire for larger players to own more of the healthcare value chain. There is also on-going speculation about how Amazon’s entry into healthcare will shift the balance of purchasing power for both commodity and specialty goods. For R&D leaders, the impact of both vertical and horizontal consolidation likely means that there are not only fewer buyers, but larger, highly leveraged buyers who will work hard to drive down costs.

- **Better models to improve the rate and results of laboratory experimentation**
  Multiple emerging technology platforms have the dual potential of not only becoming impactful clinical solutions themselves, but also offering ground-breaking tools for laboratory researchers who conduct early-stage experiments. Two examples include additive manufacturing (3D printing) and gene editing. Both provide ways to make realistic prototypes and enhanced models of human disease more quickly and at a lower cost when compared to currently available methods. For R&D leaders, there is unprecedented opportunity to transform elements of research programs with the goal of more quickly getting impactful products to market.

- **Application for artificial intelligence to expand clinical trials**
  A growing number of research programs are beginning to use artificial intelligence (AI) to find, recruit, and retain suitable patients with the hopes of transforming clinical trial productivity. AI algorithms mine more traditional data sources including clinical data, genetic profiles, and demographic information. Data from completely new sources—including social media and online platforms, telemedicine encounters, and peer communities—are also being integrated to expand the depth and breadth of information available to researchers. R&D leaders need to be prepared for substantial change in the traditional clinical trial model. Young companies, like Science 37 [and others] are already seeing the opportunities in a connected, data-rich world.
Impact

Like the apocryphal story of Babe Ruth calling his home run blasts, your team can remove a lot of the guess work about where the next big innovation will happen. But to do so you’ve got to do a lot more investigation and discovery work to triangulate market, technical and user trends. Combining these will point to new innovation opportunities. The data is out there, waiting to be gathered and analyzed and will keep you learning faster than your competitors.

Commitment to action

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READ OUR CASE STUDY showcasing how we helped a health technology company explore and understand the emerging field of artificial intelligence in clinical decision support. By considering end-users, market forces, and the current state of various technologies, we helped them realize that, for now, AI was not the only solution they should consider. In today’s world, we all need to learn to explore things with our eyes wide open, so we can decide where we need to go. PAGE 34
Senior Innovation Advisor

Tom brings to RTI Innovation Advisors two decades of experience delivering technology and innovation management solutions to a range of global corporations such as PepsiCo, PPG Industries, and Newell Rubbermaid; and federal agencies. An optical engineer by training Tom has developed optical and photonic innovations for both large OEMs and start-ups, and uses this expertise to assess technologies, author custom market analyses, and develop new technology innovation programs. A prolific speaker, topics about which he is most passionate are building learning teams for innovating, incorporating megatrend analysis into organizations, managing break-through innovations, and developing open innovation as a core organizational capability. Tom has a B.S. in Optical Engineering from the University of Rochester.
TECHNOLOGY SCOUTING:
CREATING YOUR OWN ZILLOW
If the market research reports on “top pain points” for R&D leaders are right, then concerns about filling the front end of the innovation pipeline continue to be a high priority for organizations looking to bring cutting-edge health innovations to market.

Venture capital investment in health-related innovations is at a record high and is prompting a groundswell of entrepreneurship and technology development outside of the traditional corporate R&D engine. Increasingly, large technology developers recognize this shift and are building dedicated teams to liaise with the external market to search for innovations that fill gaps in internal research programs or that allow research programs to “jump to the front of the line,” because a new partnership or acquisition could place them that much further ahead.

As RTI Innovation Advisors, we provide horizon scanning and technology scouting to commercial companies, governments, and non-profit organizations. Our clients comment that we’re a good partner since we fuse our deep technical expertise with our ability to translate findings into practical business considerations. We work with organizations to help them build teams to find external solutions, and we’ve assisted with projects when a team is capacity-constrained and/or needs help with areas outside of their zone of expertise.

“I have witnessed how hard it is to keep pace with all the different types of technology innovation and their potential to either complement or disrupt planned R&D programs. With so many entrepreneurial choices coming from all corners of the globe, it is more important than ever for teams to develop a process and leverage tools to cluster and prioritize potential pipeline fillers,” said Molly Dix, a Senior Innovation Advisor, who has been working with organizations to close critical pipeline gaps for the past 10 years.
Opportunities matter, as does aligning on what matters in an opportunity.

Our team has developed a metaphor that equates tech scouting to house hunting, or an R&D version of Zillow. For those of you unfamiliar with this real estate app, it helps potential buyers search for homes based on tiered search criteria that focus on the big issues first and then get increasingly granular. We’ve learned a lot in the tech scouting work we’ve done, including the fact that our real estate metaphor has been overwhelmingly popular and, frankly, has taken on a life of its own.

