American Management Association

THE QUEST FOR INNOVATION

A Global Study of Innovation Management 2006-2016

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Foreword

Innovation drives growth and opportunity in new markets, and breathes life into a mature industry. Executives at all levels have a responsibility to lead and stimulate innovative thinking across the entire enterprise. Stockholders, employees and customers count on executives to create a healthy, innovative work environment.

There may be an abundance of literature on the topic of innovation, and innovation may be at the top of the list among global executives, yet most organizations enjoy only moderate success in managing the innovation process. Why are so many organizations struggling to master such a critical aspect of their business strategy?

To answer this question, and capture current thinking on innovation and identify best practices, American Management Association commissioned the Human Resource Institute to conduct a survey, the results of which are the basis for the *AMA/HRI Quest for Innovation Study 2006.*

As you will discover in these pages, the reasons for pursuit of innovation are as varied as the factors that foster an ideal culture for innovation.

Armed with the study results, the analysis by HRI's team of experts, and your own business objectives, you can develop your own innovation roadmap. American Management Association offers three exciting programs to help you accelerate and fine tune your innovative process: *Critical Thinking, Innovation & Creativity,* and *Right Brain Rising.* You can learn more about these courses at www.amanet.org

Inspiration is the heart and soul of innovation, and AMA is a catalyst for facilitating innovative thinking. I encourage you to foster an innovative mindset, and to give yourself and your organization permission to make quantum leap improvements with new ideas.

Edward T. Reilly
President and Chief Executive Officer
American Management Association

Introduction

In today's fast-paced business environment, innovation is a prerequisite for success—and perhaps even for survival. That's why innovation has found its way to the top of the agenda at organizations around the world. Once considered primarily an output of R&D labs, innovation has become a corporate priority that touches every facet of, and, indeed, every employee in, an organization. External constituents, too—customers, academia, the government, vendors, even competitors—are playing a growing role in companies' creative processes.

The *AMA/HRI Innovation Survey 2006* found that more than two-thirds of the 1,356 global respondents considered innovation either "extremely important" or "highly important" to their organizations today. Yet, those impressive numbers seem modest when compared to respondents' predictions about the future. About half of respondents think innovation will be "extremely important" to their organizations in 10 years, and 35% say it will be "highly important."

In this Report, the AMA/HRI team takes an in-depth look at what is driving innovation and how companies view it. We also analyze the components of an innovative culture and look into the future to see what innovative organizations of the next decade might look like. Following is a quick review of some of the findings, which are based on a combination of survey data, our literature review process and a series of interviews with innovative companies:

- Survey respondents believe innovation is going to get considerably more important over the next decade. Yet, the survey suggests that most companies are only moderately good at innovation. And the literature implies that the vast majority of innovation efforts fail to meet or exceed return-on-investment goals.
- The biggest barriers to organizational innovation are insufficient resources and the absence of a formal strategy for innovation.
- There is no organizational consensus on how to evaluate ideas in organizations, raising the issue of how best to select which innovations to pursue and which to let go.

- Leaders can make or break innovation. They can help by developing the right strategies and setting up the right organizational designs, or they can hurt by failing to support innovation efforts or exerting too much management control.
- Customer demand is viewed as the top reason for pursuing innovation, both today and in the future. In fact, throughout much of the AMA/HRI survey, respondents viewed customers as the most dominant factor of influence on innovation.
- Creativity and innovation are inextricably linked to corporate cultures that put an emphasis on teamwork, collaboration, communication, appropriate risk-taking, freedom to innovate and other factors.
- The U.S. is in danger of losing its innovation edge to some other regions of the world that are starting to produce more engineers, researchers and other specialists. Some warn that U.S. companies could become too focused on incremental innovations and not focused enough on the kind of long-term disruptive innovation that promises the best growth opportunities for the future.
- In order to adapt to an uncertain future, companies need to become more resilient and agile in some areas, more disciplined in others. They need to be more innovative not only in terms of products and services but in terms of the way they manage. They must also become more forward-looking and capable of anticipating future trends. Before they can innovate for the marketplace, they must often reinvent themselves, or at least their innovation processes.

A Brief Review of Innovation and Creativity Theory

The literature illustrates that there are various types of innovation and creativity. The two concepts work in a kind of critical tandem, but successful innovation requires more than just putting creative people in a room and hoping they come up with valuable new products or processes.

A Critical Tandem

The literature on innovation and creativity goes a long way toward defining the characteristics of innovation, of creative individuals *and* of innovative organizations. The genius of some companies is their ability to successfully manage the complex web of social, scientific, technological and business factors that result in true innovation. This section provides a broad overview of some of the most influential ideas about innovation and creativity.

On Creativity

Creativity often helps drive innovation, but the two concepts are not identical. In fact, creative forces can actually reduce the chances of developing a successful innovation if creativity isn't managed well in organizations (Levitt, 2002). Creativity becomes a critical workforce issue because attracting, engaging and otherwise managing creative people is an art in itself. Although this report focuses primarily on innovation, it is critical that organizations have an idea of what creativity is and how it should be managed in corporations.

The research conducted during the past century in the field of creativity is quite extensive and diverse. To more effectively review this work, we present the historical research on creativity in three broad categories.

The Creative Individual

A substantial portion of the early and current research on creativity has focused on gaining a more in-depth understanding of individual-level factors. Some researchers have studied the interdependent relationship between creativity and individual intelligence (Hocevar & Bachelor, 1989; Barron & Harrington, 1981; Meer & Stein, 1955). Others have examined the influence of personality factors such as intrinsic and extrinsic motivation. They have found that creative individuals tend to be more intrinsically motivated and that extrinsic motivation can sometimes have a negative impact on an individual's creative thinking (Amabile, 1996; Hennessey & Amabile, 1998).

An extensive amount of attention has also been dedicated to studying the traits that a creative person demonstrates. After reviewing 15 years of research, Barron and Harrington (1981) summarized that creative individuals demonstrate a "high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self concept and, finally, a firm sense of themselves as 'creative.'" Amabile (1998, p. 453) described individual creativity as a function of three components: the person's expertise, creative thinking skills and level of motivation.

In addition, Michael Kirton (1989) differentiated between individuals' creative problem-solving styles. Individuals who are adaptive in their creativity tend to focus on refining, improving and extending that which already exists, whereas those who are innovative produce many ideas and redefine problems in novel and different ways.

The Social Context of Creativity

During the last two decades, attention has shifted to the external determinants of creativity. Researchers have examined the influence of a wide variety of external factors on creative behavior such as social reinforcements, role model availability, formal education, status of parents, political instability, stress levels in the environment and competitors (Simonton, 1984; Gardner, 1993; John-Steiner, 2000). As discussed by Woodman and Schoenfeldt (1990), Professor Teresa M. Amabile of Harvard University has conducted the most comprehensive body of work exploring the social and psychological explanations of creative behavior: "She has proposed and investigated a number of social and environmental influences on creative behavior, including social facilitation, modeling, motivational orientation, evaluation expectations, effects of actual evaluations, use of rewards for creative behavior, task constraints and opportunities for behavioral choices" (p. 284).

Other studies have focused their attention on examining creative groups (Dunbar, 1997; Kanigel, 1993). Results indicate that successful creative groups have a combination of expert team members and team members who bring fresh, inexperienced perspectives. They are able to be playful as well as show professionalism when necessary, and they have the ability to plan but also remain flexible and able to improvise when projects do not go as planned (*Harvard Business Review,* 2003).

In addition, much recent attention has been devoted to the study of culture and creativity. As described by Hennessey (2003), "creativity varies across cultures: to the extent that it is directed toward or away from certain domains of activity or social groups and to the extent that it is valued or nurtured" (p. 193).

Organizational Creativity

The research on creativity has also focused on a wide variety of organizational issues, including creativity in work groups, job characteristics, leadership support and organizational culture, among others.

Several researchers have studied creativity in work groups and have found that resource availability, group size, leadership, cohesiveness, communication patterns and group diversity have an impact on the creativity of teams (Nystrom, 1979; Andrews, 1979; Payne, 1990). King and Anderson's results (1990) indicated that democratic and collaborative leadership, organic rather than imposed structures and diversity in terms of backgrounds and experience among group members would lead to the most positive creative outcomes.

Studies conducted around characteristics of jobs indicate that job design is also related to creativity via its impact on the internal motivation of employees. Studies have found that more challenging, complex jobs (defined by Hackman and Oldham (1980) as being high in autonomy, skill variety, significance, feedback, and identity) lead to higher levels of motivation and creative performance (Amabile, 1998; Hackman & Oldham, 1980).

Other studies have focused on the role that leadership and supervisory support, in terms of both task and relationship, play in creativity. Leadership support

has been found to be linked to creative behaviors because leaders impact the perception employees have of being within a work environment that encourages and rewards creativity (Casimir, 2001; Xin & Pelled, 2003). Amabile *et al.* (2004) found that the daily interactions of leaders with their employees can influence their feelings, perceptions and, thus, performance in the creative work they do.

Amabile *et al.* (1996) point out that most of the work on creativity and culture has focused on factors that appear to enhance creativity. Because obstacles are also important, Amabile identified characteristics in the culture that would differentiate between factors that support creativity and obstacles that impede it. In a large study focused on the R&D lab, Amabile and Sensabaugh (1992) found the following environmental stimulants to creativity: freedom and control, good project management, sufficient resources, and various organizational characteristics (collaborative atmosphere, a high expectation of creativity, an acceptance of failure, and a nonbureaucratic structure). In addition, various obstacles to creativity were identified: lack of freedom or choice in deciding what to do or how to go about it, lack of interest or psychological support within the organization and poor project management (Amabile & Sensabaugh, 1992).

Kanter (1983) published the results of extensive case study work on innovation and culture. She also looked at both the supporting factors and obstacles. Kanter (1983) lists "10 Rules for Stifling Innovation" that focus on control of action, decisions and information, hierarchical structures and lack of supervisor support or encouragement (p. 101). Kanter reports that companies that have integrative structures and cultures emphasizing pride, commitment, collaboration and teamwork produce the highest entrepreneurial accomplishments. In addition, Angle (1989) learned that "innovation effectiveness was found to be related both to communication frequency within the innovation teams and communication frequency outside the teams" (McLean, 2005). Communication patterns are reflective of organizational culture. Burns and Stalker (1961) discuss open communication flows as being by definition present in an organic organization.

Tesluk, Farr and Klein (1997) report that management should convey, through actions and words, that they value challenging norms, active risk-taking, sharing of information and open debate. When this is the case, employees are more likely to engage in creative behaviors. Tesluk *et al.* also discuss the relationship of rewards within cultures and note that the critical factor is that rewards and recognition systems either (1) encourage or enable *intrinsic motivation* or (2) do not focus too much on extrinsic factors. The major factor identified in the literature that impedes creative performance is control (Amabile, 1998; Angle, 1989; Kanter, 1983; Oldham & Cummings, 1996). It may be that control in decision-making, control of information flow or even perceived control in the form of reward systems put too much emphasis on increasing extrinsic motivation.

Recent work on creativity has also turned to examining the use of technology to enhance creativity in groups (Paulus, Larey & Ortega, 1995), and to studying the impact of diversity on creativity (Miliken & Martins, 1996).

On Innovation

Innovation is the term used to describe how organizations create value by developing new knowledge and/or using existing knowledge in new ways. The term is often used to mean the development of new products or services, but organizations can also innovate in other ways, such as through new business models, management techniques and organizational structures.

The literature on innovation is large and covers a wide range of topics. Over the last half century, the kinds of innovation that have been examined and the kinds of problems in which innovation scholars are interested have changed. "In the 1960s," reported J.T. Hage (1999) of the University of Maryland's Center for Innovation, "the emphasis was on incremental change in public sector organizations, while in the 1980s and 1990s it [was] on radical change in private sector organizations" (p. 600).

In economics, Nobel Prize winner James March (1991) uses an organizational learning perspective to distinguish between innovations that explore for new knowledge and innovations that find clever new ways to exploit existing knowledge. Firms that explore for new knowledge may seek incremental scientific improvements to serve existing markets, or they may break away from the safety of existing products and markets to pursue bold new product ideas or to try to create new markets.

Product and Service Innovation

Incremental Innovation. Applied science that searches for incremental improvements to existing know-how adds value to existing products for existing markets and is more common than high-risk pure research. Indeed, the most common approach to innovation is to look for low-risk ways to improve the design of existing products using current knowledge to serve today's markets. Larger and more established firms tend to be more risk-averse and prefer innovations that have a greater chance of making money even if it means that the potential returns are less than spectacular. These firms often have a large installed customer base and a larger and a more geographically dispersed supply chain.

For these firms, the central innovation challenge is to constantly move the performance bar a little bit higher without losing the ability to keep a complex set of technological and business relationships arranged in an orderly fashion. These firms prefer gradual incremental innovations and tend to delay more fundamental innovations as long as possible (Anderson & Tushman, 1986, 1990).

That's not to say that there's anything easy about a more incremental approach to innovation and product development. Mature products tend to be more complex to design, produce, market and distribute because significant commitments have already been made and are hard to change despite the fact that there is a constant threat of new entrants and technological change.

During the 1980s, Japanese companies in the automobile industry came to represent the state of the art in rapid, cost-effective, high-quality product develop-

ment. The rise of Japan as an industrial power owed much to faster, more productive product and process development (Womack, Jones & Roos, 1990). Companies learned that the complexity of new product introductions requires concurrent product-process design participation by hundreds of suppliers (Howells & Wood, 1993).

Products that are incrementally improved can lead to new product "architectures" that seem dramatically different and can undermine the usefulness of the knowledge of established firms (Henderson & Clark, 1990). Hybrid cars, for example, are the result of many small improvements in automotive technology, but, combined into a new product architecture, they can lead to big changes in the competitive environment.

The complexity of new product development can be reduced by designing "platform products"—groups of products aimed at a market segment or customer group with the same product architecture applied to a series of related products (Meyer & Utterback, 1993). This allows firms to rapidly introduce variations while delaying periodic changes in the architecture as long as possible.

Customers also play a role in effective product innovation. Engineering approaches such as "quality function deployment" (Akao, 1988) allow designers more freedom to use customer needs to guide design decisions by translating those needs into product and engineering specifications.

Breakthrough Innovation. Exploring for new knowledge is well illustrated by the basic science that is often pursued in corporate research and development (R&D) labs as well as in university research centers. This form of R&D feeds the value chain for new product development by making scientific discoveries and earns a return on investment by claiming ownership to intellectual property through patents and proprietary knowledge. Because this form of R&D can be expensive and risky, it is sometimes hard to justify the investment unless there is some clear idea of the potential market value of new knowledge discoveries. "Pure science" is exceedingly uncertain from a business perspective.

Departments that focus on basic research are more likely to be staffed by people with Ph.D.s, while those in departments devoted more to technology development are more likely to have business educations and business backgrounds. The "performance" of R&D can be highly uncertain. Long lags between scientific discovery and technology development and commercialization occur because there are missing forms of knowledge concerning product design and production know-how (Narayanan, 2001).

R&D is inherently more difficult to manage with the same yardstick of efficiency that might be applied to other areas of organizations. Lawrence and Lorsch (1967) found significant differences in the way organizations structure their R&D efforts compared to their operations, with most R&D departments exhibiting less formal structure and a longer-term outlook than other departments.

Breakthrough thinking can yield tremendous new opportunities, but the length of time to bring a breakthrough product to market can be very long and many hoped-for breakthroughs may never achieve their goals.

Organizational Innovation. Innovation often means more than the creation of new products and services. It can mean innovation in terms of business models, management techniques and strategies and organizational structures (Hamel, 2006). The attempt to create new products and services may spur organizational, or what some term "management innovation," or innovations such as new business models may arise to take advantage of newly discovered market opportunities.

