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Linking Theory & Practice

Navigating the innovation landscape: past research, present practice, and future trends

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Abstract

The management of innovation is among the most critical capabilities contributing to the success of modern organizations. It is also complex and frequently misunderstood. In this paper we first provide a broad overview of the organizational innovation literature [the *Past*] to distill five fundamental themes: What is innovation, why is it important, where does it come from, who engages in it, and how can it be best executed? Second, we illustrate how these concepts are applied by three companies on the vanguard of innovation management [the *Present*] – Google, Walt Disney, and Johnson & Johnson. Third, we project the discussion forward by considering key issues and emerging trends [the *Future*] of innovation management such as nanotechnology, ethical dilemmas, information technology, globalization, and sustainability. Fourth, we derive from the above analyses concrete guidelines for managers to leverage these insights and enable more effective innovation practices.
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Keywords: innovation; management; industry; organization



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Introduction

In today's increasingly turbulent business environment, largely attributed to continual and rapid globalization and technological advancements, change has become a ubiquitous phenomenon. Innovation has emerged as an important mechanism to facilitate adaptation to this shifting competitive landscape. Although considered controversial by some skeptics, innovation plays a critical role in nurturing the economy, creating and radically transforming industries, sustaining the competitive performance of firms, and improving the standard of living and creating a better quality of life for citizens. Understandably, research that is focused on this climate of change displays a strong "pro-innovation" perspective (Kimberly, 1981; Abrahamson, 1991) and visualizes innovation as an inherently beneficial organizational activity with profound consequences for multiple constituencies. Indeed, it is an organization's capability for sustained innovation that oftentimes determines its success. However, when discussing the management of innovation, one must also consider the more ambiguous, potentially destructive, and less readily understood social and ethical dynamics of the innovation process.

This paper attempts to provide a broad overview of the innovation management landscape. First, we survey the existing



innovation management research (*The Past*) by focusing on five fundamental yet significant questions in an attempt to synthesize and cohesively present what is known about the management of innovation:

- (1) What is innovation?
- (2) Why is innovation important?
- (3) Where does innovation come from?
- (4) Who engages in innovation?
- (5) How can innovation be best executed?

In addition, in order for innovations to be effective and to lead to positive outcomes, one must be sensitive to the nuances found in the innovation literature and extract and apply what is relevant in a particular context. Thus, in the second part of this paper (*The Present*), we take a detailed look at how innovation management concepts are put into practice by three companies that have rightly earned the reputation of being innovative and successful in their industry and were named by *Business Week* as one of the 50 most innovative companies in the US – Google, Walt Disney, and Johnson & Johnson (J&J). These companies represent a combination of a relatively young organization and more mature companies across different industries involved in both the manufacturing and service sectors. In addition, though each of these firms has taken different paths to being innovative, they all show a remarkable ability to be proactive and adapt their products, services, and business processes to varied industries whose structures and boundaries are being radically altered. We highlight some of the best practices within these companies and how they implement and leverage new ideas, bring new products to market, and adapt to a rapidly changing competitive environment. Thus, we explore how companies practically conceive and implement the innovation concepts that we have elucidated in the first section.

In the third section, we discuss the relevance of past knowledge and present practice to emerging trends that will exert a growing influence on the management of innovation (*The Future*). Major advances such as the continued proliferation of the internet, evolution of personal communication devices, and increasing awareness of issues associated with ethics, sustainability, and global interdependence have changed the way individuals, groups, and corporations communicate, operate, and interact. We outline how these changes have created or magnified challenges/opportunities in

the management of innovation across the following four areas:

- (a) nanotechnology and issues of customization;
- (b) biotechnologies and related ethical issues intertwined with them;
- (c) how information technology and social networking affect the creation, diffusion, and assimilation of innovations;
- (d) how globalization, sustainability, and green management affect innovation focus and diffusion.

Finally, in the fourth section, we conclude by presenting specific guidelines for managers (*Actions*) on how they might leverage the preceding insights to enable more effective innovation management and subsequent organizational competitive advantage.