There is a general understanding that opportunity selection can benefit from using filtering criteria. That said, we’ve been surprised by the range of different approaches organizations take, and how they do [or do not] have internal alignment on the most promising opportunities. “Over the years, we have seen teams build out comprehensive details on every solution, spending huge amounts of time and money on research on technologies or partners that don’t meet the minimum requirements of the market or their business. Often, this has impacted development timelines, which has translated into competitors getting to market first,” comments Molly.
We evaluate opportunities iteratively, first clustering by highest priority issues and then getting increasingly granular.

- **Start by identifying strategically relevant “neighborhoods”**

We help teams get past the urge to compare pipeline opportunities against every possible criteria. We encourage teams to spend time in the beginning to align on what’s most important. Do you buy a house by worrying about the color of the counter-tops first? No, you make a logical progression in thinking about key criteria in a logical order: location, perhaps schools/taxes, home costs, square footage, major features, and so on. Again, this is the equivalent of comparing opportunities based on locations of light switches in a house before deciding if you were looking to live in Boston or Bangkok.

Sample index filters we’ve seen work well at the “neighborhood” level include: definition of market gap/unmet need, growth rate of specific technology sectors/categories, stability of market opportunities, depth/breadth of research activity, complexity of regulatory requirements, degree of disruptive potential, and comparative levels of investment dollars from either government or venture sources.

- **Move to selecting must-have “home” requirements**

After the strategic frame of neighborhoods is in place, we narrow the number of neighborhoods. This is usually most effective via strategic facilitation, where different perspectives can be shared, ultimately leading to the development of a “short list” (and yes, much like house hunting, perhaps some negotiation and compromise are required). Having a short list of “strategically-relevant” neighborhoods makes it much easier to look at attributes of specific technologies or company partners. This is also where the technical strengths of RTI Innovation Advisors become an added asset since we have the expertise and experience to critically evaluate scientific evidence, technical specifications, and user requirements.

Sample index filters we’ve seen work well at the “house” level include: market position (leader with significant market share vs. small, fast-growing vs. stable, niche player), core differentiators (technology, time to market, strength of claims, product experience, etc.), clinical/scientific evidence, reimbursement/payment codes from CMS and other commercial payers, complementarity of business models, and track record of go-to-market success.

- **Select a limited number of “interior design” requirements**

Our experience has shown that many index filters that get placed on initial query lists are interesting things to know, not criteria that would impact business decisions, especially at an early stage of exploration. We recommend limiting these criteria to a vital few since this information is often the most difficult to uncover and has the least impact on overall decision making.

Sample index filters at this level tend to be nuanced and specific within a technology, industry, or organization. However, a few examples include: compliance with accepted manufacturing practices, current or planned distribution channels/models, and interoperability potential with other technology platforms.
Impact

Technology scouting, much like house hunting blends both subjective and objective thinking and ultimately succeeds through some level of compromise. In our opinion, it is the R&D leader’s role to align key stakeholders around what success looks like. It is not uncommon for research, marketing/sales, and regulatory/medical affairs stakeholders to think differently about neighborhoods, houses and interior design criteria (in the same way spouses have different opinions and requirements about houses). Only after the criteria are agreed upon and prioritized should research begin. A lot rides on getting the research right, so spending time on the front end to get the evaluation framework built is the most critical factor for doing scouting with consistent excellence.

Commitment to action

TECHNOLOGY SCOUTING PROJECT:

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<th>ATTRIBUTES OF STRATEGICALLY-RELEVANT “NEIGHBORHOODS”</th>
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READ OUR CASE STUDY showcasing how we helped a health technology company evaluate emerging technologies, assess potential partners and evaluate potential growth opportunities. PAGE 36
Director, Strategy and Innovation

Molly advises and supports RTI Innovation Advisors’ clients in technology-driven market intelligence, commercialization, and partnerships, and manages work for Fortune 100 companies globally, universities, and government agencies, focusing on understanding client need, building project plans and teams, and delivering results. In addition to her background in commercial opportunity analyses and marketing strategy development, Molly has identified and secured more than 25 licenses and won six awards for exceptional performance in technology commercialization. She speaks on topics including innovation management and commercialization. Molly received a Master of Intellectual Property, Commerce, and Technology from the University of New Hampshire School of Law and a B.S. in Mechanical Engineering from the University of Rochester.
ECOSYSTEM-BASED COLLABORATION

ECOSYSTEMS: RE-WRITING THE TRADITIONAL BOUNDARIES OF BUSINESS
The strategic concepts of first-mover advantage and innovation ecosystems are top of mind currently as new opportunities emerge and new business combinations take place. Both of these ideas have sparked discussion in senior ranks, and we see many experiments underway. Increasingly, however, these ideas are linked. Strategists are beginning to think about first-mover advantage within an ecosystem, where the collective movement of a group allows for improved speed, reduced risk, and a more effective way to crowd out the competition.