One of the principal reasons for organizational innovation is that established firms can lose not just their ability to innovate but their insight into the necessity to innovate. Successful firms sometimes become blind to opportunities other than those that sustain their current customer base. Christensen (1997, 2003) explains that as firms sell more technologically advanced and feature-rich products to serve their existing customers, they fail to see discontinuous innovations that would serve new customers in new ways. Overlooked opportunities might include a demand for new products that are technologically less sophisticated than their current products. By achieving higher mastery of technology and higher mastery of product complexity, firms risk losing a sense of how best to respond to customers whose requirements for simplicity override their need for the most technologically advanced products.

There are, of course, a variety of organizational and management innovations, three of which will be briefly touched on here:

1. **Business Model Innovations.** History proves that successful innovations often stem from excellent business models as much as they do excellent technologies (Shelton & Davila, 2005). Companies may decide to innovate in terms of how they approach markets. For example, a manufacturing company may decide that it really should move primarily into providing services, such as consulting. Or it may decide to move from being a low-cost producer to a value-added one that depends on selling fewer products at a higher price with larger profit margins.
2. **Business Structure Innovations.** Whether because they wish to pursue new markets, pursue new innovations, or meet some other strategic goals, businesses may innovate in terms of their structures. This can involve everything from mergers and acquisitions (often spurred by a desire to absorb some other company's innovations) to reengineering, to offshoring. For larger organizations, it can also mean restructuring to try to duplicate some of the advantages of smaller organizations. Or, it can mean inventing structures that didn't exist before, as occurred when the banks that founded Visa formed a consortium to create a well-known brand and global financial web (Hamel, 2006).

   New markets and new technologies are often easier to pursue in newer, younger organizations that are not captives of the existing ways of doing business. This is the type of innovation in which entrepreneurs thrive. Entrepreneurs are rewarded by their ability to take the initiative in exploiting new opportunities before others can respond and often before they understand the true potential of the opportunity. Some experts emphasize

the role of lead customers in actually creating their own new products (Thomke & Von Hippel, 2002). Entrepreneurs rapidly build prototypes and test new product ideas in a close relationship with lead customers.

If organizations are interested in preparing to serve untapped markets, however, they cannot expect their current customers to lead them there. Discontinuous innovations require breaking away from existing organizational practices and perspectives and may also require the development and/or acquisition of new knowledge. This type of innovation often requires an approach resembling the creation of a new venture, whether in the form of a new organization, or in the development of a new division within an existing organization (Christensen & Raynor, 2003).

3. **Business Process Innovations.** This type of innovation looks less at what is produced than it does at how it is produced, though these two factors often influence each other. When Ford Motor moved to a production line system for creating a standardized product, it wound up being a great process technology innovation combined with a great business model (Shelton & Davila, 2005). In some cases, companies are able to reduce costs while boosting productivity and quality via business process innovations.

Depending on how one chooses to look at the literature, other types of organizational innovation exist as well. For example, it would be easy to make a case for "business culture innovation" in which a company systematically tries to forge a new and more innovation-friendly corporate culture. The literature indicates, though, that any classification system has certain limitations. A complex subject such as innovation tends to defy neat and discrete categories, which is one of the primary reasons it remains a major challenge for organizations.

What is Driving, or Curbing Innovation Today?

Various factors drive organizations and, indeed, whole societies to become more innovative, while other factors impede innovation. Some of these drivers arise from the business environment, while others arise from the larger social environment via patent laws, national cultures, educational systems, public spending on research and development, and other factors.

This section highlights (1) the primary factors that drive innovation in businesses, (2) barriers to innovation in organizations, and (3) factors that influence innovation from outside the corporations. This analysis is based on the *AMA/HRI Innovation Survey 2006* as well as HRI's environmental scan of the literature on innovation.

The Predominant Role of the Customer

Whoever originally said "the customer always comes first" could have been looking at the results of the *AMA/HRI Innovation Survey 2006*. When survey participants were asked about their reasons for pursuing innovation in their own organizations, their top reason was the need to "respond to customer demands." In fact, when looking at the importance that respondents attached to this customer demand via the Likert-type scale used in this survey question, it's clear that customer demands will become even more important over the next decade. The following table shows a relative ranking of the top six reasons for pursuing innovation today. Only the relative rankings for "increasing market share" and "using new technologies" change when respondents were asked to look ten years into the future.

Top Reasons for Pursuing Innovation Within Organizations

Reasons	TODAY	In Ten Years
To respond to customer demands	1	1
To increase operational efficiency	2	2
To increase revenues or profit margins	3	3
To develop new products/services	4	4
To increase market share	5	6
To better use new technologies	6	5

Source: AMA/HRI Innovation Survey 2006

The predominant role of customers is not surprising, since similar findings have shown up in other surveys as well. For example, a 2004 Conference Board study of 100 firms, primarily from the U.S. and Europe, found that customers were major factors in the companies' innovation goals for 2006. Over 7 in 10 respondents rated the following goals as highly important: improving customer satisfaction via new processes (79%), increasing loyalty among current customers (73%) and identifying new customer segments (72%) (Troy, 2004).

It's interesting to note that, as a reason for pursing innovation, the desire "to develop new products/services" not only ranked below "customer demands" but also below "operational efficiency" and "revenues/profits." In other words, innovation for its own sake is not the highest priority for businesses. Innovation tends to serve a larger business purpose.

Why would "increasing operational efficiency" be ranked so high in the survey results? Probably because innovation means more than just creating new products and services; it means modifying existing products to allow the organization to produce them more efficiently.

When respondents to the *AMA/HRI Survey* were asked about the external drivers of innovation, the predominant role of "customer demands" again rose to the fore, ahead of important external factors such as "technology" and "pace of change." The important role of customers also appears in the "collaboration/alliances with customers" response (see table below). This driver is of particular interest partly because it's seen as becoming relatively more important over time and partly because it highlights a trend in today's marketplace: the fact that companies are increasingly forming partnerships with customers in the innovation process.

Top External Drivers of Innovation

Drivers	TODAY	In Ten Years
Customer demands	1	1
Technology	2	2
Pace of change	3	4
Collaborations/alliances with customers	4	3
Availability and cost of talent	5	5
Globalization/increased competition	6	6

Source: AMA/HRI Innovation Survey 2006

Other important external drivers of innovation—including technology, the pace of change, talent, and globalization, among others—will be elaborated on below.

Technology and the Pace of Change

The remarkable spread of new technologies—driven by a wide range of scientific discoveries and engineering progress—is driving companies to compete in marketplaces where the "next big thing" can change whole industries. A company that relies on aging technologies is increasingly likely to get waylaid by competitors with new and better technologies.

But that's not the only role technology serves in regard to innovation. Technical advances such as computer-aided design and the ability to share ideas in real time are allowing companies to shorten the time it takes to introduce new products to the market. A 2004 Conference Board survey found, for example, that 58% of respondents use the Web for team collaboration and 56% use it for idea-sharing (Troy, 2004). The product design and marketing cycle—from idea to invention to innovation to imitation—once took 30 to 40 years but is now closer to 30 to

40 weeks, according to expert forecasters Marvin J. Cetron and Owen Davies (2005). In short, the pace of change is being increased, partly because of new technologies and partly because of the internal work process changes that companies are making.

Experimentation via computer simulations and virtual techniques is also helping to bring new products to consumers more rapidly and with less expense. The innovation tools that involve computer modeling and simulation are often used by automobile manufacturers because computers can determine such things as speed as a factor in vehicle crashes. Rapid prototyping and combined technologies quickly produce items that can be tested in real conditions, not just virtual ones, making it a more effective method for certain products, such as drugs and new synthetic materials ("Speeding Up Experiments," 2004).

The Global War for Creative Talent

The "availability and cost of talent" are among the top external drivers of innovation, according to respondents to the *AMA/HRI Survey*. In a world in which innovation becomes ever more important, so does the need to compete for the kind of talent that makes innovation work. Of course, this talent pool consists of members of what experts call "the creative class," but it also means managers who know how to set up organizations in ways that optimize innovative impulses.

Both the availability and cost of innovation-spurring talent will be a growing issue, especially in light of the expanding global labor force. Will U.S. companies be able to attract top talent from abroad in coming years? And, even if they can, will it be less expensive and more efficient to just create innovation facilities in other nations and utilize the talent there?

U.S. companies must realize that the status quo is changing. For years, people with technology and engineering skills left India, China and Russia to find new opportunities in higher-wage countries such as the U.S., but this "brain drain" now shows signs of reversing. More of the foreign students who've learned valuable skills in the U.S. are heading home these days (Cetron & Davies, 2005).

In some cases, this is because home nations are growing economically at a faster pace and so are looking more attractive. But some experts believe that the U.S. culture has also become less attractive and innovation-friendly over the years. Richard Florida, professor of economic development at Carnegie Mellon University, writes that during the 1980s and 1990s, talented immigrants as well as creative, ambitious Americans congregated in U.S. urban hubs that became centers of innovation for artists, designers, inventors and a host of entrepreneurs who encouraged one another in cutting-edge endeavors.

Times have changed. Terrorism concerns and other cultural changes have contributed toward making the U.S. less attractive than it had been, according to Professor Florida. He says it's now necessary to strengthen the U.S. creative economy by concentrating on enhancing higher education through university expansion and directing subsidies to emerging industries that will keep talent at home (Florida, 2004). By making the U.S. more appealing to creative talent, the country

may be better able to create new products, industries and jobs to help replace many of the jobs being lost to developing countries (Troy, 2004).

Of course, corporate policies may ultimately be just as important as national ones. In the future, organizations will need to become "employers of choice" for creative workers. To accomplish this, they'll need to take a hard look at their corporate cultures and processes to see how innovation-friendly they really are.

The Race for Innovation

Who Has the Innovation Edge?

Many experts still consider the U.S. as the most innovative nation in the world, but some warn that it's edge in this area is quickly slipping away. They point to three general trends. First, the percentage of papers in top physics journals authored by Americans declined from 61% in 1983 to just 29% in 2003. Second, there's been a recent drop in the percentage of Nobel Prizes going to Americans. Third, Americans' share of U.S. patents is now about 52%, down from 66% in the years prior to 1988 (Broad, 2004).

There is a U.S. problem with scientists and engineers as well. Even as there's been a decline in U.S. doctoral degrees in science and engineering, there's been a fairly steady rise in such degrees in Europe and a remarkably sharp upsurge in Asia. *Science and Engineering Indicators 2004,* a biennial report of the National Science Board, reports that the U.S. ranks just seventeenth among nations in terms of the percentage of its 18- to 24-year-olds earning natural science and engineering degrees, whereas it ranked third in 1975.

In China, many of its students are graduating in fields of science and engineering, potentially leading to greater innovation in the future. Although China is spending less than the U.S. on R&D, it may be getting a huge return on its investment because Chinese engineers and scientists earn much less than their U.S. counterparts. By some calculations, China has 1.3 million researchers, compared with 743,000 in the U.S. (Fishman, 2005).

If current trends continue, by 2010 over 90% of those educated in physical sciences and engineering may be Asian workers who live in Asia (Human Resource Institute, 2004). Already, R&D centers are springing up in both China and India.

Even as the U.S. relative advantage in innovation has declined, other nations have made progress. The nations of northern Europe (Sweden, Finland, Denmark and the Netherlands) achieved particularly high scores in a "creativity index" of 15 countries, compiled by the London think tank Demos. The index looks at the "3Ts of economic growth," which include talent, technology and tolerance. It found that the U.S. "placed second behind Sweden on the overall creativity index and fell to 10th out of 14 countries in terms of growth of creative capabilities in recent years," according to a press release (Demos, 2004).

Other nations have also made progress in the field of innovation. Japan is second only to the U.S. in terms of the percentage of U.S. patents granted in 2003. Canada, too, has fared fairly well in innovation, ranking fourth (behind the U.S.,

Sweden and Finland) of 24 OECD countries, according to a report from the Conference Board of Canada (Vu, 2004).

Latin America has also been making progress, according to data from the National Science Foundation. Between 1988 and 2001, the number of science and engineering articles authored by Latin Americans nearly tripled. The majority of this writing was generated by authors from Brazil, Mexico, Argentina, Chile, Costa Rica, Colombia and Venezuela ("Science Research Rises," 2005).

R&D Spending in the U.S.

Any nation or company needs to maintain a level of research and development spending in order to succeed in the global innovation game. Although more spending does not always equate with greater innovation, too little spending on R&D can certainly impede both innovation and economic performance (Jaruzelski, Dehoff, & Bordia, 2005).

Total R&D spending in the U.S. is projected to reach $320.7 billion in 2006, an increase from $301.5 billion in 2004, according to research from analysts Battelle and *R&D Magazine* (Duga, Studt & Dearing, 2006). In comparison with other years since the last recession, 2006 is projected to be a better year for the U.S. in terms of R&D spending. In 2006, nearly half of R&D leaders expected that they'd increase their total R&D spending by more than 2.5%, and another 22% thought they'd keep their spending the same or reduce it, according to data from the Industrial Research Institute's (IRI) 22nd annual *R&D Trends Forecast*. In 2006, more emphasis is being placed on business growth and idea creation than on supporting existing business, another good sign for R&D (Ayers, 2006).

While industry gets the bulk of applied research and development funds, colleges and universities get the bulk of basic research funds. Jon Dudas of the U.S. Commerce Department says, "Academic researchers, and the inventions they patent, are integral to the progress of the science and technology that strengthen the economy, create new jobs and enhance the health and welfare of all Americans" (U. S. Patent and Trademark Office, 2004). The distribution of funds in academia is, however, uneven. Although engineering, computer sciences and life sciences (which consists of medical science, biological science and agricultural science) have received an increasingly larger share of academic R&D, other disciplines—such as social sciences, physical sciences, earth/atmospheric/ocean sciences and psychology —are receiving less, according to a 2004 report from the National Science Foundation (National Science Board, 2004).

R&D Spending in Other Nations

Although the U.S. continues to lead the world in R&D expenditures, the U.S. share of R&D spending is slowly shrinking. In 2004, the U.S. accounted for 32.7% of R&D spending, a number that's expected to decline to 31.3% in 2006. Meanwhile, Asia's share of total R&D spending continues to rise, reaching a projected 39.5% in 2006, largely thanks to increases in China and India. Europe's total share is projected to be 23.4% in 2006, down from 24.6% in 2004 (Duga, Studt & Dearing, 2005).

Other countries tend to devote a larger proportion of total R&D funds to academia than does the U.S. In all OECD countries, 17.2% of R&D funds go to the academic sector, with the U.S. spending 14.9%. But Argentina, Canada, Poland and Italy, for example, spend about one-third of total R&D funds within the academic sector, the UK 20.8%, and Turkey just over 60%, according to OECD data in a 2004 report (National Science Board, 2004).

But it's Japan, Finland and Sweden that stand out when other comparative measures are used. Those three countries have outpaced the U.S. in R&D expenditures as a percentage of GDP and also in the number of researchers per 1,000 total employment, according to OECD in *Figures* (OECD, 2004; Duga, Studt & Dearing, 2005).

Government Influence

Governments can have a strong impact on the innovativeness of their nations. Some government actions encourage innovation while others discourage it. In the U.S., critics point to the political climate, immigration restrictions and delays in visa processing as responsible for a diminishing talent pool of creative people. On the other hand, benefits such as tax incentives, the support of excellent universities and government-funded research and development can spur innovation.

Tax Incentives

In many nations, the government offers tax incentives to encourage research, development and other endeavors to promote innovation. Tax policies in most OECD countries allow deductions from taxable income for industrial R&D spending, and many also offer incremental credits to encourage increased R&D spending. Norway, the UK, Australia and Spain offer additional provisions to encourage R&D in small and medium-size enterprises, as well (National Science Board, 2004).

In the U.S., many companies may not realize what kinds of corporate activities qualify for such tax incentives. According to Kendall Fox of PwC's Research and Experimentation Tax Services, many believe that "…only the lab coat, cutting-edge, high-tech clean room environment is considered R&D," but since the IRS loosened its definition, many product and process improvements may qualify for certain tax credits, too (PricewaterhouseCoopers, 2005).

