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# Long-Term R&D Strategy and Planning

*Companies find R&D planning and investment over longer-term time frames challenging. A scorecard can help them evaluate the maturity of their R&D vision and planning.*

Kent M. Young, Terry L. Rosenstiel, and Pam Henderson

**OVERVIEW:** The rapid pace of change makes the future increasingly difficult to predict. Companies are under stress as they seek to make investments that protect against disruption and create new opportunities. This stress is magnified for R&D, which allocates resources to longer-term technology platforms supporting future business growth. R&D must invest in platforms that extend beyond the time frames for which businesses scout insights on where markets, customers, and competitors are going. This article focuses on the state of R&D planning in longer-term time frames where insights are limited. We present the study results and provide a scorecard for evaluating the maturity of a strategy function.

**KEYWORDS:** R&D planning, Strategy, Long-term investments, IRI Research

R&D is a core function for achieving growth; it supports business growth through programs, including technical service, new product development, assessing emerging technologies, and disruption defense through adjacent technologies (Stam and Wennberg 2009; Jelinek et al. 2012; Roussel, Saad, and Erickson 1991). While the distribution, approach, and scope of these programs vary, R&D is consistently called

upon to plan for and allocate resources to these activities. The time horizon (Hobcraft 2015; Blank 2019; van Putten, Baghai, and MacMillan 2010; Moore 2007; Applegate and Kerr 2016) and insights needed for these activities vary greatly, as does the nature of the planning processes required (McKinsey 2009; Hartmann, Myers, and Rosenbloom 2006; Hansen, Weiss, and Leak 1999).

R&D organizations must create perspectives on developing technology platforms; assess the future of markets, customer needs, and competitors; and understand the business models required across a variety of tactical and strategic time frames. But processes to guide R&D organizations in making decisions in longer-term time frames are underdeveloped and poorly defined. We set out to assess how R&D leaders gather insights and develop strategies and plans for long-term time frames. The IRI Research-on-Research (RoR) working group studied R&D planning processes in a variety of companies to understand how R&D leaders gather insights, to learn what role cross-functional participation plays, and to assess how leaders build consensus around longer-term planning to gain the investments needed to execute programs.

## The Imperative for Long-Term Planning

Two core activities, technical service and new product development, occur within a company's traditional business cycle. Business cycle time frames differ between companies and between industries, and by factors such as technical complexity, product development cycles, industry maturity, customer needs, and regulatory environment. A consumer products company might have a 6- to 18-month cycle between invention and commercialization, while an

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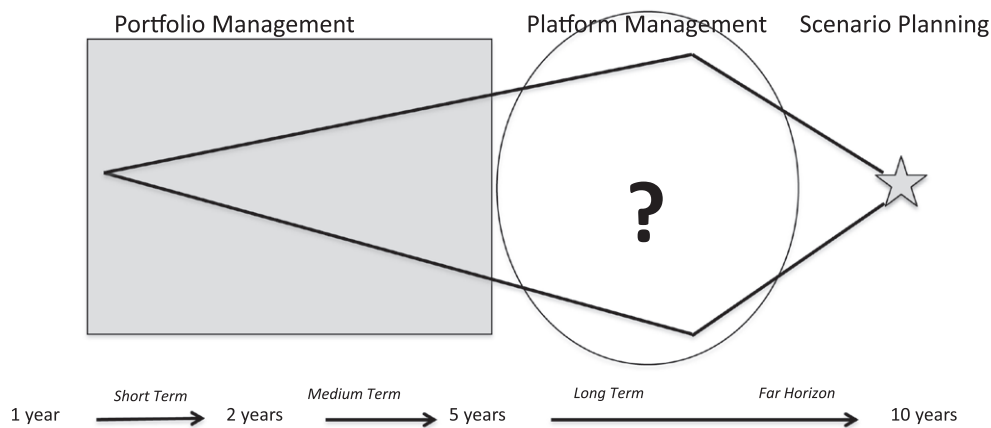
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**FIGURE 1.** Time frames for R&D planning

automotive company may have a 5- to 10-year cycle (Vancil and Lorange 1975).