While this strategic view of ecosystems and first-mover advantage is important for all companies, it is particularly important for R&D leaders of health technology companies because of the complexity of the products they are bringing to market and the increasing rate of change of technology platforms. With these changes in mind, some experts believe that within a decade, companies will define their business models based on their effectiveness in operating within ecosystems. Based on the idea of safety in numbers, one potential strength of a cooperative ecosystem is that it can create protection for its members when they move into new territories. An organization entering a new market or territory on its own can be an easy target, but an ecosystem (or swarm) moving forward together protects its members and reduces the risks of entry and competition. These ideas highlight the importance of ecosystems and encourage us to examine how ecosystems are constructed, now and in the future.

As RTI Innovation Advisors, we help organizations build effective innovation ecosystems. Our team has worked with companies, government agencies, universities, research labs, science parks, entrepreneurs and others across the globe to create ecosystems to accelerate good ideas to market more rapidly.

“IN THE LONG HISTORY OF HUMANKIND (AND ANIMAL KIND, TOO) THOSE WHO LEARNED TO COLLABORATE AND IMPROVISE MOST EFFECTIVELY HAVE PREVAILED.”
– CHARLES DARWIN
The strategic concepts of first-mover advantage and innovation ecosystems are top of mind currently as new opportunities emerge and new business combinations take place.

Through the work that we’ve done, we have identified eight traits that are required for the development of an effective ecosystem.

**INNOVATION ECOSYSTEM FRAMEWORK**

**Current ecosystems**

Today, healthcare technology companies participate in a fragmented ecosystem, where there is as much competition as cooperation. Large companies struggle to find the most productive ways to work with entrepreneurial companies and vice versa, with the result being missed opportunities to master emerging technologies and new service models. Part of this is based on internal pressures, where success is driven by meeting near-term goals, leaving little time to think beyond today or outside the needs of a specific business unit. Challenges have also existed at the state and federal levels with misaligned reimbursement models and complex regulatory requirements. However, the environment is finally beginning to change, and we are seeing parts of the country move towards value-based care, and we are beginning to encounter customers who feel more empowered in making healthcare choices and more loudly voice their expectations. In aggregate, this means we have the opportunity to rethink collaboration, redefine co-creation, and realign around the unprecedented opportunity to impact the trajectory of health and disease.
Future ecosystems

For health technology companies, future success will require capabilities in emerging areas—artificial intelligence, personalized medicine, robotics, big data and digital engagement, as examples—that historically have not been core competencies of traditional medical device developers. Winning in this future context will require integrated solutions that combine hardware and software components. Building stronger relationships with universities and with other—perhaps non-traditional—organizations with complementary capabilities will be essential. “Within the healthcare industry, companies are realizing that looking for research and co-development partners early on can result in better products and increased productivity,” notes Dr. Zagit “Z” Gaymalov, an RTI Innovation Advisors colleague. Both Z and I have observed the power of ecosystems and what happens when organizations band together to influence Food and Drug Administration/Centers for Medicare & Medicaid Services policy and payment model reimbursement challenges that often discourage development of breakthrough innovations in certain categories. Most companies view their product launches as a key success metric [which they are]. However, there have been many high-quality healthcare technology products whose path to widespread adoption was rocky. Ironically, it was not because it wasn’t an impactful innovation, but instead because the “receiving” clinical workforce was not prepared for the unexpected work flow implications, required changes in care practices, and/or the new and sometimes completely different roles that were needed to adopt the new solution. The most visible example is ongoing adoption challenges with electronic health records. Proactively anticipating how work flow will be impacted in response to the introduction of new health innovations is an often-overlooked node of ecosystem development, but a vital one for having the maximal impact on care delivery.
Impact

R&D leaders must strengthen their ecosystems. An effective ecosystem functions as connective tissue that allows innovation to thrive. Historically, ecosystem participation could have been viewed as an optional activity and nothing more than advanced networking. Today it is a necessity since it gives R&D teams access to potential sources of funding, complementary development partners and emerging innovation.

Ecosystem questions R&D leaders should be actively addressing:

- How do innovation assets match with sectors that are primed for rapid and sustainable growth in global markets?
- Which potential partners are best to coordinate with to proactively influence the policy landscape?
- Which traditional and/or non-traditional organizations help expand capabilities and get impactful products to market more quickly?
- What needs to be done to ensure that clinical workforces are also being developed such that emerging innovations can be leveraged by professionals [or patients] with the appropriate mix of skills?