The past – key ideas and insights for managers

Innovation is a focal point of an organization's strategy and a crucial element of its long-term survival (Tushman and Anderson, 1997). Thus, the practice of innovation management is important for firm sustainability and success. As with other disciplines, the best practices tend to be based upon sound theory. In this section we present established theories and concepts associated with innovation, based upon the following five questions, to serve as the foundation for its management.

What is innovation?

Defining innovation is an elusive but important task since innovation can be understood in differing yet not mutually exclusive ways. This, in turn, can offer valuable descriptive power and influence decisions regarding where innovation has originated, the type of organizational structure implemented, and the manner in which systems integration is approached, and can ultimately determine the impact on firm profitability. Innovation is not only the creation of faster objects – it is much broader than this. In short, innovations can and should be conceived as new useful initiatives that are administrative vs technical in their focus (Damanpour and Evan, 1984), product vs process in their orientation (Utterback and Abernathy, 1975; Ettlie and Reza, 1992), radical vs incremental in their nature (Dewar and Dutton, 1986), and architectural vs component in their scope (Christensen, 1992a, b). We elaborate more on each of these below.

Innovations can be administrative or technological in focus. Administrative innovations involve new organizational structures and administrative processes such as recruiting personnel, allocating resources, distributing rewards, and structuring tasks or units. Technical innovations can be product or process innovations, further discussed below, depending upon their application, but are generally more observable, more testable and are perceived to be more advantageous than administrative innovations (Damanpour and Evan, 1984). The distinction between these types of innovations is important as each follow distinctly different paths, and is facilitated by different kinds of organizational structures. Technical innovations often originate among scientists and engineers (technical core) of an organization and follow a bottom-up implementation process, whereas administrative innovations originate among the top management personnel (administrative core) and follow a top-down implementation process (Daft, 1978).

Product innovations are new products or services introduced to meet a market need while process innovations are new elements introduced into an organization's production or service operations (Utterback and Abernathy, 1975; Ettlie and Reza, 1992). A product innovation generated by one firm can become a process innovation for another. The distinction between these two types of innovations is important as their adoption requires differing organizational skills; product innovations require that firms assimilate customer need patterns with design and manufacturing during development while process innovations enable improved efficiency and effectiveness of product development (Ettlie *et al.*, 1984). However, the frequency of occurrence of product and process innovations varies significantly over the stages of the industry or technology life cycle with process innovation following product innovation (Utterback, 1978).

Radical innovations, those that are new to the firm, industry, and/or world, have sometimes been described as competence destroying or destructive in nature to reflect the impact they have on markets, firms, and industries (Schilling, 2008). In contrast, incremental innovations reflect additive improvements to existing products or processes. Incremental innovations are often customer driven while radical innovations are usually internally driven. Radical innovations tend to require more time for development and involve greater risk for

market adoption but can have greater positive impact on firm profitability as well as industry and economic dynamics. We further discuss the impact of radical innovations when addressing why innovation is important.

An innovation may also be a part of a system. An innovation is component in nature if it does not change the overall system configuration of the product (Schilling, 2008). An innovation is architectural in nature if it requires changing the system configuration (Henderson and Clark, 1990). For example, the microprocessor is a component within the configuration of a laptop computer system. A faster microprocessor would be a component innovation and changing from a laptop to a tablet PC would be an architectural innovation. Existing customers tend to initially resist architectural innovations and prefer component innovations due to system reconfiguration costs, making architectural innovation adoption more challenging for incumbent firms.

Why is innovation important?

Not all innovations are equal in their impact. In particular, as mentioned above, radical innovations can have a significant impact on the emergence of new industries and the success of new technologies through the establishment of dominant designs (Benner and Tushman, 2003). While incremental innovations can provide real, tangible benefits to firms and consumers within the confines of existing industries, the impact of incremental innovations is frequently overshadowed by the game-changing magnitude of radical innovations. We further discuss the influence of radical innovations on industries, designs, and firms below.