Since R&D activities happen regardless of the length of the business cycle, business units determine where to invest and what the priorities are. Business units typically operate on a short-term business planning cycle, which involves portfolio management, project management, and the implementation of Stage-Gate tools and practices (Moore 2007). At the other end of the spectrum of planning cycles is the *far horizon*, which involves processes such as scenario and contingency planning and incorporates insights from futurists and think tanks (Figure 1). Scouting from 10 to 50 years ahead can be seen as insurance. Companies are better prepared if they have first imagined the future world. Future-state scenarios and contingencies developed here consider possibilities such as wars over water or the end of fossil fuels (Smith 2015). These time frames do not need to be precise to be useful. Futurists' predictions still deliver value by defining direction and opportunities for organizations, rather than specific timing of events (Wegand et al. 2014).

Between these two extremes is what we define as the *long-term planning cycle*, a time frame ranging from three to eight years out—it is well beyond the annual strategic planning cycle of companies but shorter than the time frames commonly considered for scenario planning. The long-term time frame is where business units are often unclear about future customers' product requirements, the markets they will serve, and the competitors that will emerge but near enough that planning is needed now to address those eventualities. R&D is responsible for insulating the business from disruption and having platforms ready that will enable the company to exploit emerging opportunities. Thus R&D organizations must begin work in the present to develop the technology and business models for products and services that will be commercialized in this three- to eight-year time frame (Moore 2007; Cotterman et al. 2009; Bean 1995).

## The Study

The research team worked with groups within IRI to gain insights and vet results. Participants—primarily director-level

R&D leaders at mid- to large-size corporations based in the United States—met for working sessions at national IRI meetings (three sessions, 50 to 100 participants each). Those in attendance were asked to provide company insights (success factors, pain points, current processes) and vet research findings and hypotheses derived in previous phases of study. The study had four phases.

**Phase 1: Defining the Problem**—Phase 1 focused on defining what successful long-term visioning looks like via working sessions. Approximately

55 R&D leaders discussed overarching methodology, organizational issues (needs, gaps, pain points), and definitions of success. The outcome was a set of statements summarizing the challenges R&D leaders face in setting strategy for longer-term platforms and what success would look like if they had a more effective visioning and strategic planning process for these time frames.

**Phase 2: Understanding Key Challenges and Current Behaviors**—Phase 2 comprised interviews with R&D leaders from 15 diverse organizations.<sup>1</sup> The purpose was to refine understanding of key challenges and current behaviors, with a focus on benchmarking companies believed to exhibit best practices in long-term planning. We developed and used a maturity model on the drivers of breakthrough innovation to create selection criteria for the interviewees (Brockhoff and Chakrabarti 1998). We focused on companies with centralized R&D functions that served the needs of all businesses or had a corporate R&D function focused on challenges beyond the near term. These organizations were likely to have greater need for strong planning processes to allocate investments. The goal was understanding typical planning time frames, roles, frequency, sources of insight, and key challenges.

**Phase 3: Exploring the State of the Art (Current State) and Satisfaction Levels in Long-Term Strategy and Planning**—Phase 3 explored the planning practices used by all participating organizations, from those with little practice through to those with stronger protocols. We used Phase 1 and 2 findings to establish key vectors of the long-term planning process—timing and cadence, point of view, funding, insight gathering, engagement and communication, and opportunity identification and measurement. We used these vectors to develop the online survey questions aimed to benchmark how companies are tackling long-term strategy and planning. Pilot surveys were conducted with seven companies to refine the survey; those early responses informed revisions before the survey was distributed more widely.

<sup>1</sup>A sample of organizations who participated in the interviews include: Caterpillar, Applied Materials, John Deere, Xerox, GE, Johns Manville, Dupont, Newell Rubbermaid, and Armstrong.

The lack of accepted best practices for measuring long-term innovation effectiveness makes quantifying the potential value of long-term innovation difficult.

Seventy-one respondents completed the revised survey. Statistical analyses of responses included frequencies, means, and correlations with two dependent variables: R&D leader satisfaction with long-term planning processes and with the ability to secure funding for long-term projects.

These two dependent variables were tested against the elements of a successful planning process: success in acquiring funding (assuming that one measure of a successful planning process is the ability to secure funding), and satisfaction with the long-term planning process.