Commitment to action

Use this table to assess if you are leveraging your ecosystem to its fullest potential.

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<tr>
<th>TRAITS OF EFFECTIVE ECOSYSTEMS</th>
<th>HOW ARE WE APPROACHING THIS?</th>
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<td>Identify strategic growth sectors</td>
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<td>Create policy infrastructure</td>
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<td>Foster effective entrepreneurship</td>
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<td>Strengthen university-industry alignment</td>
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<td>Build relationships with complementary businesses</td>
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<td>Develop an innovation-ready workforce</td>
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<td>Accelerate commercialization</td>
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<td>Assess effectiveness &amp; impact</td>
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Senior Innovation Advisor

With extensive experience in commercialization, strategic technology transfer and new product development, at RTI International Advisors Zagit has led projects for multi-campus public universities and helped develop innovation-focused activities for clients in the United States, Saudi Arabia, the Commonwealth of Independent States, United Arab Emirates, and Turkey. He’s championed technology scouting and partnership development activities, identified innovation assets and developed economic development strategies. He speaks worldwide on topics related to open innovation in healthcare, technology translation, and commercialization. Zagit earned his B.S. in Molecular Biology and Genetics from Middle East Technical University and his Ph.D. Pharmaceutical Sciences from the University of Nebraska Medical Center.
PATIENT-CENTERED INSIGHTS

SUPERCHARGING R&D THROUGH PATIENT CENRICITY
It may seem obvious that incorporating insights from end-user research into product or solution design yields better results.

Yet despite how intuitive this seems, both large companies and entrepreneurs often fail miserably at routinely incorporating patient stories, care delivery journey maps or community ethnography into routine practice. Who can forget the highly-publicized story of the large US-based orthodontia company who readied themselves for launch in China with their leading US product, invisible braces, only to discover at the 11th hour that Chinese middle-class families preferred metal braces, since it was a visible sign of wealth. These types of insights can only come from taking the time to understand end users.

Given the pace of technology development, it’s easy to see how innovators could become entranced with the potential of emerging technologies and easily lose sight of the problem they are trying to solve.

A former Mayo Clinic chief medical officer has been quoted as saying ‘if an entrepreneur talks for me for more than three minutes without mentioning the patient or the problem they are solving for, I politely ask them to leave.’ I experienced this phenomenon first hand as a Ph.D. researcher. In over six years of study on a specific biochemical pathway in a specific microorganism, I never thought of what must be like for patients with this infection or the challenges that care providers face when treating this disease. All I knew, and frankly all I cared about at the time, was that this was a really interesting biochemical puzzle and it was mine to solve. Innovators constantly lose sight of the patient in the rush to create a solution.

“EVERY ESTABLISHED COMPANY THAT HAS MOVED FROM PRODUCTS TO SERVICES, FROM HARDWARE TO SOFTWARE, OR FROM PHYSICAL TO DIGITAL PRODUCTS NEEDS TO FOCUS ANEW ON USER EXPERIENCE. EVERY ESTABLISHED COMPANY THAT INTENDS TO GLOBALIZE ITS BUSINESS MUST INVENT PROCESSES THAT CAN ADJUST TO DIFFERENT CULTURALContexts. AND EVERY ESTABLISHED COMPANY THAT CHOOSES TO COMPETE ON INNOVATION RATHER THAN EFFICIENCY MUST BE ABLE TO DEFINE PROBLEMS ARTFULLY AND EXPERIMENT ITS WAY TO SOLUTIONS.”

– HARVARD BUSINESS REVIEW
The business advantage of patient centricity.

Keeping patients at the core of key business functions can give health technology companies a competitive edge as they develop and deliver meaningful health technologies. Patient centricity can help companies gain clarity on essential solution requirements which should inform strategy, development and go-to-market plans. Furthermore, patient insights can inform later-stage development – importantly clinical trial design and can help overcome some of the most vexing problems - initial patient recruitment into trials and patient retention once trials have begun.

As RTI Innovation Advisors, we bring the patient and other key stakeholder insights into our work with health technology companies.

While we leverage many different tools to support stakeholder insights work, one of the most versatile and universally useful is the patient experience journey map.

**PATIENT JOURNEY MAPPING FRAMEWORK**

Source from NNGroup
In healthcare, patient journey mapping is useful for developing three distinct types of insight.