Radical innovations can alter, redefine (Kim and Mauborgne, 1999), or rejuvenate existing industries by de-maturing moribund technologies or cause the creation of a new industry (Anderson and Tushman, 1990). However, these radical innovations are often not the outcome of industry incumbents. Large incumbent firms tend to favor exploiting existing technology through incremental innovations (Kusunoki, 1997), whereas industry outsiders or newcomers are more likely to develop radical technologies (Bower and Keogh, 1996) that can redefine industry or transform industries. Google, for example, a rank outsider to the field of telephony, took the lead in internet telephony, using their technological expertise in web and VOIP technologies. This move by Google has changed



the nature of competition for telecommunication players in both wired and wireless telephony.

When several competing innovations simultaneously enter the market, typically one dominant design emerges to become the industry standard. Dominant designs can emerge in several ways. First, as a technology begins to be used, it is understood better and subsequently applications and performance associated with the technology develop faster. Second, the more a technology is utilized, the greater are the economies of scale and cost effectiveness that are developed. Third, complementary assets of the technology develop faster and more effectively. Fourth, the developing firm may co-opt key partners that help determine which dominant design emerges. Fifth, the government may stipulate adherence to a design. Finally, a larger installed base of consumers can influence the dominant design.

With regard to firm success, the alignment between innovation strategy and business strategy underlies organizational competitiveness and success (Burgelman *et al.*, 2008). Companies can choose to focus on a few innovations that have a tremendous impact or many innovations of limited impact (Kimberly and Evanisko, 1981; Damanpour and Evan, 1984). Organizations that are willing to adopt many innovations or undertake a “high innovation magnitude strategy” are consistently willing to face uncertainty and take on risks. Such a high magnitude strategy works in industries where many incremental innovations are needed to make an impact on the market (Gopalakrishnan and Damanpour, 2000). Other industries favor a “low magnitude innovation strategy” (Gopalakrishnan, 2000) where one or two radical innovations alter the industry and generate profit streams.

Where does innovation come from?

Innovations can be either generated or adopted by organizations. Innovations that are *generated* can be used internally within the organization or sold to other organizations or users. The generation process of innovations (Saren, 1984) is typically viewed as a five-stage integrated, but not always, linear sequence that includes idea generation, project definition, problem-solving, design and development, and marketing or commercialization. Each stage is devoted to removing different ambiguities about the innovation, focusing on both technical feasibility and commercial viability. Innovations that are *adopted* originate from outside an organization. The adoption process consists of

two main stages: initiation and implementation (Rogers, 1983). The initiation stage occurs before adoption and involves making members of the organization aware of the innovation, initiating the development of an attitude toward it, and evaluating it from an organizational standpoint (Ettlie, 1980). The decision to adopt an innovation marks the beginning of the implementation stage, where there is a trial implementation with limited application of the innovation within the organization followed by a sustained implementation where the innovation is completely assimilated into the organization (Zaltman *et al.*, 1973).

If an organization focuses on innovation generation, then its strategic thrust will be consistent with “first movers” to introduce radical products and processes that are new to the world. Therefore, the resources required, risks undertaken, and the probability of failure are all significantly higher. Emphasis on innovation adoption more often ensures that organizations adapt to existing products or technologies. This can include imitators that are capable of bringing out new products that are not necessarily “new to the world” or are less radical in nature.

Who engages in innovation?

Innovation can involve multiple actors at multiple levels of analysis such as individuals, teams, organizations, and networks across permeable organizational boundaries and technical domains. Innovation, once perceived as a process internal to an organization, has experienced a paradigmatic shift to include a variety of actors that transcend organizational boundaries and technical domains (Von Hippel, 1988) which has recently been described as “open innovation” (Chesbrough, 2003). Most firms are successful innovators due to their ability to use multiple sources, reaching beyond the firm’s boundaries to include sources such as customers, complementors, competitors, suppliers, universities and/or government laboratories for all or portions of the innovation process (Roberts, 2001). However, individuals serve as the foundation of innovation through their creativity, generating novel and useful ideas that feed the innovation process. These individuals can include employees, customers, users, and inventors. Individuals provide the valuable “human factor” for innovation (Livesay *et al.*, 1996) and the loss of a key person within an innovation system can negatively impact organizational innovative competitiveness (Aime *et al.*, 2010).