**Phase 4: Developing a Long-Term Visioning Scorecard**—The group next developed the Long-Term Visioning Scorecard (using a maturity model framework) to help organizations evaluate their current performance and practices. An initial version of the scorecard was vetted with IRI membership during a working session held at the October 2016 meeting in Chicago; we refined the scorecard using this input and other research.

#### Working Group and Interview Results

During Phase 1, attendees articulated that significant gaps exist in their ability to plan for the long term. R&D leaders identified several key challenges regarding gaps in long-term planning and discussed what success would look like if there was an effective approach for developing vision and strategy for the future (Table 1).

The Phase 2 interviews revealed that leading firms—that is, those with mature innovation functions—define *long term* as generally three to eight years in the future. Their R&D strategy is re-evaluated annually, with regular check-ins, and the chief technology officer (CTO) usually champions the R&D vision and strategy. Long-term growth focuses on technology—most conversation centers around technology gaps,

**TABLE 1. Current challenges and desired state for R&D leaders**

	Current State Challenges	Desired State
Choices	<ul style="list-style-type: none"> <li>• <i>Too many choices:</i> There are more investment options than resources. R&amp;D must make difficult choices and then persevere to retain programs.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Making the right choices:</i> Leaders want to ensure their decisions will defend against disruption and provide platforms and technologies for future growth, ensuring the company's future success.</li> </ul>
Insight	<ul style="list-style-type: none"> <li>• <i>Lack of business insight to guide choices:</i> R&amp;D supports growth of businesses, yet those businesses cannot provide insight into trends and needs beyond their planning horizon.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Signposts and tipping points:</i> Leaders desire better insight on where to invest and when, when to dabble and when to go all-in. They require the ability to identify signposts and tipping points to adjust investments as needed.</li> </ul>
Strategy	<ul style="list-style-type: none"> <li>• <i>Short-order cooks:</i> R&amp;D must spend most of its effort maintaining current business success, leaving little time to focus on the future. In the absence of a clearly articulated long-term vision and strategy, R&amp;D struggles to push back against day-to-day encroachment.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Clear communication methods:</i> Leaders desire succinct ways to communicate vision and strategy to inspire their own function and the broader organization.</li> </ul>
Influence	<ul style="list-style-type: none"> <li>• <i>Lack of influence:</i> R&amp;D leaders are not always at the strategy table and thus may lack influence regarding strategic direction. Ironically, they are responsible for having technologies—some needing longer-term investments—ready when needed.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Seat at the table:</i> Leaders desire a strong voice on vision and strategy and need the supporting insights necessary to influence the organization to prepare for the future.</li> </ul>
Human and Financial Resources	<ul style="list-style-type: none"> <li>• <i>Selling and reselling:</i> Given the higher turnover in business leadership, R&amp;D must sell and resell the platform investments. Since business is not necessarily aligned with the future, business plans may be lacking adequate specificity to anchor R&amp;D investments.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Securing resources:</i> Leaders want to secure the resources—human and financial—to adequately invest in the future and protect those investments for the timeframes needed to see payoff.</li> </ul>
Investment	<ul style="list-style-type: none"> <li>• <i>Disconnect in timeframes:</i> Timeframes of R&amp;D investments extend beyond the usual timeframes of business planning, leaving R&amp;D organizations to secure knowledge about long-term factors and needs.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Partnerships:</i> Leaders want clarity about where to form partnerships and desire organizational backing to develop the relationships that will enhance their capabilities.</li> <li>• <i>Investing in adjacent areas:</i> Leaders looking to guide effective growth in adjacencies not directly aligned with current core businesses.</li> <li>• <i>Preparing for new business models:</i> Leaders recognize that there will be technology requirements for a future under new business models and seek to develop those technologies now to avoid disruption.</li> </ul>

though some R&D focus areas are market driven. These firms are working toward future best practices for R&D that include holistic insights that combine technology and market information.

Even companies with more mature innovation and planning processes experience challenges. Prioritization is a universal challenge. Participating companies indicated they had difficulty knowing which trends will have an impact and require R&D action. They are most comfortable exploring familiar opportunities, while new business opportunities, new lines of business, and technology areas less aligned with their current business receive less attention. R&D leaders seek balance between technology push and market pull, but sometimes the insights available make this balance unachievable. Corporate executives are frustrated that they collect business unit problems instead of technology platforms that extend across businesses that could better leverage investments. Too often the R&D portfolio is tethered to the company's current capabilities rather than defining future needs. Moreover, the lack of accepted best practices for measuring long-term innovation effectiveness makes quantifying the potential value of long-term innovation difficult. Businesses want to be able to make beneficial trade-offs (place value on potential options and make informed decisions).