Patent Laws

Patents are designed to protect inventors, but some critics argue that they sometimes actually impede innovation. Proponents of open-source software, for example, say U.S. patent protection laws, which provide publishers of U.S. software with 20 years' protection from others' use, curtail technology advancements, according to Daniel Ravicher, executive director of the Public Patent Foundation (Stross, 2005).

Patents have also been a subject of political debate in Europe. A proposed EU software patent law that would have unified the patenting of software in all EU countries was resoundingly defeated by the European Parliament. Smaller firms without the financial wherewithal to fight patent battles in court thought the legislation would make competition with larger companies more difficult. Larger firms,

however, said such protection would provide more incentive to increase R&D investment. At last report, the European Commission had no plans to resubmit a similar proposal, saying that EU member countries will handle their own patent challenges (Echikson, 2005).

What Hinders Organizations?

Barriers

There are various barriers to innovation within organizations. The top three, according to the *AMA/HRI Innovation Survey 2006,* are insufficient resources, the lack of a formal strategy for innovation, and a lack of clear goals and priorities. Also important are organizational structures that just aren't geared to enhance innovation.

In a similar vein, a Conference Board study of 100 firms, primarily from the U.S. and Europe, looked at barriers to innovation success and found that among the most commonly cited ones were a lack of organizational alignment (52%), insufficient resources to pursue new ideas (51%), no formal innovation strategy (49%), and a lack of goals and measures (44%) (Troy, 2004).

Traps

There are also common "traps" that organizations fall into that curtail innovation, according to innovation experts Liisa Välikangas of the Woodside Institute in California and Michael Gibbert (2005) of Bocconi University in Italy. They describe these common traps:

- The "performance" trap occurs either when a company is doing well and neglects to explore other opportunities because of the disruption, time or financial commitment they pose, or when a company is having difficulties and retreats to short-term measures instead of long-term solutions.
- The "commitment" trap occurs either when a company overinvests in one opportunity, which makes turning back expensive and embarrassing, or when a company is tentative about an opportunity and requires continual research, analysis and testing which delay arriving at any real results.
- The "business model" trap occurs when a company pursues innovations requiring competencies that are very different from those that are available, or when the current business model provides revenues that translate to a disincentive to make a change.

Another possible innovation trap is the short-term mindset. Some observers claim that the trend toward financing mature, established technologies rather than the speculative, more innovative ones may create a dangerous innovation void. "Over the years, the financial community has pushed for shorter-term results," says Peter Garcia, CFO at Nanosys, a nanotech startup firm. Meanwhile, firms doing research with potential long-term impact are often finding that there's a lack of funding for such projects (Huang, Lok & Rotman, 2005, p. 36). If companies never shoot for anything more than incremental innovations, they may well find themselves swamped by truly breakthrough innovations when they do come along.

Characteristics of an Innovative Culture

The AMA/HRI Survey, *combined with a literature review, clearly shows that an innovative culture has various characteristics. The ability to focus on customers is viewed as the top-ranked factor for developing an innovative culture, according to the survey. This is no surprise given that other sections of the survey show that customers are the number-one driver of business innovation.*

While the innovation literature shows a focus on customers, it also indicates that this focus alone does not guarantee that a culture will be innovative. Current customers may not see the possibilities of major technological paradigm shifts and may have few insights into how companies can expand into new markets with a very different set of customers.

So, organizations also need to have enough resources, teamwork, communication, autonomy and other qualities to allow innovations to flourish. The table below illustrates a range of influences ranked according to the importance that the AMA/HRI respondents assigned to them. In this section, we examine the role that many of these factors—and some additional ones that show up strongly in the literature review process—play in shaping innovation-friendly organizational cultures.

Factors for Developing an Innovative Culture, by Rank

Factors	TODAY	In Ten Years
Customer focus	1	1
Teamwork/collaboration with others	2	2
Appropriate resources (time and money)	3	6
Organizational communication	4	3
Ability to select right ideas for research	5	4
Ability to identify creative people	6	5
Freedom to innovate	7	7
Ability to measure results of innovation	8	8
Encouraging both small ideas and big ideas	9	9
Innovation accountability/goals	10	10
Culture of risk-tolerance	11	12
Organizational structures	12	11
Diversity	13	13
Balancing incremental improvements and breakthrough discoveries	14	14

Source: AMA/HRI Innovation Survey 2006

Customer-centricity

Current and potential customers have always driven innovation in companies in the modern age, but today's organizations are taking the idea of focusing on customers to a new level by "capturing" their ideas or actually allowing them to innovate on their own behalf.

Some companies look to "lead users" or "luminaries" to help them innovate. GE's healthcare division, for example, calls upon published scientists and doctors from well-known institutions to attend advisory board sessions, where discussions of technological advances can lead to new GE products. BMW has reached out to customers via a toolkit on its Web site that allows customers to propose and expand new ideas. "Not only is the customer king: now he is market-research head, R&D chief and product-development manager, too," sums up *The Economist* ("The Rise," 2005, p. 59).

"Tapping into the innovativeness and imagination of customers…can generate tremendous value," says Harvard Business School Professor Stefan Thomke. He recommends encouraging customers to design what they want with state-of-the-art software. "It could generate innovations that suppliers simply cannot imagine today" ("Speeding Up," 2004, p. 8).

Some companies are also working to create new products and services geared more to the individual tastes of customers. In what has been coined a "mass market mutiny," customers are clamoring for a host of personalized products that companies allow them to create. Such customization has become a trend in the clothing, music and telecommunications industries. Research by the consultancy Brand Keys suggests that between 1997 and 2005, the relationship between customization and brand loyalty grew fivefold (Laue, 2005).

And then there's the trend toward "design thinking," an increasingly popular notion for boosting growth and innovation. The idea is that we are evolving from a "knowledge economy" to an "experience economy." This new economy is increasingly customer-centric and focused on delivering not just goods but "experiences" to customers. Successful firms will be those that can deliver better customer experiences by using empathy skills to build new brands or develop new consumer experiences using established brands (Nussbaum, 2005).

There's little doubt that as new business models arise and new technologies emerge, organizations will find other ways of gaining new customers and involving current customers in the innovative process.

Teamwork and Collaboration

Both the *AMA/HRI Survey* and the research literature review show that teams and work groups are critical in terms of their ability to encourage and support innovation. Of course, not all work groups are created equal. They're most likely to be innovative when they're able to integrate people with diverse perspectives and allow them to effectively swap ideas and expertise (McLean, 2005). Cross-functional teams may be especially good at arriving at new ideas that are both innovative and practical.

Teams probably won't be successful unless they have the support of leaders who provide them with clear goals and necessary resources. On the other hand, poor leadership can be very damaging to teams. One recent study examined how well cross-functional new product development (NPD) teams are supported. These cross-functional groups typically include representatives from R&D, design, engineering, manufacturing, marketing and key customers and vendors. The survey of

269 product development managers at U.S. and Canadian manufacturers found that NPD team managers often believe that the teams will usurp their power, and there's sometimes a lack of commitment and communication when it comes to such teams (Boyle, Kumar & Kumar, 2005).

The Need for Diversity

The most creative teams are drawn from diverse backgrounds, says Michael West, professor of organizational psychology at Aston Business School. West says such teams bring diverse skills and knowledge to projects, offering many creative solutions to problems because they approach such problems with different perspectives (Glover & Smethurst, 2003). Team diversity can also help companies improve their focus on customers. When diverse employees relate to diverse customers, companies can tap into new product ideas and markets (Lockwood, 2005).

Tania Aldous, a manager in the global consumer design department of Whirlpool Corp., says that if employees are to work on cross-functional teams, "We need diversity of thought, various perspectives and cultural heritages." It is important not to "bring in all clones," said Robert Sutton, a professor at Stanford University and author of *Weird Ideas That Work: 11½ Practices for Promoting, Managing and Sustaining Innovation* (Pomeroy, 2004, p. 50).

Michael West cautions, however, that teams made up of people from diverse backgrounds can generate conflict, and they must be well managed to make sure such conflict remains constructive (Glover & Smethurst, 2003). So, the bottom line is that teams and teamwork are important to innovation, but they require skilled leadership to make them as effective as they should be.

Internal and External Collaborations.

More innovation occurs through collaboration and community than through the inventive thinking of a single mind, according to Andrew Hargadon, author of *How Breakthroughs Happen: The Surprising Truth About How Companies Innovate.* Hargadon contends that most new ideas are adapted from existing ones, a concept he calls "recombinant innovation." What's more, ideas can spring from even casual encounters that expose one to a new perspective as easily as they can from concentrated teamwork. His book explores other theories that support the value of community, too, such as the concepts of "serious play" and "communities of practice," in which companies purposely create internal networks to foster knowledge-sharing and creative thinking (Kleiner, 2004).

Collaboration occurs both within organizations and among them. These days, only slightly more than half (55%) of innovation is generated internally. Organizations are tapping academia, the government and other firms for fresh ideas, according to the 2004 *Making Innovation Work* study by The Conference Board. That survey found that organizations seek innovation through collaboration with universities, private R&D labs and government agencies and through participation with consortia. Such "open innovation" is expected to strengthen as firms continue to diversify their innovation portfolio (Troy, 2004).

Companies with R&D located in the U.S. seem particularly interested in collaborations based on alliances. There have been relatively large increases in "participation in alliances and joint R&D ventures" in recent years. In fact, 61% of surveyed companies expected to increase their participation in those endeavors in 2006, according to the IRI's 22nd annual *R&D Trends Forecast* (Ayers, 2006).

Sometimes companies collaborate through investment. Companies that do not want to risk trying to achieve their own breakthroughs find ways to invest in other creative but risky firms by providing some of their start-up capital or by buying these companies once they prove the value of their ideas. Real-options reasoning provides valuable insight into how flexible commitments can be made to fund breakthrough research projects by taking the investments of large companies and spreading them across many path-breaking smaller firms in the hope that some of them will succeed (McGrath, 1997).

But whether collaboration is among companies or individuals, the differing backgrounds that parties bring to the table can often produce friction or conflict that erodes trust. Cultural differences must be taken into account. If properly channeled, such conflict can benefit the innovation process. The collaborating entities must focus on their commonalities, such as goals and challenges, rather than their differences, although properly managed friction can serve as a catalyst for productive change (Hagel & Brown, 2005).

The Right Resources

The *2006 AMA/HRI Survey* showed not only that "appropriate resources (time and money)" was among the top factors for developing a culture of innovation but also that "insufficient resources" was the most widely cited barrier to innovation.

Top-Ranked Barriers to Innovation*

Barriers	Rank
Insufficient resources	1
No formal strategy for innovation	2
Lack of clear goals/priorities	3
Lack of leadership/management support	4
Short-term mindset	5
Structure not geared toward innovation	6

**Seen by 10% or more of respondents as the number-one barrier in their organizations.*

It's not true, however, that more is always better. Having too few resources hinders innovation, but having too many might also be a kind of obstacle (McLean, 2005). Employees with long spans of time in which to come up with results may lose motivation. The right balance of money is important, also. Too

little, and employees have to devote time and energy to seeking other resources. But too much (beyond the "threshold of sufficiency") has not been shown to have a positive effect on creativity (Troy, 2004).

This rule applies to research and development as well. A recent Booz Allen Hamilton study found that "there is no relationship between R&D spending and the primary measures of economic or corporate success, such as growth, enterprise profitability and shareholder return" (Jaruzelski, Dehoff, & Bordia, 2005). On the other hand, the same study shows that spending too little on R&D can hurt corporate performance.

Communication

A truly creative culture tends to be distinguished by open communication and the free exchange of ideas (McLean, 2005). This means communication among different parts of the organization, among team members, and up and down the corporate hierarchy. Communicating means not only sharing ideas but also sharing the lessons learned from failures and successes. Ways to enhance communication include more inclusive meetings, better online tools for sharing knowledge, cross-functional assignments and more brainstorming sessions (McGregor, 2005).

The most suitable type of communication—e.g., via technology or face-to-face meetings—will often depend on the type of collaboration needed to solve problems that call for creativity (Sonnenburg, 2004). In situations where an organization is trying to develop more radical innovations (or find more radical solutions to problems), collaborators are often friends or partners who need to communicate on a more personal level. In other situations, technology-mediated communication is probably sufficient.

Communication also includes story-telling. This means telling both inspirational and cautionary tales. After all, stories about why ideas fail might be as valuable a source of learning for businesses as stories about success. Without examining why ideas fail, valuable lessons that might be learned are lost, according to Jerker Denrell, assistant professor of organizational behavior at the Stanford Graduate School of Business (Wagner, 2005).

An Ability to Select the Right Ideas

Fully 96% of all new innovation initiatives fail to at least meet return-on-investment targets ("Creative," 2005). While having an idea-sharing culture in place is part of the profile of innovative firms, the bigger challenge may lie in having the right processes in place to quickly cull through ideas and select those to shepherd through to fruition.

But there is no obvious strategy for selecting or even evaluating ideas. Nearly half (48%) of the AMA/HRI respondents reported that they "don't have a standard policy for evaluating ideas," by far the largest response to a question on this subject. The next most common responses? About 17% said they use an "independent review and evaluation process," while 15% said "ideas were evaluated by the unit manager where the idea was proposed."

Percent Using These Approaches to Evaluate Ideas in Their Organizations

Approach	Percent
There is no standard policy for reviewing and evaluating ideas	47.6%
There is an independent review and evaluation process for ideas	16.5
Ideas are reviewed and evaluated by the unit manager where ideas were proposed	15.4
Ideas are reviewed and evaluated by the unit that would be impacted by the ideas	12.6
The employee is responsible for starting and managing the review process	7.6

Some experts contend that the best way to sort through multiple options in the pursuit of innovation is to create a defined portfolio of innovation approaches. This allows a company to balance different types of innovations—such as incremental and breakthrough—in order to maintain a healthy range of selections.

Some companies vest their employees with the responsibility to "sell" their own ideas. Whirlpool Corp., for example, encourages innovation teams to pursue new ideas by creating a business case and applying $25,000 in funding to quickly prove its worth. The low-budget, quick-turnaround method is a far cry from the big-dollar projects of Whirlpool's past and was designed to generate "radical and low-risk" ideas (Pomeroy, 2004). Whirlpool also uses an "i-pipe," or online idea pipeline, where ideas are shepherded through the process by trained i-consultants and i-mentors that help employees to work as part of an innovation team. Surveys, business plans, focus groups and brainstorming sessions are all tools that might be utilized to manage the project. Separate teams may nurture an idea through the research, development and implementation phases, as well (Pomeroy, 2004).

American Family Insurance Group, too, gives peer groups the vote for determining the feasibility of new IT projects. IT code writers are encouraged to develop prototypes quickly without heavily investing time and effort to demonstrate what a new application might accomplish. Depending on colleague reaction, the project might get approved for code development (Ulfelder, 2005).

Technology plays an important role in idea evaluation as well. Some organizations are bypassing physical models and using Web-based simulations or rapid prototyping to test designs (Shelton & Davila, 2005). Among the advice from the UK business school Henley Management College is to use technology solutions such as computer or mathematical simulations to evaluate ideas. And when it comes down to decision time, it's recommended that companies ask questions from a commercial perspective. Identifying the problems that will need to be addressed in order to implement the idea is one of the key decision points (Henley, 2005).

All in all, the ability to make quick decisions and to move from idea to action appears to be a key determinant of successful innovation. According to Patrick Kulesa, global research director for ISR, "Successful innovation companies excel at setting the stage for generating new ideas, and also have the business discipline and processes necessary to take those new ideas to market" (Kulesa, 2005, p. 41).

Creative People

Companies need creative people, of course, but it's a myth that innovation stems only from a small cadre of "creatives" (Breen, 2004). In fact, when it comes to creativity, there are few areas of human activity where we all start out so equal, according to Kristina Murrin, managing partner of the What If consultancy (Glover & Smethurst, 2003). Some experts say that creativity is, to a large degree, a trainable skill.