Three specific and unique groups of individuals involved in the innovation process most worthy of further discussion are inventors, lead users, and innovative intra/entrepreneurs. *Inventors* are individuals who specialize in the creation of new technological products and processes whether working independently or for an organization. Although there is controversy regarding whether inventors can be “made” or whether invention is an innate ability, research has characterized inventors as individuals who are focused on problems, able to think abstractly, are curious in nature, able to integrate knowledge across disciplines and fields, and willing to challenge existing assumptions (Root-Bernstein, 1989). Interestingly, inventors are not necessarily entrepreneurs seeking commercial gain from their inventions. Thus, inventors often need to connect with others to transform their invention into an innovation (Livesay *et al.*, 1996). While end users of an innovation typically have a deep understanding of their unfulfilled needs and ways to fulfill them to help drive the innovation process, many of these solutions are incremental in nature. *Lead users* are a specific group of end users, though, who experience and understand significant new trends before other users, sometimes years before they emerge, and when identified and tapped, can be a valuable source of ideas for more radical innovations with large market potential while simultaneously saving on development time and costs (Von Hippel, 1988). Gatorade is one of the more famous examples of a lead user-based product, developed by University of Florida doctors to improve the performance of their football team late in games (Von Hippel *et al.*, 2009). Finally, innovative *entrepreneurs* (external) and *intrapreneurs* (internal) are individuals who, rather than simply administer the innovation process as is typical for most managers and executives, actually drive the innovation process. Innovative intra/entrepreneurs include famous icons such as Steve Jobs of Apple, Jeff Bezos of Amazon.com, A.G. Lafley at P&G, and Bill Gates of Microsoft. Research has found that these intra/entrepreneurs exhibit five key discovery skills that distinguish them from others: associating, questioning, observing, experimenting, and networking (Dyer *et al.*, 2009).

Teams also engage in innovation but must be properly organized and led for maximum effectiveness (Burgelman *et al.*, 2008; Bierly *et al.*, 2009). For innovation, development teams must ensure proper communication among members through

physical co-location, open and continuous communication, boundary-less interactions, advanced electronic connections, and cross-functional integration along with clear roles. Innovative teams must also have the right type of leadership. They could be led loosely or closely, by local or heavy-weight managers, and within defined or open-ended parameters, depending on the particular nature of the endemic projects and challenges. *Organizations* as a whole also engage in innovation and must be properly designed and managed to facilitate appropriate processes and metrics. These organizations can include small and large firms, universities, government organizations, and non-profit organizations and the networks among them. For example, universities and government laboratories are organizations that often serve as sources of new knowledge, particularly basic research knowledge that is important for innovation. Many universities have created technology transfer offices, incubators, and science parks, often with the help of government sponsorship for economic development goals, to facilitate links with other organizations or the creation of spinoffs for commercialization of university knowledge (Shane, 2004; Link and Siegel, 2005). Technology clusters are regional clusters of connections in a geographic area based upon a common industry where firms seek the transfer or spillover of tacit knowledge and agglomeration economies through regular interactions (Almeida and Kogut, 1999; Porter, 2000).

How best to execute innovation?

Understanding best practices for innovating involves observations regarding different aspects of the innovation process as well as the application of different management techniques for optimum leverage. In this section we offer several distilled insights regarding the best way to execute innovation. To begin with, there are different *success factors* for basic (i.e., invention or technical success) and applied (i.e., implementation or business success) components of the innovation process. Each of these must be properly managed, either within or between organizations, for innovation to happen (Lengnick-Hall, 1992; Drucker, 2002; Burgelman *et al.*, 2008). Success in the “fuzzy front end” of innovation should involve inspiring creativity, stoking ideas and inventions, and institutionalizing new knowledge generation. As noted previously, individuals are the foundation of innovation. Individuals who engage in innovation must

therefore be properly oriented, motivated, and prepared to innovate (Simon, 1991; Katz, 2004; Kessler, 2004). For example, achievement, opportunity, recognition, and creative freedom can be more important than traditional monetary remuneration during this stage of innovation as innovative people typically have different personality traits, attitudes, and behavioral predilections. Management can promote creativity by enabling employees to work on projects they are interested in and enjoy, tapping the imagination of employees, encouraging creative insights, facilitating creative autonomy and collaboration, enabling access to needed resources, and serving as a champion of ideas (Amabile, 1988; Amabile and Khair, 2008). However, creativity can also be stifled within organizations through factors such as excessive workload pressures and misaligned motivational and managerial systems (Amabile *et al.*, 1996), conservatism, lack of attention to new opportunities, reinforcement of existing practices, and rigid, formal management structures (Van de Ven, 1986).