- **Seeing the disease experience through the lens of the whole person**
  
  R&D programs develop interventions for specific conditions [or sets of conditions] where clinical indicators of benefit are the gold standard for success. Because of this, it is easy to lose sight of the other factors that go into the development of a successful intervention - convenient dosing, ease of use/administration, disruption to lifestyle and possibly work, and stress on immediate family all impact how interventions get deployed in the real world. R&D teams make assumptions about the above-mentioned factors, but engaging patients in the development process and spending time in the field are the only ways to ensure that the assumptions are true. The bottom line is that medical interventions need to fit into the lives of patients, not the other way around.

- **Understanding the role of the therapeutic alliance between a clinical team and a patient**
  
  Depending on the condition, its severity and/or length of treatment, the bond that gets built between a clinical team and a patient is extremely important. Medication adherence and compliance with care protocols are two of the most expensive challenges facing our healthcare system. This is because we underestimate the amount patient-level behavior change needed, especially for longer-term management of chronic diseases. Better understanding of how care teams build trust and how interventions can be designed with this trust in mind can only help improve their long-lasting impact.

- **Becoming empathetic to different medical literacy levels and to cultural differences**
  
  Judith Hibbard, M.D., a senior researcher of the Health Policy Research Group at the University of Oregon, has been a trailblazer in this field for the past decade. Her team has developed methods for engaging patients, based on their medical literacy AND their willingness/desire to ‘own’ their medical journey. R&D leaders have found her insights [and the insights of others in this field] instructive since they provide added context for how developers need to think about not only what they are creating, but how they communicate the potential benefit to a diverse population. RTI International’s own Dr. Ginger Rothrock has experienced this first hand as she and the RTI team work in sub-Saharan Africa to launch new HIV prevention and contraception within rural and low-income communities.
Impact

The mandate for R&D executives is to affirm the importance of end-user insights earlier in the research and development process. Using client insights derived from tools like the patient experience journey needs to be the norm, not the exception. Leaders are taking notice and making important changes – in fact, several Fortune 100 medical technology clients of ours have recently incorporated Stanford’s Design School customer insights methodology across all of their global business units as an expected first step in the launch of new project initiatives.

Commitment to action

<table>
<thead>
<tr>
<th>PATIENT INSIGHTS</th>
<th>WHAT PROJECTS WOULD BENEFIT FROM THESE PATIENT CENTRIC INSIGHTS?</th>
<th>WHO IS RESPONSIBLE FOR MAKING THIS HAPPEN?</th>
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<tbody>
<tr>
<td>Seeing the disease experience through the lens of the whole person</td>
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<tr>
<td>Understanding the role of the therapeutic alliance between a clinical team and a patient</td>
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<td>Becoming empathetic to different medical literacy levels and to cultural differences</td>
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</table>
Senior Director, Commercialization and Intrapreneurship

Ginger is an expert in the business and technical development of emerging technologies. Her specializations include product development, advanced materials, biomedical innovation, commercialization, and market intelligence. She leads a cross-RTI team managing the institute’s commercialization portfolio, a role in which she vets RTI technologies for commercial impact and builds teams to accomplish early-stage market assessments and determine business models. Ginger also works with regional and global biomedical technology accelerators to employ consistent approaches and best practices to translate and de-risk product concepts to meet the specific needs of stakeholders. She received her Ph.D. in Analytical Chemistry from the University of North Carolina at Chapel Hill and a B.S. in Chemistry from Furman University.
CREATING THE CONDITIONS FOR INNOVATION TO THRIVE
Despite all the media buzz about innovation, most companies consider themselves to be at the early stages of innovation maturity.

In fact, a recent study, co-authored by KPMG and Innovation Leader, found that of the 270 R&D, innovation and strategy executives surveyed, 43% of them defined their company’s innovation maturity as ‘emerging’.

This same survey also acknowledged that success was multi-factorial – requiring leadership support, strategy alignment, and an ‘experimentation-willing’ workforce. “Innovation will only last as a sustainable business capability when all of the fundamental pillars are addressed and are in balance”, comments RTI Innovation Advisors’ Director of Strategy and Innovation Jeffrey Phillips. “Innovation, like young plants, only thrives in the right conditions.” A greenhouse provides the right conditions to grow plants, even when the conditions outside would kill or hamper the growth of young plants. In the same way that plants need the right conditions and environment in which to prosper, sustained innovation requires the same thinking and careful consideration about the right conditions that will enable and sustain innovation.

As RTI Innovation Advisors, we help organizations better understand the current condition of their innovation environment [greenhouse] and define the conditions needed for future success. Not every organization has a green thumb or an innate love of gardening, so we tailor our approach and recommendations accordingly.