Still, it's true that people who are prone to invention do tend to share certain traits or habits, notes Murrin in her book *Sticky Wisdom.* For example, they have a stimulating life outside of work that triggers creativity, they use prototypes to bring ideas into reality, they often "go their own way," they communicate and are open to ideas, and they have the courage to express new ideas (Glover & Smethurst, 2003).

Some of these observations may be borne out by history. Creative people such as Edison, Shakespeare, Mozart, Einstein and Darwin had wide-ranging interests and ideas that allowed them to innovate in their fields. They also had the courage of their convictions. They suffered various failures but eventually brought finished projects to fruition (Sutton, 2004).

Of course, the corporate environment plays a large part in helping people live up to their creative potential. The freedom to fail without heavy penalty can, for example, be a powerful support to eventual success. So can the physical environment of the workplace. What If research claims that the physical environment stimulates eight out of 10 new ideas, with creativity triggered by something immediately visible to the employee (Glover & Smethurst, 2003).

So, not only do employers need to recruit and retain creative people, they need to provide training in creativity and set up work environments that stimulate creativity in all employees.

Freedom and Risk-Tolerance

The autonomy to work toward goals is an important feature of an innovative culture. This does not necessarily translate, however, to the autonomy to *decide* those goals. Research conducted by Professor Teresa M. Amabile of Harvard University shows, in fact, that employees' creativity is enhanced when their goals are clearly specified and they're granted freedom to pursue those goals by whatever means they decide. Too much control can impede creativity and innovation.

Laird D. McLean combed through the research of innovation experts and concluded that several types of control can inhibit creative performance. "It could be control in decision making, control of information flow, or even perceived control in the form of reward systems that put too much emphasis on increasing extrinsic motivation" McLean (2005).

Organizations must also be willing to allow a certain amount of risk-taking. Risk implies the danger of failure, but innovative companies know that failure is as essential a part of the growth process as success. Organizations that understand risk-taking is necessary make that message come alive through their employee communications, their idea-sharing and evaluation processes, their recognition programs and their reward systems.

Managing employees in a way that encourages innovation requires leaders to acknowledge and reward risk-taking behaviors—not just successful outcomes. John Sweeney, author of *Innovation at the Speed of Laughter,* suggests managers use techniques such as initially welcoming all ideas without first judging them, creating an atmosphere where opinions can be freely shared, and reinforcing the value of employees' contributions by acting on them ("Employee Innovation," 2005).

Ways of Measuring Results

Innovation and its impact can be measured in a number of ways, though none of them is perfect. The top-ranked measurement type, "customer satisfaction," isn't a major surprise given the high ranking of customer-related factors in all parts of the *AMA/HRI Survey.* But it's interesting to see how much more important respondents consider it compared to measures such as "innovation as a percentage of profits" or as measured in terms of "intellectual property." On a 1 to 5 Likert scale, where 5 is extremely important and 1 is not important, "customer satisfaction" received a whopping 4.36, compared with just 3.40 for "innovation as a percentage of revenues and profits" and 3.07 for "intellectual property."

Relative Importance of Ways of Measuring Creativity and Innovation

Measurement Types	Rank
Customer satisfaction	1
Market share	2
New products/services/processes produced	3
Financial impact of ideas submitted by employees	4
Innovations as percent of revenues and profits	5
Spending on research and development	6
Spinoffs/new operations based on new products	7
Intellectual property (e.g., number of patents)	8

It's interesting to see how these data compare with other recent research, which looks less at the importance of innovation measures and more at their degree of usage. Only about half of the fast-growing U.S. businesses (48%) have tried to link innovation to a measure of success, according to results from PwC's

Trendsetter Barometer. Of those that made the effort, the most common measures included "overall revenue growth" (78%), "customer satisfaction" (76%), "revenue growth from new products/services" (74%), "productivity increases" (71%), "earnings" (68%), "recruitment/retention" (34%) and "market capitalization" (17%) (PricewaterhouseCoopers, 2005).

A 2004 Conference Board study found that to track the success of employee innovations, respondents used measures such as "total number of employee ideas submitted annually" (76%), "financial impact of implementing employee ideas" (76%), and "percentage of ideas implemented" (56%).

The Conference Board survey also found that respondents said measures related to innovations (e.g., patents, R&D spending as percent of sales) were the most useful, followed by financial measures (e.g., sales, market share), process measures (e.g., time to market, fulfillment speed) and people measures (e.g., performance-based awards) (Troy, 2004).

Some experts (Muller, Välikangas & Merlyn, 2005) say innovation should be measured through three different lenses: (1) the resource view, which analyzes inputs such as capital, talent and time with factors such as percent of workforce time invested in innovation, number of employees with entrepreneurial experience or percent of capital dedicated to innovation-related activities; (2) the capability view, which measures inputs through the number of innovation tools, the percent of employees with innovation as a key performance indicator, and the percent of employees receiving training in activities related to innovation; and (3) the leadership view, which measures inputs through percent of executive time invested in innovation versus operations or percent of management team trained in the use of innovation tools.

It's clear that companies have many options when it comes to trying to measure innovation. Their choices will depend on their industry, their experience at using such measures, and their ability to make each measure as accurate as possible. The literature suggests, however, that many companies could do more in the area of measurement than they currently do.

An Ability to Balance Incremental and Breakthrough Innovations

While radical or breakthrough innovations can reap handsome financial profits, the largest percentage of revenue is still more likely to come from incremental innovation. Balancing efforts to capture the advantages of both can be a wise but challenging goal for organizations to pursue.

Some research suggests that executives expect a growing percentage of future innovations to come through breakthrough, rather than incremental, innovations (Troy, 2004). That's understandable given that companies that can leverage more radical innovations can realize huge financial gains. Clayton Christensen, author of *The Innovator's Dilemma,* conducted a review of innovations and found that, in 2000, 37% of the companies that were leaders in terms of providing a "disruptive" innovation—such as computing via cell phones—exceeded $100 million in rev-

…the ability to foster creativity and innovation is among the top competencies required of leaders today, and this ability will become considerably more important over the coming decade.

—AMA/HRI Leadership Survey 2005

enues. In contrast, just 3% of organizations attained such revenue levels if they were in already established markets (McLagan, 2002).

And, for firms in the high-tech sector, while next-generation innovations represent only 14% of product launches and 38% of revenue, they still bring in 61% of profits, according to a study by *Harvard Business Review.* The study also showed that while incremental innovations account for 62% of revenue, they bring in only 39% of profits. Gregory C. Tassey, senior economist at the National Institute of Standards & Technology, said, "We should invest more in next-generation technology" (Rovner, 2003).

Leadership and Accountability

Not only is leadership crucial to innovation, the reverse is true as well. In another AMA/HRI survey, *Leadership Survey 2005,* it was found that the ability to foster creativity and innovation is among the top competencies required of leaders today, and that this ability will become considerably more important over the coming decade (American Management Association and Human Resource Institute, 2005).

So, what are the most important roles leaders play in spurring innovation? The *AMA/HRI Innovation Survey 2006* found that the single most widely selected action that leaders take is "developing an organizational strategy for innovation," followed by "redesigning organizational structure or workflow" and "increasing employee involvement." In a nutshell, leaders are expected to shape the organization and the overall management philosophy to make sure innovation can thrive. They must set up systems that regularly encourage innovation.

Too often, however, leaders have the opposite effect in organizations, inhibiting or disrupting innovations by setting up bureaucratic barriers, squashing creative ideas before they're given a fair chance, or trying to take charge of development teams instead of giving the necessary autonomy. The AMA/HRI Survey found that "lack of leadership/management support" is a significant barrier to innovation, as is "no formal strategy for innovation," "lack of clear goals/priorities," and, as mentioned before, "insufficient resources." In each case, top leaders have the power to build up these barriers or remove them.

So, who is responsible and accountable for innovation in an organization? Some companies have specifically designated leaders for this. In fact, about 40% of firms have someone to fill the role of "chief innovation officer," though this respon-

…more and more organizations are seeing that creativity and innovation are not the exclusive province of a small group of employees. Many are working to change their corporate cultures to make innovation everyone's job.

—Troy, 2004

sibility may reside with officers with a range of titles, from head of R&D to vice president of global innovation (Troy, 2004).

But more and more organizations are seeing that creativity and innovation are not the exclusive province of a small group of employees. Many are working to change their corporate cultures to make innovation everyone's job (Troy, 2004). This, of course, means finding ways to encourage innovation and hold people accountable without making them risk-averse. Figuring out ways of doing this well is likely to remain a significant organizational challenge in coming years.

Motivation and Reward Systems

What are the most effective means of rewarding employees for innovation? The answer is a matter of debate. Some experts argue that if companies focus too strongly on providing employees with extrinsic rewards such as bonuses, they risk destroying employees' intrinsic motivation. This viewpoint is based on empirical research showing that "following reward, individuals often spent less time performing an activity and stated they like the activity less, as compared to a control group that performed the task without reward" (Eisenberger & Shanock, 2003, p. 123). Experiments have shown that this sometimes applies to creative tasks.

On the other hand, other social researchers have arrived at contrary conclusions. In one case, for example, students who had been promised a reward for inventing creative story titles were found to be more creative than those who were given the same instructions without the promise of a reward. Eisenberger and Shanock looked at the research and concluded that "encouragement of creativity, in the form of tangible and socioemotional rewards, strengthens creative motivational orientation" (p. 128). This implies that that employers can effectively use traditional reward systems to motivate employees to act more creatively in the workplace and that rewards don't necessarily reduce intrinsic motivation.

That's good news in light of the fact that many employers engage in some type of reward and recognition system at work. The AMA/HRI Survey found that the most commonly cited forms of rewards are nonfinancial, as the following table demonstrates:

Reward and Recognition Practices

Type of Practice	Percent
Innovation is not rewarded in this organization	26.0%
Innovation is recognized with nonfinancial rewards	20.9
Innovation often leads to more challenging work and/or autonomy	19.3
Innovation is rewarded by individual bonuses and/or salary increases	17.6
Innovation is considered in promotion decisions	9.2
Innovation is rewarded through team bonuses	4.4
Innovation is rewarded with larger staff and/or budgets	2.0

If companies do decide to use financial rewards such as bonuses for innovation, they should recognize that there may be a fine line between too much and too little. Stanford Professor Antonio Davila says the issue can be controversial. Some experts say that the bonus can become a larger focus than the innovation itself for some employees, while others feel the absence of financial incentives will dampen motivation. In one survey, Davila found that bonuses averaging about 30% of pay seem to be optimal, depending on the complexity of the project. All in all, recognition seems to be as important a motivator as financial incentives when it comes to innovation. (Pomeroy, 2004)

State-of-the-Art Innovation

In order to depict what could be considered a state-of-the-art organization in terms of innovation, we've created a theoretical "ideal company" that encompasses many of what strike us as "best in class" innovation practices. The Composite Theoretical Company, or CTC, is based on a review of the literature on creativity and innovation, on data from the AMA/HRI Innovation Survey, *and on a series of interviews with corporate leaders about their practices. However, it should be noted that every company is different. Not all aspects of CTC's program may be applicable in all cases. The purpose of this section is to help companies generate ideas on how best to make themselves more innovative.*

The Composite Theoretical Company 2006

The Composite Theoretical Company is a large, Fortune 1000 corporation known for its ability to innovate across all of its internal and external functions. CTC views innovation as something that occurs within its products, services, and business operations.

The Role of CTC's Leaders

CTC's leaders create an overarching strategy for innovation, and they work hard to make sure that their organizational structures and processes stimulate rather than impede innovation. They provide the necessary resources and—taking into consideration both intrinsic and extrinsic motivation—recognize and reward innovation. They know employees need to be constantly encouraged to develop and share new ideas. CTC's leaders also model the desired behaviors that they seek from their employees, and they make themselves readily available to consult to teams and individuals seeking to conceptualize, develop or implement an innovative initiative.

Leaders ensure the company has the right metrics in place to keep track of the company's progress. Not only do they rely on customer satisfaction and engagement surveys, they use a range of other metrics and analytical tools such as breakeven analysis, discounted cash flow analysis, the number of new patents per year, R&D-to-sales ratios, earnings per share, and time to market. They also track and proactively respond to turnover rates in order to ensure that they have a workforce that is composed of associates with the right skills and abilities. "We have an innovation scorecard set up for the whole corporation as well as for individual businesses. This helps us make strategic decisions and set innovation goals, which we take very seriously around here," notes CTC's CEO.

CTC's leadership also stresses organizational communication, cross-functional collaboration, and employee participation. "We know that teams need considerable autonomy to innovate well, but we also have to make sure people are goal-oriented, so we've set up systems to help us achieve this balance," says CTC's CEO. "We try to maintain a culture where a diversity of backgrounds and perspectives is valued so we can avoid the kind of groupthink that often kills innovation. And we try to find the balance between big ideas and small ones. We're increasingly shooting for breakthrough innovations but are making sure we do the bread-and-butter incremental stuff as well. We are seeking a balance that ensures both today's and tomorrow's ultimate success."

A Culture of Innovation

CTC sees itself as having a culture that thrives on innovation, creativity and intelligent risk-taking. Taking a page from a number of other innovative companies (Battelle, 2005; Stevens, 2004; Deutschman, 2004), CTC encourages many of its employees to spend a portion of their time—somewhere around 10%—pursuing speculative ideas and business concepts that they think will help its customers and shareholders. The idea is to generate ideas and concepts that stretch the current boundaries of existing product lines or are on the cusp of new lines of product evolution.

Researchers are highly networked and often pitch in to help with one another's "spec projects," as they're informally called. CTC also encourages employees to formally present new ideas once they've reached the stage where they seem feasible. If a researcher is able to gain enough support, an idea will move into the formal pipeline so it can be given more resources and developed further. CTC recognizes the advantage of maintaining an environment that stimulates many ideas and prevents the "untimely death" of embryonic ideas that may someday have a high payoff. Projects that are not selected are positively viewed as a learning experience and a potential launch pad for future ideas.

The company provides in-house experts whose primary role is to coach and mentor an employee or team through all aspects of their spec projects. The role of these experts is to assist in bringing a project from conception through to implementation. They provide guidance in finding experts who can expound or test the innovative concept, process or product. CTC also has organizational development facilitators who are skilled at helping cross-functional team members work together efficiently.

In addition, CTC emphasizes collaboration and communication among departments and divisions. There are knowledge management systems that help employees find experts within as well as outside their organizations who can assist on research projects. And idea management systems are available to all employees to feed ideas to those working on projects. There is also a page on the corporate intranet where people showcase projects on which they're working. These are aimed at helping employees informally connect with those who share common interests.

CTC uses training and orientation programs to foster its innovative culture. Associates are trained in the meaning of innovation and how to develop an idea into a product. Other important training programs include project management, communication skills, team formation, and the navigation of innovative ideas through the corporate structure.

Such training,and the culture as a whole emphasize that the management of innovation is a genuine discipline with real processes. Those processes are not always run identically or without disagreement, but everyone shares a similar mindset about how the overall system operates. CTC also trains people in appropriate risk-taking, innovation tracking tools and modern ideation techniques (Hipple, 2005). Managers and supervisors are trained in how to create an innovative work environment.

Even while recognizing the individual contributions of certain star players, CTC's experience is that innovation most frequently stems from group efforts. Therefore, the company teaches and otherwise cultivates group dynamic effectiveness while guarding against groupthink. Diversity of opinion is encouraged, but internal debates are tempered by an emphasis on loyalty, trust, and respect. CTC also assists team members in knowing their own innovation-thinking styles.

CTC adopts various practices to inspire internal creativity. These include boundary-spanning exchanges, multiple channels to gain support for new projects, funding for exploratory initiatives, professional exchanges, the creation of support networks, innovation conferences, sabbaticals, and the rotation of assignments.