The translation of possibilities to profits requires an entirely distinct yet complementary set of parameters that capture new knowledge and apply it in strategically functional ways. Superior technology does not always translate into superior market performance. Ideas must be implemented and leveraged both within and across the organization to support viable business models. To this end, carefully designed innovation funnels, rigorously enforced stage-gate processes, diversified technology portfolios, and strategic S-curve mappings are just some of the tools available to managers for instilling “discipline” into an otherwise loosely governed inventive process and building the bridges from technical success (ideas) to business success (dollars).

When pursuing innovation, managers must also achieve a *balance* between preservation (e.g., their identity, core competencies, and competitive advantages) and destruction (e.g., their possibilities, future trajectories, and adaptations to new market realities) (Lieberman and Montgomery, 1988; Leonard-Barton, 1992; Schilling and Hill, 1998; Gopalakrishnan *et al.*, 1999). This equilibrium is achieved by simultaneously leveraging and adapting core competencies so that an organization can keep doing what it does well but adapt to, or even shape, the patterns of technological evolutions and avoid getting bogged down in formerly useful but ineffectual core rigidities. They must also

achieve a balance between different innovation performance metrics including the synergistic deliverables of minimizing time-to-market (speed), maximizing fit with customer requirements (quality), and optimizing the development process (cost). The most successful innovators recognize that these outcomes are inherently intertwined and that trade-offs must be managed to produce innovation that is simultaneously efficient, effective, and fast. However, it is important to recognize that there is a difference between *speed* and *haste*. Whereas competitive, technological, and other forces demand that managers execute the innovation process with extreme efficiency and effectiveness, there are both promises and pitfalls in pursuing an accelerated innovation paradigm (Clark and Fujimoto, 1991; Eisenhardt and Tabrizi, 1995). From a management perspective this means properly establishing orientation criteria and innovation strategy, setting innovation scope and project parameters, infusing project staffing and team structures, and enabling innovation capability and processes. Looking at the big picture one must consider that speed is not an end in itself but a tool bringing advantages, as well as exposures, that can be used to support pioneering, fast follower, or late mover strategies.

Overall, research has clearly established that there are more and less facilitative approaches to creating a *sustainable platform for innovation* (Van de Ven, 1986; Damanpour, 1991; Schilling and Hill, 1998; Kessler *et al.*, 2001; Burgelman *et al.*, 2008). Managers need to shape a deep seated innovation-conducive culture through drivers that include tolerance for failure, dedication to continuous learning, taking reasonable risk, and creating comfort for acting and reinventing oneself in uncertain environments. Innovative organizations also need to create requisite structural capacity to process and acquire the raw material for innovation, as well as the “absorptive capacity” (Cohen and Levinthal, 1990; Tsai, 2009) to recognize and properly integrate external knowledge as well as to enhance innovative capacity and success. Finally, managers need to achieve “ambidexterity” – the ability to behave like “big little” firms with unique yet complementary control systems, structures, cultures, decision parameters, and patterns of operations to drive the innovation process (Kanter, 1988; O’Reilly and Tushman, 2008). This requires the establishment of systems that harmonize bureaucratic and organic mechanisms of governance and regulate design parameters such as

differentiation and integration as well as formalization and centralization to achieve a balance of tight and loose systems, and prudently pursue concurrent, parallel project management strategies. For example, some of the most successful firms manage innovation by seeking to be initially creative and organic in their structure and processes to promote creativity and novel ideas but become more mechanistic as an invention progresses toward production and commercialization (Burns and Stalker, 1961), all the while continuously cross-seeding initiatives, leveraging developments across projects and platforms, and accelerating learning opportunities.