When senior people change roles in an organization, R&D often has to resell its strategy. As a result, a tug of war can ensue between business units and R&D. Business-led innovation focuses on shorter time frames and platforms (linked to current capabilities), which makes gaining consensus about R&D investments in the long term difficult. A balancing act occurs when introducing new technology—to minimize risk, many companies seek to experiment in a new area before investing large scale.

It became evident during the interviews that different organizations have different needs and goals (for example, fund adjacencies, fund new business models, fund advanced technologies). Given that specific goals varied by organization and industry, we chose a more universal goal of being satisfied with the process. Business unit leaders are the best to judge if their processes are achieving goals. Satisfaction has been used successfully as a dependent variable in previous work on assessing maturity of an innovation function (Brockhoff and Chakrabarti 1998).

### Survey Results

Analysis of the survey results produced a clearer picture of the state of the art for long-term vision and planning and indicated key drivers of success and satisfaction, supporting the definition of better practices. R&D leaders articulated that securing funding for longer-term and more adjacent projects was a key success factor and the end goal of having a good

Satisfaction with funding was stronger for companies focusing their R&D on industry-leading and breakthrough innovation versus those focusing primarily on driving top-line growth.

process. We organized survey results into four categories: satisfaction with ability to secure funding, satisfaction with funding and processes, satisfaction with long-term planning processes, and satisfaction with identifying opportunities.

### Satisfaction with Ability to Secure Funding

R&D leaders consider securing funding for longer-term and more adjacent projects a key success factor. We derived four key findings:

1. *Moderate levels of satisfaction with ability to acquire funding*—Overall, R&D leaders were moderately satisfied with their ability to secure funding. No one was highly satisfied, 23 percent were very satisfied, 38 percent were moderately satisfied, and 39 percent were minimally satisfied or not satisfied. The fact that 39 percent of R&D leaders marked the lowest level of satisfaction is concerning, especially given the rapid pace of change in technology where R&D needs to respond quickly and forecast the organization's needs.
2. *Difference in funding versus purpose of R&D*—We found that organizations that were more satisfied with their funding perceived the role of R&D differently than those that were not satisfied. Satisfaction with funding was stronger for companies focusing their R&D on industry-leading and breakthrough innovation versus those focusing primarily on driving top-line growth. Organizations seeking breakthrough innovation would be more likely to fund long-term investments. R&D leaders indicated that organizations that focus on top-line growth underfund long-term platforms that need attention.



FIGURE 2. Scope of R&D program vs. satisfaction with funding

3. *Difference in scope of R&D exploration*—We found that as satisfaction with funding grows, so does diversity of projects being funded. Those not satisfied with their funding appear to rely heavily on outside partnerships, presumably because of limited resources to do long-term work themselves. As satisfaction grows, we see organizations add projects in adjacencies, new technology platforms, longer-term initiatives, and new business models, in that order. Each type of investment is likely to prevent disruption and create opportunities (Knott 2018). Research shows increases in R&D funding are linked to competitiveness (Carey et al. 2018). If given the requested funding, it appears R&D leaders will diversify portfolios (Figure 2).

Companies that achieve the funding they need for longer time frames are generally more diverse in execution—they have R&D functions with a more strategic role and are focused on investing in advanced technologies, longer time frames, more adjacent areas, and new business models. Most companies, however, are not satisfied or are only moderately satisfied with their funding levels.

#### **Satisfaction with Funding and Processes**

Our research revealed that the correlation between R&D leaders' satisfaction with the ability to secure long-term funding and their satisfaction with the processes that justified that funding was surprisingly low. We expected more leaders would be satisfied with their process than with their funding and that some leaders would have processes they felt were thorough and could justify expenditures, but ultimately resources would fall short due to other factors.