Among the most common extrinsic rewards are stock options. CTC also has a career track specifically geared toward scientists and engineers, one that runs parallel to the management track and is often used for people who have successfully brought an important project to completion.

CTC's Portfolio Approach

CTC uses a process called "portfolio management" to manage innovation. This process helps CTC allocate potentially scarce resources in alignment with strategic goals. It helps CTC balance projects in terms of various parameters such as risk vs. return and short-term vs. long-term. This enables CTC to evaluate, prioritize and select projects. Existing projects can be accelerated, killed or de-prioritized using this system.

One of the most important aspects of the portfolio management process is setting the criteria for making go/no–go decisions. Companies often find they are faced with too many projects for the limited resources available and no one is willing to make a "kill" decision. By tying such decisions to innovation scorecards and feasibility studies, CTC makes such decisions in a systematic way. "No-go" projects are evaluated for potential licensing opportunities. CTC has an internal staff devoted to intellectual property (IP) issues. They contract IP help as necessary and support the company's goal of bringing in a minimum of $1 million a year in royalty revenues.

Another key aspect of portfolio management is that it allows the opportunity for people working on spec projects that could have some commonalities to be brought together to share ideas and other information. This is especially important because CTC has thousands of employees located around the world.

CTC's portfolio system allows it to categorize innovation in a number of ways, such as "incremental vs. breakthrough" or "product vs. service." It can also look at innovations by division, research group, and other organizational classifications. The section below describes five of its major categories, each representing a different way to innovate. Although the lines sometimes blur between these approaches, CTC has found these categories useful.

Five Approaches to Innovation in CTC

In order to help gain a better perspective on how innovation works, CTC carries out a variety of exercises and analyses recommended by innovation experts. For example, CTC studies past patent trends in order to see patterns of technological evolution. This has helped the company see the "big picture," identify major disconnects and see new opportunities for applying established innovations in one area to other areas where they haven't been used before. It also works hard to anticipate major changes in breakthrough or disruptive innovation so that it isn't caught off guard by new developments.

1. Customer-Driven Innovations

CTC uses a variety of techniques to generate customer-based innovations. Not only does it survey customers and conduct customer focus groups, it also involves cus-

tomers directly in the innovation process. In some cases, CTC closely follows what its "lead users" are doing. These are customers who are pushing the envelope in the use of one or more of its products, using them in ways that are unexpected and that may anticipate new design features. It also maintains an awareness of its competitors for customers, their commercial activities and their intellectual property activity.

For some of its products, CTC also provides Web-based tool kits to customers, giving them the chance to conduct their own experiments to see which design features best suit their needs (Thomke & von Hippel, 2002). In this way, customers essentially become directly involved in the innovation process and can "test" their ideas anytime no matter where they are.

In recent years, CTC has also used an anthropological approach to customer innovation, which essentially means closely observing customer behaviors. "Very often," says a member of CTC's research group, "customers will say one thing and do another. We need to know what they're actually doing with a product in order to improve on it." CTC occasionally uses video techniques to capture in detail how customers use their products. This provides insight into necessary product modifications and new product ideas. CTC also has anthropologists and social psychologists on staff in order to help the company better understand its customers, what customers really want in terms of design and usability, and the degree to which CTC's internal culture maintains its innovation focus.

CTC makes sure customer-focused employees such as salespeople communicate well with designers and researchers. For example, it's not unusual for an engineer to travel with a salesperson to see the customer use a product and watch the interaction of the customer, salesperson and product. "Real-world" learning is viewed as critical. CTC even offers its engineers training to help sensitize them to become better at relating to customers and non-engineering colleagues.

Of course, determining what customers want, and what they may want in the future, is just the beginning. Any potential innovations—customer driven or otherwise—have to be realistic and cost-effective. That's why—depending on the type and magnitude of the innovation—experts from manufacturing, finance and other disciplines can become key players in the process. They help provide data about what it will take to get a potential product made and what the true costs will be.

Marketers can help the company determine the market potential of a proposed innovation, and HR helps assess whether the organization has people with the appropriate skills to carry out the innovation, whether labor could be contracted out, and what the labor costs would be. In the end, a cross-functional team determines whether the innovation is feasible and should proceed into development. Sometimes outside experts are brought in to provide other perspectives.

A more streamlined approach is taken if the innovations are deemed to be incremental and "small impact," meaning that they are relatively minor tweaks that aren't expected to have a large impact on sales, manufacturing, or any other critical factor.

All CTC business units are encouraged to hand out small ($5,000 to $25,000) start-up innovation grants to teams whose ideas are viewed as feasible. These smaller grants usually go to incremental innovation ideas that are often inspired by customer needs and desires.

2. Process-Improvement Innovations

At CTC, innovation is sometimes driven by process changes, especially in the form of quality and efficiency improvements. Six Sigma, for example, is a measure of error rate in the manufacturing process, and CTC has expanded its use into other areas to boost productivity and delivery times (Studt, 2003). To improve product quality through its manufacturing process, for example, CTC has made innovations in both its production facilities and processes as well as its product designs.

CTC also engages in benchmarking, reengineering, and x-engineering in order to modify and sometimes even overhaul business processes. It sometimes benchmarks best practices within and outside its industry by comparing financial measures such as return on equity and economic value added. This information helps CTC decide whether it needs to examine and adjust its processes, because CTC understands that benchmarks are a better tool for "catching up" than for innovation.

CTC employees are central to such improvements, of course. The firm conducts training to ensure that everyone from engineers to workers on the line has a requisite degree of knowledge about process improvements. In fact, continuous improvements are expected of all units. CTC's performance management system includes goals that measure and reward innovation. Because everyone shares a common language, CTC has made tremendous advances in areas that some experts would term incremental innovation.

Some process improvements involve the end-to-end flow of materials or information. Other types of improvements focus on keeping the system dynamic and responsive to customers and changing market conditions. Therefore, process innovation can be both "business" and "technical" in nature.

CTC is aware that some types of process management programs don't mesh well with other types of product development. As Management Professor Michael Tushman of Harvard Business School noted, such programs "can actually get in the way of things that are more exploratory" (White, 2005). CTC's managers try to ensure that they do not over-reward or overemphasize incremental improvements in ways that would make people resistant to bolder, long-term innovations. CTC's leaders consider the balancing of different innovation strategies to be a core CTC competency.

3. Breakthrough Innovations

CTC pursues breakthrough innovation initiatives that enable the company to shape the market. These products and services often provide the largest profit margins in the company, particularly right after launch. Yet, these greater rewards come with a higher risk, so CTC has developed a planning and review process to ensure that this risk is managed effectively. CTC's multi-stage innovation process aims to stimulate breakthrough ideas, fail fast, learn often, and achieve on-time profitability.

Ideas for breakthrough innovations have many potential origins: associate ideas, the study of patterns of product and technology evolution, basic research founded on new ideas from the larger scientific community, universities with which

CTC has formed relationships, basic-research collaborations that CTC has formed with other companies, and occasionally customer research. A number of breakthrough innovations also stem from the "spec projects" that emerge from associates who devote a portion of their work time to pursue their own ideas.

CTC uses a modified version of what's commonly known as a stage-gate system. A "stage" is when part of the innovation process occurs. A "gate" is a checkpoint at which decision-makers determine if the project should be killed or not. The following is a brief description of the CTC system, which could potentially have more "gates" than outlined here, depending on the potential of the project and the amount of funding it requires.

Stimulating Ideas, Recognizing Opportunity

This stage is as much about research as it is about innovation. It works best when it is separated from ongoing business activities. Initial research funding often comes from a combination of corporate and other external resources. Creative scientists, opportunity recognizers, and project team leaders and members all play a part at this point in the process. They have one thing in common: a passion for, and belief in, a potential innovation. This passion protects the innovation from organizational forces.

Often, it is a creative scientist who is able to link disparate bits of information together that help the idea grow. CTC evaluates on the potential of a major technical breakthrough rather than on a business case. But once a concrete product idea has emerged and a new product development (NPD) team can be assigned to it, it goes to the next stage.

The Feasibility Stage

At this stage, CTC works to balance hopeful projections with some reviews and measures. Before an idea moves to the "go"/"no-go" phase, an NPD team must put together a proposal in which they make some risk calculations, do cost estimates, make market penetration projections, and set general timelines. In addition, barriers to entry are evaluated. CTC is aware that second-to-market firms can capture momentum away from market innovators if entering a market is easy.

CTC adopts a combination of quantitative and qualitative analyses in its feasibility studies, but intuition and experience play a role. CTC recognizes that for some truly groundbreaking initiatives, seasoned judgments of proven designers are required. These people sometimes have an intuition about a proposal that carries some weight in its metrics. Despite that flexibility, innovations have to align with organization mission and strategy, or else be considered for licensing.

CTC tries to find the right balance between overanalyzing the market potential for a breakthrough innovation and allowing a project to go on too long, eating up company resources. It keeps in mind the warning of Peter Koen, director of the Stevens Institute of Technology Consortium for Corporate Entrepreneurship: "The thing is, sometimes people try to get into high-risk projects by applying the tools and techniques that they have for incremental or low-risk products. And then they

try to say how much the project is going to make, and they kind of get into this 'do-loop' where a company will say, 'I want you to spend a lot of time and get the financials right,' when in fact, that's really the last thing they should be doing. When you're dealing with high-risk projects, what happens is that once you get into the marketplace and start to sell product, the strategy begins to emerge" (2005).

In the feasibility stage, a cross-functional team works with the NPD team to assess potential and risk. Different functional experts bring business, technical, and operational mindsets to the team. Everyone on this team has experience with innovation, clearly understands the company strategy, and is seen as not having a strong corporate political agenda (Harvard, 2003).

Sometimes it helps to include associates who are especially gifted at identifying potential business partners. These talented people can envision possibilities in products that are in fairly early stages of development, and they can determine which two or three ideas would fit the organization's needs. Some have described these people as good "foragers" who can use their networks to glean important knowledge. They know, for example, when a patent has to be bought for protection of intellectual property and when an alliance will work.

Such cross-functional expert teams have no decision-making authority, and their role is to assist NPD teams to create a feasibility presentation. But, if a cross-functional team ultimately advises the NPD team that a project simply doesn't seem feasible, then the NPD team may itself kill the project. At CTC, it's ingrained in the corporate culture that NPD teams are not expected to bring their projects to the next stage if they can't make a good case, and there's no shame in giving up on a project at this point.

During the feasibility stage, the project is protected from organizational impediments, including challenges from the existing product line leader and established assumptions about the "right" product for the future.

The "Go"/"No-Go" Decision

So far, only the NPD team itself has been able to kill its project. But if, after doing the feasibility study, the team truly believes that the breakthrough project should move to the next stage, then it's required to enlist the help of an executive project champion, get the approval of a decision-making committee, and find funding for the project. This is the ultimate "gate" that potentially keeps it from going to the development stage.

The executive champion helps mediate organizational disputes, cuts through bureaucracy, builds cooperation, and provides funding guidance. If funding can be achieved through operating funds, there is a greater likelihood of approval. CTC is wary of taking on new debt. Multi-year funding can be requested when the vagaries of year-to-year budgeting might threaten project completion. Funding commitments are made considering CTC's specific life cycle as well as industry cycles. It would be foolhardy to fund a project at the height of the cycle and then not be able to complete it as the cycle bottoms.

NPD teams can request funding from a variety of sources, but most funding comes from corporate headquarters, individual business units, or CTC "Bright

Idea" grants. The latter are taken from a pool of resources collected to fund compelling ideas on which business units aren't willing to take a chance because they don't fit current business models well enough. In a few cases, NPD teams have also been able to get financing from other companies that are willing to finance an idea in return for part future ownership or other benefits. This may be in the form of partnerships or joint ventures with suppliers or users.

But only CTC's decision-making committee—which is made up of high-level experts who are as objective and unconstrained by political pressures as possible—can give the final "go" decision after carefully listening to the NPD team, looking over the feasibility study and, perhaps, getting the viewpoints of outside experts.

Once the NPD team has the proper funding and approval, it has the green light to proceed to the next stage. If a project is given the go ahead, members of the NPD team are released from their prior job responsibilities as long as they're needed. Team members are reassigned, or join another team, once their stage of the project is completed.

Development Stage

The development stage kick-off is a major event at CTC. It is a time for the NPD team to celebrate and then to gather new personnel, set time frames, and redouble commitment to making the innovation idea a success. Meeting project milestones and reviews becomes more crucial.

NPD feasibility-stage team members are expected to share their knowledge and experience with new team members to bring them on board quickly and effectively. Some of the new team members are subject-matter experts with whom the team has consulted before and who are now joining the team full time. A large number of design techniques are often used, including rapid prototyping and computer simulations. Researchers try to ensure that new product or service ideas that aren't working will be quickly uncovered.

Roles start to shift as the team makes progress on the innovation. The role of operations increases since 70% of manufacturing cost is dictated by design. (Utterback, 1994) Team members reach out to key suppliers and customers. Once the core research has been worked out, research roles start narrowing on critical technical barriers.

The NPD team operates on several parallel tracks: product development, operational planning, product testing and prototyping, and market development. Joint ventures are explored, suppliers are investigated, demonstration or test sites are identified, and marketing plans start to be defined. As the final product takes shape, the NPD team connects more closely with the larger organization. They communicate more often with those outside the team as they work to establish stronger cross-functional bridges.

Production Stage

Once the product is ready, it receives the authorization to go to the production stage. This is seen as the organizational equivalent of "crossing the Rubicon," as there is no going back. It is time for execution. A decision to commercialize is

finalized and a firm strategy and plan are set and implemented. Exploration and investigation yield to systems, structures, and standards. Features may still be added or removed but the basic design and financial goals are set. Firm plans for staffing, funding, coordination, facilities, market launch, and product schedules are authorized and implemented. When glitches surface, the company uses problem-solving techniques, cost-benefit analyses and quality standards in order restore the project to plan.

Marketing and sales are ramped up as the company targets early adoption customers. Global sales plans become operational as CTC launches a major new product that it hopes will further enhance its reputation as an industry leader.

In the Marketplace

Depending on the exact nature of the product, breakthrough innovations may well continue to evolve once they've gone to market. Because these products are, by definition, unlike traditional products, there's still much to learn. There's going to be some experimenting and testing, and the company is going to analyze how people use the product, what their misgivings are, and how they think it should be modified. As Peter Koen, director of the Stevens Institute of Technology Consortium for Corporate Entrepreneurship, says, "[I]f you get your product to the marketplace in less than perfect form, you'll get marketplace correction" (2005).

4. Business Model Innovations

Many firms become trapped by the assumption that they must conduct business the way they always have. Or, when entering a new market, they assume they have to be structured like competitors. The cost of investing in new resources versus the cost of staying with existing ones can also limit options. Moreover, new business models can require new sets of competencies, making management reluctant or even unable to change business models. Fear of cannibalization of existing resources and loss of revenue can also be very real fears and impediments.

CTC feels that it can be innovative in business models as well as outputs. It defines a business model as "a framework for making money" and "the set of activities that a firm performs, how it performs them and when it performs them so as to offer its customers benefits they want and to earn a profit" (Afuah, 2004).

CTC routinely investigates how its lines of business can use techniques such as licensing, franchising, new distribution channels, shared ownership, leasing, long-term financing and pricing in an innovative manner. It actively examines new business models outside of its industries for concepts that can be adapted to existing divisions or become the foundation for new divisions, strategic business units, or satellite units.

CTC goes through various stages of decision-making and due diligence before adopting new business models. Once an idea is proposed—often by a business leader but sometimes during CTC's employee suggestion process—a cross-functional leadership team examines the projected costs and benefits of launching a new business model. CTC systematically sets goals that are explicitly expressed in

quantitative terms. Different scenarios for attaining the stated goals are analyzed, with the benefits of each scenario being carefully weighed against its costs.