“Innovation is a discipline — it can be measured and managed. Procter & Gamble’s structured approach to innovation allowed it to triple its innovation success rate and double the size of a typical initiative.”

– Scott Anthony
Core to our approach are five thematic pillars, each of which is essential for sustainable innovation.

In aggregate, these are characteristics and features of an organization that establish the environment in which innovation can thrive. While each pillar is important to innovation success, the pillars are also mutually dependent. For example, it’s difficult to have good governance or attract the best resources if the strategy isn’t defined or isn’t clear. Each pillar needs to be carefully considered and implemented, but the pillars are not intended to be silos. Innovation sustainability occurs when leaders ensure that there is interdependency across the pillars and that they are managed synergistically.

**SUSTAINABLE INNOVATION CAPACITY FRAMEWORK**

**INNOVATION COMPETENCIES**
- Recruiting and retention of talent
- Innovation skills and abilities
- Learning mindset and behaviors

**INNOVATION STRATEGY**
- Connection with broader corporate strategy/vision
- Leadership, governance and accountability
- Defined innovation portfolios

**INNOVATION CULTURE**
- Rewards and recognition
- Partnership, teaming and collaboration
- Organization-wide communication

**INNOVATION STRUCTURE**
- Organizational design [internal and external]
- Processes and methods
- Impact metrics

**INNOVATION RESOURCES**
- Sustainable funding
- Time and people allocation
- Infrastructure investments [space, systems, tools]
Assessing your innovation greenhouse

To continue the greenhouse analogy, these factors define the temperature, the level of moisture, the amount of sunlight, the nutrients in the soil and the skill and availability of gardeners to work the plants. If any one of these pillars isn’t well considered and/or implemented, innovation (or gardening) suffers. If several are faulty, innovation success is almost entirely dependent on involved engagement from a senior executive and the capabilities of the individuals tasked to complete the work.

Each pillar represents a distinct and vital component of a sustainable innovation function. At the highest level they are industry agnostic, however, to make the pillars practical, they need to be contextualized for specific business models within specific industries. Also, as you can imagine, innovation leaders are curious about how their approach compares to that of peer organizations.

As Innovation Advisors, we’ve assessed organizations within and across industries, especially those in the medical device market. What we’ve found is that most organizations need help with the structure and culture pillars. The structure pillar includes factors that shape many innovation activities, such as organizational/program design, approach to open innovation, innovation management processes, and key impact metrics [as examples]. We also know that the culture pillar, while perhaps challenging to address, is vital for sustained innovation success. Again, we’ve helped teams identify and address cultural roadblocks to innovation and create rewards programs to foster internal cultures that are more welcoming of innovation activities.

“CEOS AND SENIOR EXECUTIVES MUST PLAY A VITAL ROLE FOR INNOVATION TO SUCCEED. IF THEY DON’T, THE FAILURE POTENTIAL FOR INNOVATION IS HIGH, DUE TO MISALIGNED GOALS, CLOSE-MINDED CORPORATE CULTURE AND POORLY ALIGNED METRICS.”

– JEFFREY PHILLIPS
Impact

The mandate for R&D leaders is to recognize that sustainable innovation capabilities are a requirement for the future. To stay ahead of the competition, recognition is not enough, action is required. This action can’t be delegated down, it must live at the leadership level. Done right, you will be able to deliver a return on your innovation investments benefiting both shareholders and internal stakeholders alike.

Commitment to action

<table>
<thead>
<tr>
<th>INNOVATION PILLAR</th>
<th>FOCUS</th>
<th>CONVERSATION STARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRATEGY</td>
<td>Linking innovation to strategic goals; building and managing innovation portfolios</td>
<td>What does our current innovation portfolio look like? Will the level of risk we’ve decided on enable us to meet our strategic growth goals?</td>
</tr>
<tr>
<td>STRUCTURE</td>
<td>Defining structures – organizational structures, measures and metrics for innovation success</td>
<td>How do we promote external engagement with entrepreneurs and non-traditional partners?</td>
</tr>
<tr>
<td>RESOURCES</td>
<td>Assigning the right people, and ensuring they have enough time and budget to do the job well and have access to the space and equipment they need</td>
<td>How are we allocating funds for innovation activities? Is it effective?</td>
</tr>
<tr>
<td>CULTURE</td>
<td>Examining culture to identify attitudes and behaviors that may block innovation ('not invented here') and to increase focus on recognition and rewards</td>
<td>Do the recognition, reward and incentive programs that we currently have in place encourage a broad spectrum of participation across the organization?</td>
</tr>
<tr>
<td>COMPETENCIES</td>
<td>Defining the competencies and skills necessary to innovate and introduce the best training to help build new skills</td>
<td>How are we introducing new competencies, skills and training, especially in concepts like design thinking, customer experience journey mapping?</td>
</tr>
</tbody>
</table>