Approximately 23 percent of respondents indicated significant satisfaction in levels of funding they were receiving to execute their long-term mission, yet only 13 percent were satisfied with the efficacy of their long-term planning process. Why would there be lower satisfaction with a planning process when enough resources are being allocated to the function? After reviewing the responses, the disconnect became clear: companies, regardless of funding level, were still unsure



**FIGURE 3.** Purpose of R&D program vs. satisfaction with planning process

about their direction because of perceived weak processes and a general lack of direction in long-term planning.

Companies fell into one of two extremes; those with large amounts of money resourced to R&D, and those with limited, inconsistent funding. Members of the former group are industry leaders operating under peak market conditions, with regular, relatively large funding. Without strong processes, however, they remain unsure where to best allocate resources. The latter companies also appeared to lack meaningful processes, which, if in place, would help them make effective investments with the funding they receive.

#### **Satisfaction with Long-Term Planning Processes**

Only 13 percent of companies were truly satisfied with their planning, while 36 percent were moderately satisfied. To better understand, we used satisfaction with processes as a dependent variable, exploring differences between organizations that are more satisfied versus those less satisfied with their strategic planning processes. Our results revealed the following:

1. *Longer time horizons*—Companies more satisfied with their strategy processes were generally focused on longer time frames in planning. Strategic planning programs for established operating business units typically look ahead three to four years. We found that greater satisfaction with the planning process occurred when R&D focused out five years or more. Considering that an effective technology roadmap requires consistency of effort and discipline over time, this longer view would enable the inclusion and analysis of more significant trends that themselves have longer timelines. Consistency of effort over time adds confidence in the long-term planning process as it strengthens confidence in the plan being consistent and current as knowledge is gained over time.
2. *More frequent reviews of strategy*—Companies with greater satisfaction in their long-term planning processes conducted routine planning activities, while companies moderately satisfied planned annually. The most satisfied companies planned annually with revisits as needed throughout the year, while companies that were unsatisfied had no formal cadence for their strategic planning.
3. *Going beyond the core*—Satisfaction with the long-term planning process was greater when R&D efforts focused

When the purpose of R&D was to drive growth in new and adjacent markets, there was greater satisfaction with the processes.

**TABLE 2.** Satisfaction with research inputs for long-term strategy development

	Companies Experiencing Below Average Satisfaction with Process		Companies Experiencing Above Average Satisfaction with Process	
	Very Satisfied	Extremely Satisfied	Very Satisfied	Extremely Satisfied
	Technology Trends	38%	4%	33%
Market Trends	13%	8%	50%	0%
Competitive Insights	17%	4%	50%	0%
Customer Insights	25%	8%	17%	33%
Business Insights	25%	0%	40%	0%
New Business Models	0%	0%	17%	0%

on both supporting the businesses today and growth beyond the core. When the purpose of R&D was to drive growth in new and adjacent markets, there was greater satisfaction with the processes. Focus on the longer term forces stronger planning processes, which can drive the company to a longer-term perspective. Focus on the long-term R&D program and its planning process can impact a company’s future viability as its businesses and underlying technologies change over time (Figure 3).

4. *Satisfaction with research inputs*—Companies content with their long-term planning processes are more satisfied with their use of various long-term planning research inputs. Other companies are fairly satisfied with their use of traditional inputs such as technology and market trends but are much less satisfied with the research conducted outside of these areas. Successful leaders adeptly leverage additional inputs (trends, cross-business synergies, new business models) when developing their long term-strategy. Without these additional insights, companies cannot develop a wider view of the environment, which can prevent them from anticipating shifts in markets. Failure to prepare for these market shifts creates great difficulty in the development of long-term plans (Table 2).
5. *Communication*—The most satisfied leaders communicate their vision and strategy across the entire organization. Leaders with better processes communicate their long-term strategies more broadly across the company, while leaders without satisfactory processes rarely communicate outside individual departments or business units.
6. *Gaps*—The differences between companies satisfied and those not satisfied with their overall processes provide directional indicators that could help R&D leaders with long-term strategy processes. Behaviors of leaders with stronger processes include: thinking farther out in time, more frequent strategy reviews, scouting adjacencies, using a broader array of inputs, and good cross-functional and organizational communication of plans. Our findings do not explain why so few leaders are satisfied with their processes—a need for improved strategic planning for longer-term R&D remains.