Operations, marketing, manufacturing, human resources, R&D and other functions are included in these meetings so non-financial considerations are included in the analysis. After all, business model decisions have big implications on people, culture, infrastructure and other issues.

The Entrepreneurial Spin

At times, CTC develops good business ideas or products that nonetheless don't seem to fit its current culture or work processes well. Rather than allowing such ideas to languish, CTC sometimes uses spinoff organizations or engages in proactive external licensing.

In one recent example, team members of a new CTC product (which didn't fit well into its current line of products) were given the freedom to create their own brand and choose a future direction for their new organization. Although CTC remains a major investor in the new organization, it takes a hands-off approach. Being small, flexible, and independent has allowed the spinoff to innovate more quickly. While it engages in partnerships with CTC, the spinoff also pursues opportunities with other organizations. It maintains a less formal structure and culture, and all the income that it generates goes right back into its own products and services. The involvement of CTC's innovative financial department was of great assistance.

Another approach is for CTC to create a "virtual startup," in which an entrepreneurial leader with a passion for a product or idea is allowed to run a small business within the larger firm. The rules for managing and measuring the business are adjusted to allow the business to grow within this structure. Organizational rules are relaxed for this start-up, which has growth as its dominant goal. The firm uses CTC resources to innovate in terms of products or business approaches in ways that potentially yield vast improvements over standard methods of doing business.

5. Structural Innovations

While CTC's business models tell the company what activities it wants to perform and how and when it wants to perform them, the organizational structure tells employees who reports to whom and who is responsible for what activity. CTC continues to use traditional hierarchy and centralization where appropriate, but it also experiments with decentralization and other organizational designs. It very much relies on cross-functional, self-managed teams and virtual teams as well as co-location and satellite organizations.

The firm is much more decentralized than it had been a decade before, and the number of overall "silos" has been reduced. CTC's leadership believes that today's technologies make it much easier than it used to be to customize organizational structures to the needs of individual operations and goals. "There's much less need to standardize than there used to be," notes CTC's chief executive. "In some cases, we even have star researchers working out of their homes, though we insist

on robust communication pipelines. We need to make sure people can collaborate."

CTC has found that locating at least parts of their operations near universities stimulates innovation. The organization has studied the structures of R&D sites to try to determine the ideal number of sites, sizes, teams, team members, and the like. It's also looked hard at coordination mechanisms, from technology infrastructures to work spaces that inspire collaboration and brainstorming. It has found that the optimal structure and makeup of R&D sites depends on the types of innovation on which CTC is working as well as on its business units and industries.

CTC's research indicates that the location of R&D influences performance. Leaders note, for example, that one Japanese pharmaceutical company with international R&D found they were more productive than those with purely domestic research (Shaver & Penner-Hahn, 2005). Such studies are one reason they've devoted time and effort to globalizing research operations.

CTC engages more in alliances and partnerships than it once did, but these are always strategic decisions and never based on cost-cutting considerations alone. "We're not going to outsource what gives us a true advantage in the marketplace," notes the CEO. "But we're always having discussions about what we should buy and what we should be doing ourselves."

The corporation ensures that no division becomes so large that the spirit and potential for innovation are lost to bureaucracy. It has also made structural innovation a part of its repertoire in terms of making key acquisitions, forming partnerships and alliances, creating internal incubators, appropriately spinning-off business lines, and organizational restructurings. M&As are carefully studied not only in the due diligence phase but also during integration. If an acquisition has a better system than CTC in a specific area, CTC tries to adopt the new system as a way of maintaining its vibrant organization.

The Difficult-to-Replicate Whole

In summary, CTC drives innovation at various levels, and it tries to balance its innovations via a portfolio management system. While the company is increasingly interested in breakthrough products, it knows that the world of innovation is changing via new technologies. The era of mass customization is already upon it, and the organization is looking at this trend hard in order to gauge how it will influence innovation in coming years.

Innovation is not a single priority of the research function but is a critical part of all functions and involves everyone in the organization. CTC recognizes that its culture as well as the creative use of business models make it difficult for other companies to replicate its products and services.

Innovation in the Future:

Assumptions for the Future

The AMA/HRI project team arrived at five broad assumptions about the future. These assumptions contain the kinds of factors that are likely to influence innovation in coming years.

The team used the underpinnings of these five assumptions when considering how innovation strategies might evolve over the next decade or more.

1. Technology

The world is experiencing a feedback loop in which new technologies are the basis for the next generation of innovations, which are then used to create future generations. For example, more complex integrated circuits help create more powerful computers, which allow for better and faster modeling and analysis programs. Those programs, in turn, help scientists make new discoveries, run better simulations and create new prototypes. Some experts believe that these trends are speeding up the rate of innovation in various areas at an exponential rate.

Aiding that dynamic are collaboration tools, many based on the Internet, which allow experts from all over the world to communicate with one another as never before. This permits new ideas to spread quickly. Teams of designers no longer need to work in the same areas, or even the same time zone, in order to collaborate.

Information technology also gives greater power to the consumer, making it easier for companies to customize products and for individuals to get involved in the design process. Some experts even foresee a future when "3-D printers" could change the world of design. "Teams at Cornell University, MIT and the University of California at Berkeley have been quietly developing processes that adapt ink-jet printing technology to build ready-to-use products, complete with working circuitry, switches and movable parts," reports *Business 2.0* (Maier, 2004). If 3-D printers get to the point where they're creating real products and not just prototypes, then more consumer goods could be locally produced and customized, radically changing today's factory-driven production models.

No one knows exactly which technologies will have the greatest impact over the next 10 to 20 years, but among the best prospects are artificial intelligence, radio frequency identification inventory control, Internet telephony, voice recognition, robotics, biotechnology, nanotechnology and materials sciences. Internet and wireless technologies may allow developing nations to catch up to, and possibly even leapfrog over, developed nations in terms of communication infrastructures. This, in turn, could allow companies to place sophisticated research and development laboratories virtually anywhere in the world.

Technology will also have an impact on the workforce. Jobs and knowledge will evolve as more employees try to keep up with new technologies. This dynamic will require lifelong learning on the part of employees.

Information technologies are also likely to aggravate certain business problems, such as difficulties in protecting intellectual property and confidential information. And there may be increased integration, standardization, and control if companies outsource more of their innovation and manufacturing processes. They'll need to ensure that all the "pieces" fit, and this might have a negative impact on creativity and autonomy.

2. Globalization

Globalization will have a strong influence on innovation, as companies customize some products and services to meet specific cultural and regional needs. Meanwhile, Asia will be the home of the majority of the world's engineers, perhaps making it the center of innovation over the next decade or two. Engineers and software developers in places such as China and India may well approach problems differently than have their North American or European counterparts.

Global political tensions will influence the degree to which governments spend on military R&D, which will, in turn, influence the research direction of everything from lasers to artificial intelligence. There is also likely to be more innovation geared toward products that are affordable to people making lower incomes than are found in most of today's Western nations.

3. Organizational Structures

The future challenge for companies will be to develop an "agile mindset" that allows them to quickly respond to changes in the marketplace, new technologies, geopolitics and other factors. The standard organizational pyramid with the vertical hierarchy of boxes, while not disappearing entirely, is likely to lead to a more overlapping and highly linked set of satellites connected by information technology. A growing number of organizations will be characterized by an integrated and dispersed set of mobile, multifunctional expert teams rather than by separate functions and distinct regional offices. The key will be to quickly focus and organize resources to support strategic initiatives, including innovation goals.

There will be more collaboration to develop innovations via alliances with universities and other organizations, from suppliers to business competitors. This means there will also be more emphasis on how to manage and facilitate such collaborations well, especially those carried out via technologies.

When setting up creative teams, companies will need to do their due diligence to ensure that everyone understands the ground rules and the culture. Team leaders will need to know how and when to use e-mail, set the right tone, facilitate and be clear about response times.

Systems such as portfolio management are likely to become more popular so companies can maintain a balance between various types of innovation. And they'll likely place more emphasis on organization structures and processes that give them the best chance of increasing the success of their innovation efforts.

4. Worldwide Talent Pool

Most of the scientists who have ever lived are alive today. Historically speaking, the talent pool is enormous and will only grow as the education systems all over the world improve. This gives companies unprecedented access to talent. Corporations based in North America and Europe are already building more R&D facilities in nations such as India, and this trend will continue. Companies will both look for and try to develop innovation hubs in various parts of the world, trying to recreate the "Silicon Valley phenomenon."

Companies will work harder on attracting and retaining creative people via the right mixture of compensation and benefits packages, stimulating work environments, considerable work autonomy, and challenging assignments. Some will also "lease" the talents of highly-sought creative people who work in consulting firms, universities, think tanks or other specialty organizations, or who operate as independent contractors.

Of course, because engineering, scientific and other creative talent increasingly comes from Asia and other non-Western regions, organizations will need to become considerably better at "managing diversity" on a global stage. Anthropologists and other cultural experts are likely to play a growing role in helping forge international teams, develop policies, and create new products and services that are suited for specific cultures.

Managers will increasingly seek ways to create more innovation-friendly corporate cultures and will look for ways of assessing creative talent. They will want to get an idea of whether a person is risk-averse, open to new ideas, able to recognize novel patterns, and so on. And they will try to find ways of measuring creative propensities and innovation-related performance.

5. Government Influence

Government policies will play a significant role in determining innovation success. Patent laws, immigration policies, business regulations, tax incentives, intellectual property protections, educational systems: these are just some of the factors that help or hinder innovation in any nation. Governments can deter innovation by regulating too much (thereby keeping companies from maintaining flexibility and entering new marketplaces) or too little (thereby failing to create a stable business environment where it's worthwhile to innovate). Governments need to ensure that companies can attract the best and the brightest immigrants, for example, and they must establish education systems that teach creative problem-solving.

The next 10 to 15 years are also likely to bring more international government agreements in areas such as trade and environmental policy. These could have a major influence on innovation. For example, some blocs of nations may create strict policies that force companies to create products that have a relatively low impact on the environment. Some experts believe that nations such as China and India will ultimately be forced to move in this direction in order to allow for much more per-capita consumption without causing a disastrous environmental impact.

The Composite Theoretical Company 2016

We revisit the fictional Composite Theoretical Company (CTC), this time in the form of an interview with the CEO. The interview is set in the year 2016 and incorporates ideas from the AMA/HRI team as well as from Innovation Survey 2006.

In the following fictional interview, we are projecting into a hypothetical future. We can't be sure what state-of-the-art innovation programs will look like in 2016, so these are only educated guesses about what approaches will work best in 10 years. Moreover, circumstances vary by company and industry, so not every feature of CTC's program will be applicable in every company.

The AMA/HRI research team encourages managers to engage in various strategic planning methods—such as scenario planning—to help them gain a better understanding of how their innovation programs could or should evolve.

Interview with Jordan Deagon, CEO of CTC

Radical Evolution

Reporter: We are speaking with Jordan Deagon, chief executive officer at CTC. Thank you for agreeing to this interview. As I'm sure you're aware, several recent studies laud CTC as one of the most innovative corporations headquartered in the U.S. How have you been able to maintain your top position in a world that seems to be in state of constant flux?

Deagon: In essence, we see ourselves as "radical evolutionaries." That is, we constantly work to find that organizational sweet-spot that allows us to be very flexible and resilient without ever descending into chaos. We have structure in the right spots and yet engage in lots of disciplined experimentation.

CTC recognizes that innovation can't be relegated to some R&D labs out in the hinterlands. There are many areas in which to innovate and we've had strategy meetings that have listed them all: corporate structure, customer experience, brand, manufacturing, culture, supply chain, and so on. It can get overwhelming. What's helped us is the realization that, instead of analyzing each business unit and figuring out how to make it better through lots of innovation programs, we need to see the business as a whole system.

Reporter: Which means what, exactly?

Deagon: It means that the individual components of CTC do not matter as much as the way they work together to enable the organization to create and deliver value to customers. It's great if we develop an innovative new online marketing campaign, but such a campaign often works better if it's done in conjunction with a new product or service or if it's geared toward a potential new market.

For example, a member of our marketing team had the crazy idea of advertising one of the design tools we manufacture by placing it as a virtual object in a video game. People who were basically playing at being architects and building contractors started using the virtual tool, often before they'd been exposed to the real thing. It was a nutty idea but it did boost our brand recognition, and then this inspired us to let these gamers play with the design of the tool in virtual space. Well, we actually found some of their designs useful and have incorporated a few of them into our products, sometimes even giving them design credit where warranted.

You see, we did it by allowing interesting partnerships to emerge between our marketing, manufacturing, design groups and potential customers. Even our legal

team that deals with intellectual property issues—as well as our customer ombudsman—needed to look at this one in a creative way to make sure we didn't overstep any bounds.

Partnering with Customers

Reporter: That's wild. And it's a good example of something you're getting to be known for: breaking down the traditional boundaries between designers and customers. Could you give us examples of how you interact with them?

Deagon: I almost think of customers as part of our organization, especially the people we call our LUs, or "lead users." We really court them. We've invited some of them to our UK lab in Cambridge, for example. It's an exciting process, and it's inspired us to build in ways that allow our customers to add design features.

We also conduct "idea hunts," which are searches for particular innovations from independent inventors. Winners get licensing contracts. Customers love to be a part of rapid prototyping meetings. We can even hold these meetings virtually, and the flexibility for customers makes it very appealing for them to be involved. But I will say that the excitement of bringing them into the lab is usually worth the expense and time.

Reporter: It sounds as if you've taken things well beyond focus groups and surveys.

Deagon: We have to do so. We used to send market researchers out to find the "unmet needs" among customers. They would report back and then we would develop the product, hand it over to a focus group and find that customers didn't really want it. About three-quarters of such projects failed. That's why we look for other ways to involve and include customers in idea-finding and development. This is one of the best ways to achieve innovations: thinking about the future needs of customers. The process is driven not by technology itself but by how technology is used.

We've even become buyers of customer designs. These days, rapid prototyping machines are becoming so inexpensive and powerful that customers can design things on their own. We're trying to tap into that. Also, we're well aware that digital fabrication machines—which are basically 3-D printers that can be used to create real products—represent a technology that's starting to mature, potentially changing the manufacturing process as we know it. If that happens, exactly what business are we really in? We're thinking that we'll be in the design business, as much as anything else, so we're trying to prepare for such a contingency.

Reporter: That sounds like a radically different business model from your manufacturing businesses.

Deagon: If it happens, yes. We can't be sure how it'll turn out, but we're looking at various possibilities and trying to "evolve" in the right direction, whatever happens. We're constantly tinkering with new business models. We don't want to be completely wedded to the idea of manufacturing things if the future is really more about selling design or marketing or certain kinds of services. But that doesn't mean we don't know who we are. Just as W.L. Gore and Apple Computer are known for a certain tenor of innovation, so are we.

Culture, Process and Passion

Reporter: You're probably right about that, but you certainly do have a variety of new products as well as services coming out every year. How do you stay so prolific?

Deagon: It's partly about culture, partly about process, and partly about passion. CTC has always looked for employees who want to make the world a better place. Heck, that's why most of them come here. But we realized some time ago that we needed to find ways to make it easier for them to get their ideas into the pipeline.

One way we did this was by spending time developing better "virtual laboratories." We found out that our people had relationships all over the globe with other researchers, and we learned to optimize the knowledge that flows through collaborative, networked groups. Even as the technologies have improved, we've done a lot of training to ensure that everyone knows how to learn, work, lead and facilitate virtually.

We've also learned how to have discipline without becoming too bureaucratic and rigid. CTC is highly collaborative, intellectually stimulating, and networked. Some people are part of self-managing teams that are, in turn, part of larger communities of practice. Others are in small virtual labs that are very focused on a particular, and sometimes rather esoteric, idea. It's fascinating because solutions come from all over—China, Oxford, California—we don't care so long as they work. The only thing we care about is that the best minds get access to the right problems.