WATCH our webcast on innovation metrics co-sponsored by ISQUA.

http://tinyurl.com/metricsJuly2018
MEET OUR CONTRIBUTOR

JEFFREY PHILLIPS

Director, Strategy and Innovation

Jeffrey focuses on the front end of innovation, specifically trendspotting and scenario planning, customer insight research, idea generation and open innovation. He brings to RTI Innovation Advisors’ clients his experience in linking innovation to corporate strategy, developing a culture of innovation and in innovation training. Jeffrey leads our thought leadership programs and writes regularly in several blogs, on LinkedIn, and for Inc.com. He is the author of four books (“OutManeuver”, “Relentless Innovation”, “20 Mistakes Innovators Make”, and “Make Us More Innovative”). Jeffrey received an MBA from the University of Texas at Austin and a B.S. in Engineering from the University of Virginia.
CASE STUDY 1 – AI AND DATA ANALYTICS
IDENTIFYING APPLICATIONS FOR ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS IN CLINICAL DECISION SUPPORT
Our global healthcare device manufacturer client needed to understand how AI was being used to improve clinical decision support (CDS) in order to design information-enabled medical products.

Recognizing RTI Innovation Advisors’ strengths in identifying and vetting emerging technology, the client asked us to construct a landscape of existing and emerging AI algorithms, tools, software, and technologies and help them identify strategic partnerships to pursue.

Tapping into the vast resources at RTI International, we consulted with our in-house healthcare and data science experts to understand factors that impact CDS feasibility and analyze emerging healthcare technology trends. Further, we conducted broad research on emerging AI solutions in the healthcare space.

Although our client’s original interest was AI, as we investigated the technology in this complicated space we confirmed that a simpler data analytics solution could be as good, if not better given the organization’s needs. We broadened the project scope to include data analytics.

Using our structured approach to technology intelligence we helped our client learn faster than the competition and stay ahead of the innovation curve by:

- Evaluating data analytics and AI approaches to improve CDS
- Defining potential barriers to success
- Confirming that a solution or partner would have to consider clinical relevance, impact on clinical work flow, and health IT and data management

We helped our client better understand the applications of a complex and rapidly-changing technology and they are better able to create cutting edge products. We put our client on the right path and gave them the insights they need to get the product to market more quickly.

As the organization defines its strategy to enter the AI space for chronic disease management, our client has used our insights to determine what makes up the most promising partners and technology developers, and to inform its strategic partnership plans.

While we helped our client understand the use cases for AI and data analytics related to the clinical condition in which it was interested, the question of AI and data analytics will continue to emerge related to other conditions. As a result, we equipped the team to think about these tools in the context of other diseases and this is critical to the company’s future success.

With expertise in near-, mid- and long-term applications of complex and rapidly-changing technologies, we help our customers create cutting edge health products, and thus deliver on the promise of science for global good.
CONFIRMING GROWTH OPPORTUNITIES IN THE PEDIATRIC MARKET
As part of its growth strategy, our client was considering expanding its existing product line and customer base by entering the pediatric market; the organization hadn’t previously worked in this space but believed there were significant growth opportunities. Our client needed better insights about how to move forward. RTI Innovation Advisors assembled our team of experts to scan the pediatric space and help the client identify emerging technologies, assess potential partners and evaluate potential growth opportunities.

Working closely with our client to understand their business and core competencies, we conducted a structured research effort and created a landscape of relevant competitive pediatric products and technologies. Using evaluation criteria, we co-developed with our client, we assessed product categories and technologies that included therapeutic diagnostic devices, software, pharmaceutical, and nutraceutical solutions.

We evaluated and prioritized the opportunities based on adoption rates, clinical evidence, and potential for pediatric impact and growth, and worked with cross category pediatric and industry experts to validate our findings; these included end users who helped us understand the care delivery context and technology producers. We also characterized evolving market trends and regulatory factors that would affect the categories identified.

As we assessed opportunities we used a phased methodology analogous to house hunting; we identified strategically relevant ‘neighborhoods’, chose must-haves for our client’s house, and selected a limited number ‘interior design’ requirements. As our client approached the pediatric market, they thought they had a good grasp of the ‘neighborhoods’; however, through our work we identified more than double the number of possible targets compared to what the team originally thought possible.