**TABLE 3.** Satisfaction with opportunity identification and selection

	Not/ Minimally Satisfied	Moderately Satisfied	Very Satisfied	Extremely Satisfied
Defining Opportunity	26%	55%	15%	4%
Sizing Opportunity	62%	26%	13%	0%
Long-Term Metrics	66%	30%	0%	4%
Tying Business Strategy to R&D Strategy	34%	49%	15%	2%
Integrating Risk and Decision Making	56%	32%	11%	2%

**Satisfaction with Identifying Opportunities**

R&D leaders struggle to define the right opportunities and tie them to investment strategy. Only 19 percent of leaders were satisfied with their ability to define opportunities, and only 4 percent were extremely satisfied. This gap between finding the right opportunities and tying them to investment strategy puts organizations at significant risk. If opportunities are unclear, R&D leaders cannot identify effective technology investments. Only 13 percent were satisfied with their ability to size opportunities, and no respondents were extremely satisfied. Sizing opportunities is critical for selecting and metering levels of investment. Leaders struggle to define the long-term metrics of success (only 4 percent were satisfied). By failing to link business strategy with R&D strategy there is no consensus for support—only 17 percent were satisfied and only 2 percent were extremely satisfied with their ability to do so. Without the link between integrated risk and decision-making, companies cannot make informed choices; however, only 13 percent were satisfied with their ability to integrate risk into long-term processes (Table 3).

The surprising finding that R&D leaders are more satisfied with their funding than their processes reveals how important good processes are for effective selection of opportunities for investment. Findings regarding how poorly many organizations execute—relative to identifying and prioritizing opportunities—highlights true gaps that R&D leaders experience in conducting their planning. Differences found between those organizations that are more satisfied versus those less satisfied with their processes reveals behaviors that are supportive of good processes.

**Long-Term Visioning Scorecard**

The Long-Term Visioning Scorecard synthesizes insights gathered from working groups, interviews, and survey results. Organizations can use the scorecard to evaluate their current performance and practices surrounding their long-term visioning and planning. Rows of the scorecard center on key vectors of successful long-term planning found during Phase 2. Each row articulates behaviors and practices across that spectrum of success found in Phases 2 and 3. Satisfaction

	Limited	Moderate	High
<b>Timing + Cadence</b>			
<b>Horizon for Long-Term</b>	0-4 years	5+ years	5+ years
<b>Frequency of Planning</b>	Ad Hoc	Annually	Annually with “revisits” as needed
<b>Point of View</b>			
<b>Perceived Purpose of R&amp;D</b>	<ul style="list-style-type: none"> <li>Driving growth in core markets</li> </ul>	<ul style="list-style-type: none"> <li>Driving growth in core markets</li> <li>Supporting the businesses</li> <li>Exploring mid-term growth</li> </ul>	<ul style="list-style-type: none"> <li>Driving growth in core markets</li> <li>Supporting the businesses</li> <li>Exploring mid-term growth</li> <li>New / adjacent market expansion</li> <li>Exploring long-term growth</li> </ul>
<b>Perceived Purpose of Long-Term Planning</b>	<ul style="list-style-type: none"> <li>Achieving top-line growth</li> </ul>	<ul style="list-style-type: none"> <li>Achieving top-line growth</li> </ul>	<ul style="list-style-type: none"> <li>Achieving top-line growth</li> <li>Driving breakthrough</li> <li>Industry-leading innovation</li> </ul>
<b>Funding</b>			
<b>Scope of R&amp;D Program Funding</b>	Able to secure funding for projects involving: <ul style="list-style-type: none"> <li>External partnerships</li> </ul>	Able to secure funding for projects involving: <ul style="list-style-type: none"> <li>External partnerships</li> <li>Work in adjacent areas</li> <li>New tech platforms</li> </ul>	Able to secure funding for projects involving: <ul style="list-style-type: none"> <li>External partnerships</li> <li>Work in adjacent areas</li> <li>New tech platforms</li> <li>Long-term initiatives</li> <li>New business models</li> </ul>
<b>Insight Gathering</b>			
<b>Breadth of Research Inputs Used</b>	<ul style="list-style-type: none"> <li>Technology trends</li> <li>Market trends</li> </ul>	<ul style="list-style-type: none"> <li>Technology trends</li> <li>Market trends</li> <li>Competitive insights</li> <li>Customer insights</li> </ul>	<ul style="list-style-type: none"> <li>Technology trends</li> <li>Market trends</li> <li>Competitive insights</li> <li>Customer insights</li> <li>Business insights</li> <li>New business models</li> </ul>
<b>Engagement + Communication</b>			
<b>Penetration of Communications through the Organization</b>	R&D strategy shared with: <ul style="list-style-type: none"> <li>Leadership (organization and/or business unit) only</li> </ul>	R&D strategy shared with: <ul style="list-style-type: none"> <li>Leadership (organization and/or business unit) only</li> <li>R&amp;D and Marketing</li> </ul>	R&D strategy shared with: <ul style="list-style-type: none"> <li>Throughout the greater organization</li> </ul>
<b>Opportunity Identification + Measurement</b>			
<b>Analysis Mechanisms in Place for Long-Term Planning</b>	No / limited process for: <ul style="list-style-type: none"> <li>Defining opportunity</li> <li>Sizing opportunity</li> <li>Long-term metrics</li> <li>Tying R&amp;D strategy to business strategy</li> <li>Integrating risk + decision-making</li> </ul>	Some / inconsistently used process for: <ul style="list-style-type: none"> <li>Defining opportunity</li> <li>Sizing opportunity</li> <li>Long-term metrics</li> <li>Tying R&amp;D strategy to business strategy</li> <li>Integrating risk + decision-making</li> </ul>	Established process for: <ul style="list-style-type: none"> <li>Defining opportunity</li> <li>Sizing opportunity</li> <li>Long-term metrics</li> <li>Tying R&amp;D strategy to business strategy</li> <li>Integrating risk + decision-making</li> </ul>