We also use software, or intelligent agents, who anticipate researcher needs and provide just-in-time information relevant to the work that a researcher is investigating. And we have pattern-recognition search engines that help researchers mine data.

There are also freelance problem-solvers and innovators out there. Our employees will sometimes post a problem that's perplexing them on an Internet site geared to this purpose. There are people who work freelance on the Internet willing to take such a problem on. If they are successful, we pay them. It's about speed. We don't have time to spend years finding solutions.

We pay attention to open-source data and information tools. There's no point in reinventing the wheel. Another reason to pay attention to open-source is because it's a growing business model in the world today. Our products sometimes have to compete against open-source products and ours had better have qualities the open-source stuff doesn't, or we don't have much of a business model.

Internal Markets and Disciplined Autonomy

Reporter: But how do you choose which internal ideas to fund? It's so easy to go wrong.

Deagon: We rely on what we call disciplined autonomy and, increasingly, on internal markets. By disciplined autonomy, we mean that we allow most employees to pursue their own novel ideas, either individually or in groups, for a certain frac-

tion of their workweek. But we're constantly communicating and, via managers, demanding that such endeavors serve our larger corporate strategic goals.

As for funding, we've tried to decentralize it to some degree, especially in the early stages of development. We are able to create internal markets where "angel investors" within the company can contribute part of their budgets to support a new idea. If the idea becomes profitable, the funding departments get a bonus to put back into their budgets. It's faster than going through regular budgeting processes and offers the inventor or idea champion an innovative way to seek support.

We also sometimes use internal decision markets. That is, we post a detailed idea for a new product or strategy that allows knowledgeable people within the organization to "bet" whether it will be successful. It's like they're buying stock in the idea. If a lot of people think it's going to be a success, then stock in the idea goes up. We've had pretty good results with using this as a predictive model of how well an innovation is going to catch on. If the internal decision market says an idea is good, we're much more likely to fund it all the way to completion.

Another idea, which we've taken from other companies, is an open-editing Web page that allows our associates to list project ideas. They not only add to the list but can vote on which ones are the highest priorities. We see the ones at the top of the list as our highest priorities and best ideas.

Reporter: You've been called the most entrepreneurial large firm in the country.

Deagon: We do put a lot of emphasis on breaking people into small groups and letting them try to make something of a business model or new product. Some call it "intrapreneurship." It just seems natural to us. But, I should say that we're also determined to take advantage of our size and scale. We can spend a slimmer proportion of our sales on R&D than smaller companies and get a bigger bang for our buck.

Breaking Through

Reporter: How about the breakthrough innovations that few people see coming? How do you stay ahead of the curve in terms of the truly disruptive technologies?

Deagon: There's no silver bullet solution to this, but our devotion to internal entrepreneurship, our dedication to knowledge management and systems thinking, and our willingness to sometimes compete with our own products all play a role. Sometimes, we've found, we have to be willing to create a brand new product line that seems, from many points of view, to be inferior to what we've been doing. We've developed devices, for example, based on newfangled platform technologies that are underpowered compared to some of our traditional products. The thing is, those devices potentially make the products cheap and so appeal to a wider range of customers. Now, a lot of companies would kill such ideas off in their infancy, judging them to be inferior to what we already produce. CTC, on the other hand, tries to cultivate them when possible.

It's not easy. Sometimes a spinoff is the right answer. Or sometimes we need to acquire a company that's already well on its way to competing with us via some paradigm opportunity that we flat-out missed.

The important thing is to watch how the science, technology and business-model patterns are evolving and try to capitalize on where you think things are going. Hire the best people with the best instincts and let them run, even if what they're doing potentially threatens some other older product lines. Usually, the greater threat is in ignoring the opportunity.

The Right People with the Right Skills

Reporter: It's clear that having the right people involved in your business is critical to success. Where do you find them?

Deagon: We have relied heavily on both technology and social networks to find and keep the right people. Personality assessment is now at a place where it is a reliable resource in providing data about hiring, succession and motivation. While we still depend heavily on leader and HR input, we are committed to locating "creatives" via assessments. We use simulations and assessment labs for succession purposes. Our leaders have to be capable of teamwork, collaboration and risk-taking to succeed here. I spend a fair amount of my time doing talent reviews.

We also rely on word-of-mouth. Excellent professionals know who their peers are and they'll often recommend making a certain hire. We pay people to make great references that work out.

I'll add that we develop our people, provide feedback, and have a reward system that does what it's intended to do: help retain talent! Bottom line is that people come to work here because it's a stimulating environment where they can interact with a lot of smart people to produce great products and services.

Reporter: You mentioned that you train people to collaborate and work in virtual teams. What other kinds of training do you do in regard to innovation?

Deagon: We place a lot of emphasis on skills training, brainstorming, structured problem-solving, strategic thinking, and futures thinking. To innovate at any level, you've got to have both the right skill set and a strategic vision of the future, whether it's short-term or long-term. Innovation is about imagining what could be or should be. We also teach people our standard lingo so everyone's on the same page, and we make sure they understand the metrics we use for measuring our progress.

The Role of Government

Reporter: Are there any drawbacks to being on the cutting edge of innovation?

Deagon: Oh, sure. It's often easier to create a good product when you're following rather than when you're leading. You can learn a lot from the other organization's mistakes. In fact, we put quite a bit of emphasis on being a fast-follower in certain high-risk areas.

Another challenge is that intellectual property laws are lagging behind the technology and business models that we use to get ideas, innovate and produce products. Many of our laws are based on an earlier paradigm and will have to catch up. I'm going to Washington next week to meet with experts and lawmakers to discuss this.

Reporter: Are there other ways in which the government impacts innovation?

Deagon: The funding of basic research matters. A lot of government officials know that industries that are most active in research are growing most quickly—twice the rate of the economy as a whole over the last three decades. Ten years ago, then Fed Chairman Alan Greenspan highlighted the importance of innovation by calling ours a "new conceptual-based economy." And time has proven him right.

Still, getting funding to rise along with the growing importance of innovation hasn't always been easy. Back in December of 2005, a report was published called the *2020 Vision for the National Science Foundation.* The report set out goals and strategies for supporting transformative research. But it came out even as federal funding for most R&D programs was stagnating.

A little later, of course, Congress got religion as they recognized the rising challenge coming from other parts of the world and the danger that the U.S. was about to seriously fall behind.

Today, a lot of companies have benefited from U.S. government-funded research, helping to spur an innovation boom at a time when India and China are devoting massive amounts of human capital to research and development. The U.S. can't compete in terms of sheer numbers, so it's got to be more efficient and leverage its lead. But I should note that global companies like ours can't afford to look at research from a strictly national perspective. We conduct research and pay taxes all over the world, and we try to influence government policies in various regions.

On Being a Global Innovator

Reporter: Tell me more about your role globally.

Deagon: We opened our discovery research center in Cambridge, England, early in the century and it became a world hub for technology. We have set up other hubs in other cities around the world. We had to do this to compete. When looking at patent applications, for example, we saw that the fastest-growing economies in 2007 were China, Hong Kong, India, Ireland, Israel, Singapore, South Korea and Taiwan.

Through our collaborations with people outside the U.S., we have brought in more diverse thinking and this has helped us innovate. Not only are our total patents up, but so are the financial indicators tied to new products.

But I wouldn't want you to think it's easy to work globally. The complexity is astounding, yet our skills at working cross-culturally have increased. We face an array of questions. Will our patents be honored? Will we be forced to share our trade secrets as the price of doing business in another nation? Will our foreign investments help create formidable competitors?

Reporter: What do you do about today's patchwork of laws, especially environmental regulations?

Deagon: Well, we have a reputation for producing environmentally friendly products, which plays especially well in Europe, Canada, Japan, and growing swathes of Asia. Our engineers and those of the UK and Germany are always pushing us to make components more energy-efficient, recyclable and as non-toxic as possible. It's frankly a big advantage because we meet the strictest environmental regulations in

Europe while exceeding them in most other places. It's a huge marketing advantage and, if you do it right, doesn't drive up manufacturing costs as much as some companies claim.

Let's face it: with literally billions of people in China and India trying to ramp up economic development, the only way forward is to create products that have low environmental impact.

Transform Yourself

Reporter: I'm impressed by all the complexities you've got to navigate to stay on innovation's cutting edge. Any last advice to business people who want to get better at innovation?

Deagon: If you want to win in the innovation game, think big but sweat the details. It's not a program but a way of life. You've got to innovate in ways both big and small. Every minute of every day our people are trying to improve our production, systems or productivity. Remember that outsiders are often innovators because they see things differently, which is why nearly half of CTC's new product ideas originally come from outside the firm.

But keep in mind that it's not all about inventing the next big product. It's about coming up with new ways of seeing the world and doing business. It's about creating whole new markets where none existed. And it's about trying to change the world for the better. But to do that, you've often got to transform yourself first.

Reporter: Thank you for your time.

Conclusion

Many of today's businesses face a conundrum: They're acutely aware that innovation is a growing imperative, but they see themselves as only moderately successful innovators. Among organizations responding to the AMA/HRI survey, there's no consensus on how to evaluate ideas, and nearly half of respondents don't have a clear understanding about how their companies can become more innovative. It's little wonder, then, that the literature shows most innovation initiatives fail to attain their goals.

Organizations must gear up for a new era in which they become much more effective at spurring and managing innovation. Before they can achieve this, they need to get better at the basics, such as understanding, communicating and evaluating innovation. Until they do, they simply won't know how to allocate the proper resources or set the best strategies.

What other actions should companies take? The AMA/HRI Survey finds that respondents all over the world believe that focusing on the customer is crucial to innovation. That's no doubt true, especially in our age of mass customization. Insights from customers as well as potential customers can lead to great new product lines. But it's not the whole picture. Long-term sustainability depends on successful breakthrough innovation, and this is less likely to come directly from current customers than incremental innovation.

There is no single button to push. In this report, we've laid out a variety of approaches to spurring innovation, but recognize no one way is best for every company. Still, we think that becoming an innovative company usually requires looking at the whole system, from culture to process to strategy. Companies must forge an innovation strategy that's aligned with its overall strategy, choose the projects with the best value propositions, manage the system efficiently so it doesn't waste time or resources, and commercialize innovations well, with everyone working together as a team (Jaruzelski, Dehoff, & Bordia, 2005).

Leadership is, of course, critical. Not only can excellent leaders influence culture over time, they can set the strategies and goals, model the desired behaviors, demand good metrics, permit smart risk-taking, reward creativity, cultivate collaboration and teamwork, and provide enough—but not too many—resources. Innovation requires ambidextrous leaders who can simultaneously control and promote freedom.

In the end, innovation means more than just creating new products and services. It also means considering new management principles and challenging old orthodoxies in smart, value-added ways. Of course, such things are always easier said than done. But no one ever said surviving into the future was going to be easy.

Epilogue

Since the beginning of time, the process of innovation has served to satisfy our unquenchable curiosity and our quest for discovering new and better ways of doing things—not merely for the sake of improvement, but to raise our standard of living.

Science has yet to discover the innovation gene within us yet there are many clues that it is present. The innovative process merely needs to be well nurtured in the Petri dish of the global business laboratory. While the process requires careful management, useful ideas will only emerge when the "innovation DNA" is encouraged and allowed to grow. The challenge for all business leaders is to enable and foster the best possible environment for promoting and rewarding innovation.

According to the AMA/HRI study results, the situation is quite clear: Executives and managers recognize the importance of maintaining an innovative edge yet they continue to struggle with adopting an effective approach to the innovative process. Their challenge—indeed, the challenge for all of us—is to understand the organizational barriers to pursuing innovation, implement best practices and monitor their results by establishing metrics for creativity, and create a culture in which our managers and staff feel secure in taking acceptable risk.

Innovation has moved far beyond the days of R&D investments. While customer demand is the biggest driving force behind the innovative process, there are other factors as well that play a role in bringing innovative ideas to the surface. It is up to you to identify those that will work most effectively in your organization and act accordingly.

How do you cultivate the best ideas for your company? We encourage you to decide now to be a leading innovator in your company by starting a conversation with employees, peers, upper management and, of course, with your marketplace.

The quest for innovation is a process designed to find better ways of fulfilling the needs of your customers and thereby grow your business. AMA is delighted to provide you with the skills, abilities and knowledge you need to install that process in your organization to make your company a market leader.

Appendix

About This Survey

Target Survey Population

The target survey population of the AMA/HRI Innovation Survey 2006 consisted of the HRI e-mail list of primarily high-level human resources professionals and the American Management Association international e-mail list of individual contributors, supervisors, managers and executives across a wide range of functions, including general management, finance, operations and human resources. In total, 1,396 usable surveys were submitted. Most responding companies were either global or multinational. About 60% of respondents were from the U.S. and Canada, and the rest were from various parts of the world, primarily Europe and Asia.

Survey Instrument

In this survey, multiple questions used the well-accepted 1-5 Likert-type scale, with a 1 rating designated as "Not Important" and a 5 rating as "Extremely Important." There were 27 questions in all, 11 geared toward the demographics of respondents.

Procedure

A link to an online survey was e-mailed to the target population by region during November and December of 2005.

Innovation Survey Results

Demographic Questions

***Question 1:** In what function do you currently work?*

Finance	6.3%
General management	24.6
HR or Administrative	21.6
Marketing	2.8
Operations	12.8
Research and development	8.1
Sales	8.0
Systems/IT	5.3

***Question 2:** What is your current title?*

CEO/President/Chairman	4.9%
EVP/SVP	2.7
Vice president	0.1
Director	17.6
Manager	40.2
Supervisor	4.4
Other	30.3

***Question 3:** What is your level of responsibility?*

Corporate	40.5%
Division	24.4
Region	15.2
Plant/Office	19.8

***Question 4:** What is your gender?*

Male	60.5%
Female	39.4

***Question 5:** What is your age?*

30 or younger	7.7%
31-35	15.6
36-40	16.9
41-45	18.6
46-50	17.7
51-55	13.0
56-60	7.4
61 plus	3.2

***Question 6:** What is the size of your total organization's workforce?*

Under 1,000 employees 47.9%
1,000-3,499 . . . . . 16.8
3,500-9,999 . . . . . 13.5
10,000 or more 21.8

***Question 7:** What is the revenue of your total organization?*

Less than $1 billion 54.8%
$1B to $2.99B 15.3
$3B to $9.9B 13.0
$10B plus 16.9

***Question 8:** Type of operation: (choose one)*

Global (high level of global integration) 35.0%
Multinational (national/regional operations act independently of one another) 29.7
National (operations in one country only) 35.2

***Question 9:** In which overall region are you located?*

Canada 20.9%
USA 39.3
United Kingdom 1.3
France 1.1
Germany 3.1
Other Western Europe 11.0
Eastern Europe 5.8
Scandinavia 2.5
Asia 9.2
Central America 0.3
South America 0.2
Caribbean 0.3
Africa 1.2
Middle East 2.9

***Question 10:** Within which sector does your organization work?*

Consumer goods	4.9%
Chemicals	3.7
Education	4.1
Energy/Utilities	3.8
Financial services/Banking	8.3
Food products	2.4
Government	5.7
Hi-tech/Telecom	9.5
Hospital/Healthcare/Insurance	5.3
Manufacturing	13.5
Mining or Agriculture	1.5
Nonprofit	3.0
Pharma/Biotech/Medical device	9.7
Retail	2.0
Other	22.6

***Question 11:** How would you describe your organization's life cycle stage?*

Startup firm or a firm focusing on introducing new products/services	3.7%
Rapidly growing firm with increasing market share and a strong focus on customers	13.1
Established firm with strong structure and systems as well as known products/services.	17.8
Firm focused on increasing quality, profitability, and continuing improvement in operations	23.0
Mature firm with brand name recognition and with an established culture.	26.8
Firm repositioning itself for the future; revitalization efforts are the focal point.	15.6

Survey Questions

Question 12: *How would you rank the importance of innovation in your organization?*

Overall Ratings and Percentage, Today and in 10 years

Time Frame	Rating	Extremely Important	Highly Important	Important	Somewhat Important	Not Important
Today	3.91	32.5%	35.8%	23.2%	7.7%	0.9%
In 10 Years	4.33	51.3	35.0	10.0	2.9	0.8

Ratings by Regions, Today and in 10 Years

Time Frame	Overall	USA	Canada	Europe	Asia
Today	3.91	3.95	3.83	3.88	4.01
In 10 Years	4.33	4.51	3.88	4.33	4.47

***Question 13:** How important are the following reasons for pursuing innovation in your organization, now and in 10 years?*

	Extremely Important		Highly Important		Important		Somewhat Important		Not Important	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
To respond to customer demands	43.9%	55.8%	33.9%	31.2%	17.9%	10.7%	3.4%	1.5%	1.0%	0.8%
To increase operational efficiency	39.5	45.5	33.1	33.6	20.7	16.9	5.7	3.3	1.0	0.7
To increase revenues or profit margins	39.0	47.7	32.8	31.8	20.6	14.1	4.5	3.5	3.1	2.9
To develop new products/services	34.7	46.2	33.3	33.0	22.3	15.5	7.7	3.5	2.1	1.8
To increase market share	33.0	38.9	31.8	35.3	23.6	20.0	7.9	5.0	3.6	0.9
To better use new technologies	27.7	39.7	32.8	33.9	29.3	16.8	8.8	6.7	1.5	2.9
To increase speed or time to market	27.3	36.7	33.1	36.7	25.8	19.1	10.0	6.0	3.8	1.5
To be state-of-the-art in the industry	25.7	38.1	32.0	33.6	29.7	19.2	10.4	6.4	2.2	2.7
To define new market segments	25.3	38.4	32.6	33.6	29.1	19.1	9.9	5.7	3.2	3.2
To diversify revenue stream	19.7	27.0	28.2	32.7	32.1	25.4	13.8	10.4	6.1	4.5
To defend against job loss	14.6	18.1	19.7	24.3	34.8	33.3	21.5	16.4	9.4	7.9

How important are the following reasons for pursuing innovation in your organization, now and in 10 years (by rank)?