After evaluating over 100 technical and product solutions in the pediatric market, we confirmed 15 opportunity areas and recommended five where we found the highest clinical evidence of efficacy and saw the greatest business growth potential. Our client used our recommendations and market trends we documented to refine its growth strategy. As a result, our client has a short list of candidates and is conducting due diligence on the most promising technology and acquisition targets and pursuing opportunities where they can extend their offerings for the pediatric patient population.

We provided our client a much broader market scan than they would have completed internally, and we helped them identify opportunities they may have missed. We helped an organization expand life-saving tools that neonatal intensive care unit teams need to keep neonates alive, and this is core to RTI’s mission of translating science for the global good.
<table>
<thead>
<tr>
<th>CRITICAL TOPIC</th>
<th>NEEDS OF R&amp;D LEADERS</th>
<th>IA SERVICE OFFERINGS</th>
<th>IMPACT</th>
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<tbody>
<tr>
<td><strong>TRENDSPOTTING</strong></td>
<td>Determine if there is opportunity for a new or existing technology in the market</td>
<td>Landscaping</td>
<td>Assurance that the idea or technology will have market acceptance</td>
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<td></td>
<td>Understand the state of the art and potential partners in a technology area</td>
<td>Horizon Scanning</td>
<td>Reduced risk of investing in ideas that won’t succeed</td>
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<td>Identify potential competing, adjacent and enabling technologies to an existing or planned product</td>
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<td>Reduced risk of being blindsided by new market entrants</td>
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<td>Spot and assess trends that indicate new opportunities or markets</td>
<td>Forecasting</td>
<td>Shape vision and strategy regarding where to [and not to] invest</td>
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<td></td>
<td>Identify trends across political, economic, social, and technological spectrums</td>
<td>Trend Analysis</td>
<td>Being prepared to act when the opportunity or market emerges</td>
</tr>
<tr>
<td><strong>INNOVATION SELECTION &amp; PRIORITIZATION</strong></td>
<td>Assess new inventions, technologies or intellectual property</td>
<td>Commercialization</td>
<td>Filter innovations to ensure alignment with portfolio needs</td>
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<td></td>
<td>Define and manage an ideas/product/IP portfolio</td>
<td></td>
<td>Develop a baseline of existing products and IP as a means to identify white space and/or gaps in product or IP portfolio</td>
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<tr>
<td></td>
<td>Scout for and evaluate emerging technologies</td>
<td>Technology Scouting</td>
<td>Find the best technology or solution to accomplish a specific goal, fill a need, or solve a challenge</td>
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<tr>
<td></td>
<td>Determine the best path to value for an idea or technology</td>
<td>Partner Mapping</td>
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<tr>
<td><strong>ECOSYSTEM-BASED COLLABORATION</strong></td>
<td>Empower actions around an ecosystem, to potentially exchange IP, access new technologies, or collaboratively develop new products</td>
<td>Open Innovation</td>
<td>Better results through open innovation and partnership</td>
</tr>
<tr>
<td><strong>PATIENT (USER)-CENTERED INSIGHTS</strong></td>
<td>Assess and understand unmet and under-met user needs</td>
<td>Human-centered Design</td>
<td>Focus on solving the most important and valuable customer needs</td>
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<td>Ethnographic Research</td>
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<td>Customer Experience Journey</td>
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<tr>
<td><strong>STRATEGIC ALIGNMENT</strong></td>
<td>Assess current state to understand where and how to improve innovation capabilities</td>
<td>Innovation Capacity Building</td>
<td>Define innovation process that teams can adopt and use effectively</td>
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<tr>
<td></td>
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<td>Reduce internal barriers, accelerate innovation and ROI</td>
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About RTI International

RTI International is an independent, nonprofit research institute dedicated to improving the human condition. Clients rely on us to answer questions that demand an objective and multidisciplinary approach—one that integrates expertise across the social and laboratory sciences, engineering, and international development.

Combining scientific rigor and technical proficiency, we deliver reliable data, thorough analysis, innovative methods, novel technologies, and sustainable programs that help clients inform public policy and ground practice in evidence. We scale our approach to fit the demands of each project, delivering the power of a global leader and the passion of a local partner.

We believe in the promise of science, and we push ourselves every day to deliver on that promise for the good of people, communities, and businesses around the world.

Our experts hold degrees in more than 250 scientific, technical, and professional disciplines across the social and laboratory sciences, engineering, and international development fields. Our staff of more than 5,000 works in more than 75 countries—tackling hundreds of projects each year to address complex social and scientific challenges on behalf of governments, businesses, foundations, universities, and other clients and partners.

And our separate business operations—RTI Health Solutions and Syntegrity—serve commercial clients across a wide range of industries around the world. We maintain offices on four continents, with our headquarters in Research Triangle Park, North Carolina.

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