**FIGURE 4.** Long-term visioning scorecard

with the process was the dependent, and more important, variable for leaders in choosing which opportunities to invest in; therefore, the columns articulate satisfaction levels. To simplify the scorecard, we condensed the Very Satisfied and Extremely Satisfied categories into a single Highly Satisfied category. Behaviors in the far right-hand column indicate healthy and successful planning practice. By using the

scorecard for self-evaluation, organizations can identify gaps in practice (Figure 4).

The scorecard is structured as follows:

- *Timing + Cadence (Planning Structures)*: More successful companies look farther out in time and evaluate their plans more often.



- *Point of View (Role of R&D)*: More successful companies have an expanded view of the role of R&D.
- *Funding (Scope of Program Allocation)*: Successful companies allocate more of their R&D budget to long-term platforms and more diverse opportunities.
- *Insight Gathering (Inputs for Exploring Long Term)*: Using a broader range of market research leads to more successful processes.
- *Engagement + Communication (Involvement with the Greater Organization)*: Successful companies have greater engagement in terms of cross-functional participation, linkages to business strategies, and communication of vision and strategy.
- *Opportunity Identification + Measurement (Analysis)*: More successful companies have more sophisticated processes for opportunity definition and measurement, but few have any really successful processes.

## Conclusion

We identified state of the art in long-term R&D visioning and strategy. Time frames for developing these long-term visions and strategies prove particularly challenging because they extend beyond where businesses typically provide insight and where platforms exist to address the pace of change. Even when they can secure funding, R&D leaders lack insights necessary to choose the best opportunities. Their struggles come from the need for insights beyond those based in technology. They must understand the business needs, potential market conditions, and technology trends in these time frames.

Our research yielded ingredients for a successful long-term strategy. Companies need to develop robust, long-term planning processes that can be modified and shaped according to their needs and capabilities. They need to secure funding and solidify options once that funding is received; define and size opportunities both in the context of R&D studies and the companies' holistic business model; quantify the value of work to determine future directions and smart investments; and communicate formulated strategy to the greater organization in timely and effectively.

These areas must be addressed and integrated into an embedded process that can be reviewed frequently, thereby enabling companies to regularly assess funding levels and allocation in alignment with the rest of the business model. Leaders can use the scorecard to evaluate their own state of maturity with respect to vision, strategy, and planning. They can also use the scorecard as a maturity model to determine how best to push their organization forward to achieve better processes.

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