	OVERALL		U.S.		Canada		Europe		Asia	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
To respond to customer demands	1	1	1	1	1	1	1	1	1	1
To increase operational efficiency	2	2	2	4	2	2	2	4	2	2
To increase revenues or profit margins	3	3	3	2	3	4	4	3	3	3
To develop new products/services	4	4	4	3	4	3	3	2	4	4
To increase market share	5	8	5	7	5	7	7	9	5	9
To better use new technologies	6	5	7	6	7	5	5	5	6	8
To increase speed or time to market	7	6	8	8	8	9	6	6	9	5
To be state-of-the-art in the industry	8	7	6	5	6	8	9	7	8	6
To define new market segments	9	9	9	9	9	6	8	8	7	7
To diversify revenue stream	10	10	10	10	10	10	10	10	10	10
To defend against job loss	11	11	11	11	11	11	11	11	11	11

***Question 14:** How important are the following factors for developing an innovative culture in your organization?*

	Extremely Important		Highly Important		Important		Somewhat Important		Not Important	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
Customer focus	45.4%	56.6%	29.4%	28.4%	18.3%	10.9%	4.8%	2.8%	2.1%	1.3%
Teamwork/ collaboration with others	33.8	47.0	32.9	33.8	23.4	15.1	7.0	2.5	2.9	1.5
Appropriate resources (time and money)	22.8	28.5	37.1	44.5	30.8	22.0	7.7	4.2	1.6	0.7
Organizational communication	29.6	41.5	28.4	32.3	27.8	19.7	10.9	5.2	3.3	1.3
Ability to select right ideas for research	26.0	38.6	33.2	35.4	28.4	19.6	10.0	5.4	2.4	1.0
Ability to identify creative people	25.9	36.7	29.3	35.4	28.8	20.5	12.6	5.8	3.4	1.6
Freedom to innovate	23.7	32.8	32.3	35.8	26.4	23.7	14.0	5.8	3.6	1.9
Ability to measure results of innovation	20.1	29.4	33.8	40.3	33.0	24.4	10.7	5.0	2.3	0.9
Encouraging both small ideas and big ideas	19.5	27.5	32.1	40.0	32.1	24.6	13.5	6.7	2.8	1.2
Innovation accountability/ goals	18.1	27.7	34.8	41.1	30.8	23.4	12.2	6.0	4.1	1.9
Culture of risk-tolerance	16.8	23.6	32.7	36.3	32.1	29.7	14.2	8.3	4.2	2.1
Organizational structures	14.9	26.1	31.5	35.1	35.8	27.6	13.6	8.9	4.2	2.3
Diversity	16.4	26.7	29.5	32.7	35.1	28.0	13.3	9.2	5.8	3.3
Balancing incremental improvements and breakthrough discoveries	12.8	18.5	30.6	36.2	39.2	34.1	13.5	8.7	3.9	2.5

How important are the following factors for developing an innovative culture in your organization today and in 10 years (by rank)?

	OVERALL		U.S.		Canada		Europe		Asia	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
Customer focus	1	1	1	1	1	1	1	1	1	1
Teamwork/ collaboration with others	2	2	2	2	2	2	2	2	2	2
Appropriate resources (time and money)	3	6	3	6	3	7	6	7	3	5
Organizational communication	4	3	4	3	5	3	3	3	5	4
Ability to select right ideas for research	5	4	5	4	4	4	4	4	4	3
Ability to identify creative people	6	5	7	5	7	5	7	5	6	7
Freedom to innovate	7	7	6	8	8	9	5	6	7	6
Ability to measure results of innovation	8	8	8	7	6	6	11	12	8	8
Encouraging both small ideas and big ideas	9	9	10	10	10	8	8	8	9	10
Innovation accountability/ goals	10	10	9	9	9	10	10	9	11	9
Culture of risk-tolerance	11	12	11	11	11	11	13	13	12	14
Organizational structures	12	11	13	12	14	12	9	10	10	12
Diversity	13	13	12	13	13	13	12	11	14	11
Balancing incremental improvements and breakthrough discoveries	14	14	14	14	12	14	14	14	13	13

Question 15: *How important are these external drivers of innovation to your organization?*

	Extremely Important		Highly Important		Important		Somewhat Important		Not Important	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
Customer demands	39.2%	53.4%	37.2%	33.6%	18.2%	9.9%	4.1%	2.2%	1.2%	1.0%
Technology	29.7	43.8	34.1	32.0	27.1	18.8	7.1	3.8	2.1	1.6
Pace of change	22.7	35.2	34.0	36.0	33.1	22.6	8.4	5.1	1.7	1.2
Collaborations/ alliances with customers	24.3	38.3	34.8	39.1	28.4	16.8	8.6	4.0	3.8	1.8
Availability and cost of talent	20.2	34.2	34.1	37.6	33.7	22.3	8.9	4.5	3.2	1.4
Globalization/ increased competition	21.0	38.5	31.6	29.7	28.1	19.2	12.2	6.6	7.1	6.0
Legislation	21.5	27.5	24.3	26.8	29.0	25.2	16.2	13.1	9.0	7.3
Environmental issues	15.7	28.3	25.7	25.3	29.5	23.5	16.5	12.1	12.6	10.7
Collaborations/ alliances with private-sector firms	10.9	18.3	25.2	32.7	34.4	29.7	21.5	14.1	8.0	5.2
Collaborations/ alliances with academia/ nonprofits	10.0	17.4	20.6	28.8	29.5	27.4	24.8	16.5	15.2	9.9
Government funding/tax credits	10.7	12.8	15.2	18.3	28.6	28.4	22.6	20.3	22.9	20.2

How important are these external drivers of innovation to your organization (by rank)?

	OVERALL		U.S.		Canada		Europe		Asia	
	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years	Today	In 10 years
Customer demands	1	1	1	1	1	1	1	1	1	1
Technology	2	2	2	2	2	2	2	2	2	2
Pace of change	3	4	4	4	4	5	3	3	3	4
Collaborations/ alliances with customers	4	3	3	3	3	3	4	4	4	3
Availability and cost of talent	5	5	5	5	5	4	5	5	6	6
Globalization/ increased competition	6	6	6	6	6	6	6	6	5	5
Legislation	7	7	7	8	7	7	8	8	7	7
Environmental issues	8	8	8	7	8	8	9	10	8	8
Collaborations/ alliances with private-sector firms	9	9	9	9	9	9	7	7	9	9
Collaborations/ alliances with academia/ nonprofits	10	10	10	10	10	10	10	9	10	10
Government funding/tax credits	11	11	11	11	11	11	11	11	11	11

Question 16: *How important are the following ways of measuring creativity and innovation?*

	Extremely Important	Highly Important	Important	Somewhat Important	Not Important
Customer satisfaction	55.6%	29.1%	11.7%	2.9%	0.7%
Market share	36.1	33.1	19.3	6.6	4.9
New products/ services/processes produced	28.4	39.9	23.1	6.7	1.9
Financial impact of ideas submitted by employees	17.9	35.6	30.8	13.3	2.4
Innovations as percent of revenues and profits	15.5	35.8	28.3	14.4	6.0
Spending on research and development	12.9	29.4	31.6	18.5	7.6
Spinoffs/new operations based on new products	12.4	27.8	30.5	17.3	12.0
Intellectual property (e.g., number of patents)	16.2	23.8	25.2	20.2	15.6

***Question 17:** Please rank-order the three (3) most significant barriers to pursuing innovation in your organization, with #1 being the highest.*

	1	2	3
Insufficient resources	21.7%	14.1%	11.5%
No formal strategy for innovation	20.6	14.5	12.5
Lack of clear goals/priorities	16.8	11.6	11.7
Lack of leadership/management support	12.6	11.3	7.8
Short-term mindset	12.3	14.9	11.0
Structure not geared toward innovation	11.6	14.3	13.5
Organizational constraints such as policy	9.5	10.0	11.7
Too much management control	9.4	10.1	10.1
Culture of fear about failure	9.1	12.8	10.7
Lack of rewards for creative behaviors	7.5	15.4	13.1
New ideas threaten existing product lines	5.2	6.0	8.8

Note: Columns add up to over 100% because respondents were permitted to provide more than three responses.

***Question 18:** Rank the top three (3) actions your leaders are taking to support innovation, with #1 being the highest.*

	1	2	3
Developing an organizational strategy for innovation	24.9%	13.1%	9.2%
Redesigning organizational structure or work flow	17.3	17.4	13.7
Increasing employee involvement	14.4	16.3	14.7
Identifying/attracting more creative talent	12.9	13.1	10.3
Redefining the organization's values	12.7	13.8	12.4
Establishing innovation/creativity goals	11.2	12.5	10.5
Establishing new idea review processes	9.6	13.0	11.0
Encouraging employees to learn about areas outside of their expertise	8.2	11.2	15.5
Providing training in creative thinking and problem-solving	6.9	8.7	9.4
Creating new incentive programs	5.3	8.1	7.9

Note: Columns add up to over 100% because respondents were permitted to provide more than three responses.

Question 19: *Select the one statement that best describes risk-taking in your organization at this time (choose only one).*

Risk that is well analyzed and aligned with current goals is usually accepted	47.2%
Risk is evaluated carefully to avoid error	32.4
Intelligent risk-taking is recognized	14.7
Intelligent risk-taking is rewarded	5.5

Question 20: *Select the one statement that best describes the evaluation of ideas in your organization at this time (choose only one).*

There is no standard policy for reviewing and evaluating ideas	47.6%
There is an independent review and evaluation process for ideas	16.5
Ideas are reviewed and evaluated by the unit manager where idea was proposed	15.4
Ideas are reviewed and evaluated by the unit that would be impacted by the idea	12.6
The employee is responsible for starting and managing the review process	7.6

Question 21: *Select the one statement that captures the reward and recognition practices in your organization at this time (choose only one).*

Innovation is not rewarded in this organization	26.0%
Innovation is recognized with nonfinancial rewards	20.9
Innovation often leads to more challenging work and/or autonomy	19.3
Innovation is rewarded by individual bonuses and/or salary increases	17.6
Innovation is considered in promotion decisions	9.2
Innovation is rewarded through team bonuses	4.4
Innovation is rewarded with larger staff and/or budgets	2.0

Question 22: *Rank the following in terms of the opportunities they give your organization: (1 = most opportunity, 4 = least opportunity)*

	1	2	3	4
Collaborate with customers, suppliers and other firms to design products/services	50.9%	21.7%	16.9%	10.1%
Develop new "breakthrough" products/services that lead our industry	23.3	27.5	31.3	18.0
Respond quickly and flexibly to the uncertainties of new markets	16.2	34.6	29.6	19.4
Protect our intellectual property from competitors	9.6	16.1	22.0	52.2

Question 23: *How successful is your organization at innovation?*

Very successful	14.8%
Moderately successful	70.3
Not at all successful	14.6

Question 24: *Which of the following statements best captures your feelings about innovation?*

I recognize the importance of innovation, have a clear understanding of what innovation means and how my company can become more innovative.	52.8%
I recognize the importance of innovation, have a clear understanding of what innovation means, but do not have a clear understanding as to how my company can become more innovative.	40.9
I recognize the importance of innovation, but I do not have a clear understanding of what innovation means and how my company can become more innovative.	6.0

Question 25: *In which of the following areas are you currently innovating?*

Customer experience: how to deepen the customer's relationship with you by generating an engaging experience around your offering	15.2%
Service: providing value to customers around your product offering	11.6
Core process: adding value to the central activities of the company	12.4
Product performance: design and delivery of the core offerings	12.2
Enabling process: how you support the company's core processes and workers	11.8
Business model: how the company intends to make money	10.6
Brand: how you communicate to differentiate	8.4
Networks and alliances: how you work with other companies for mutual benefit	8.1
Product systems: widening the range of products you offer through linking offerings together	4.7
Channel: how you get your offering to market	3.6

Question 26: *In which functions within your company does innovation currently take place?*

R&D	27.3%
Marketing (B2B and B2C)	17.2
Information technology	12.2
Sales	9.7
Customer service	8.9
Manufacturing	6.5
Supply chain	5.4
Planning	5.1
Human resources	3.9
Finance	2.4

***Question 27:** In my company we…*

Have a shared definition of what innovation is.	41.3%
Regularly review progress in innovation.	22.4
Have a shared agenda to execute the innovation strategy.	12.3
Have a well-understood strategy for innovation.	12.1
Have well-defined roles and responsibilities.	11.3

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For more than 30 years, The Human Resource Institute has been dedicated to providing world class research in people management issues, trends and practices. HRI, a not-for-profit organization affiliated with the University of Tampa, is widely recognized as one of the top five institutes of its kind in the United States. HRI provides its more than 100 corporate members with accurate and timely research that helps facilitate a better understanding of all the people management issues that organizations face today as well as the trends that are shaping the future. Currently, HRI is following approximately 150 demographic, social, economic, technological, political, legal and management trends. For more information, contact Jay J. Jamrog at jamrog@hrinstitute.info

About This Report

American Management Association commissioned the Human Resource Institute (HRI) to conduct an in-depth global study of innovation management—to determine what drives innovation, the components of an innovative culture, and what innovative organizations might look like ten years from now. This report is based on a series of interviews with companies that are considered the best-in-class in innovation management, a comprehensive global survey that included over 1,300 respondents, in-depth discussions with a team of individuals knowledgeable about innovation management and an extensive review of the literature on corporate innovation.

This Report:

- Outlines what's driving innovation management today
- Discusses how external and internal drivers are affecting innovation efforts
- Forecasts what will drive innovation over the next ten years and what the best-in-class practices may look like in the year 2016
- Identifies the barriers to organizational innovation and how to overcome them
- Alerts you to traps that too often companies encounter in innovation management
- Describes today's state-of-the-art innovation management practices
- Provides a summary of the Innovation Management Survey 2006 results

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