The present – best practices from innovative companies

In this section, we briefly profile three companies – Google, Walt Disney, and Johnson & Johnson – to illustrate how the previously discussed questions of what, why, who, where, and how are put into practice. Though they operate in very different industries their approaches to managing innovation reveal some startling similarities. All of these companies early in their life cycles seem to rely more on internally generated growth than on acquisitions. However, in later stages, they have all developed the skill to scan their industry and adjacent industries and make important mergers or acquisitions that have either increased their existing product lines and expanded market share or changed the scope of their business. All three of these companies have found distinct ways to develop or assimilate products, processes, and practices and integrate their businesses with those of the acquired companies to create positive systems. In short, they apply many of the above lessons to achieve sustainable innovation success.

Google

Google runs over one million servers in data centers all over the world, and processes over one billion search requests every day. The name “Google,” which in popular parlance has since become a verb, has its origins in the word “googol,” which is a mathematical term for 1 followed by a hundred zeros and is emblematic of the immense volume of information that exists and the scope of the company’s mission, which is to organize the world’s information and make it universally accessible and useful. The company founded in Menlo Park, California in 1998, focused on search engines. Google’s search engine is the market leader

with a nearly two-thirds market share in 2010 (www.comscore.com). Since its founding, the company has grown rapidly and has expanded to a chain of products, acquisitions, and partnerships beyond its core search engine business (www.pandia.com; Kuhn, 2009).

Google has introduced many product innovations, some of which have broadened its product line. Others have expanded the scope of its market and moved the company into new arenas with new categories of competitors. Some of Google’s products and services have enabled the company to enter new industries and diversify their product lineup. In 2004–2005, Google launched Google maps, later Google Earth, which provided high-resolution monochrome images of the earth. In 2006, Google acquired the online video website YouTube, which facilitates the uploading and viewing of videos. Google’s other product innovations such as Gmail, the e-mail software that has many new product components such as “chat,” web phone calling (Google Voice), and “buzz” (social networking) are built into the platform. This product has significantly altered the email experience. Some of the new industries that the company has entered include social networking with Orkut, an online community to help individuals maintain existing relationships with pictures and messages. The company has also launched an open source web browser “Chrome,” to compete with Microsoft’s Internet Explorer.

In addition to the consumer market, Google has forayed into the enterprise market with its Google search Appliance, targeted at providing search technology to larger organizations. Google launched Google Apps premier edition targeted for the business user. This provides additional disk space for email, API access, and premium support for a monthly fee. Google also provides security services to businesses (http://www.google.com/Top/Business/Business_Services/). Most recently, Google launched “Google Wave products,” which can be compared to Microsoft’s Sharepoint, where users can instantly communicate, collaborate, and work together. Finally, Google has also entered new industries such as the smart phone software market with the Android phone operating system. This phone system competes with other smart phones like Apple’s iPhone and RIM’s Blackberry and is used on phones such as Nexus One and Droid Eris (<http://Alexa.com/siteinfo/google.com>).

Google’s growth has been facilitated by a combination of organic evolution and strategic acquisitions. The company has an inherently

entrepreneurial spirit (<http://www.xconomy.com/national/> 2009). According to Google's Managing Director Jim Lecinski, there are nine cornerstones of the company's innovative culture that include: (1) launching new products early and often, rather than trying to perfect the ideas; (2) believing in transparency in the workplace and open communication; (3) hiring brilliant generalists rather than specialists; (4) allowing employees to pursue their dreams (Google has a 70–20–10 rule; this means that the company spends 70% of its engineering resources on core products, 20% on emerging areas, and 10% on wild and crazy ideas. Google Earth was the result of one such "wild and crazy idea"; (5) believing that data beats opinion; (6) keeping employee generated ideas streamlined toward the company goals; (7) focusing on creating products that are innovative and useful, not just something the company can sell; (8) not killing ideas, but morphing them into something useful; and (9) believing that good ideas can come from inside as well as outside the company. This openness to ideas and Google's ability to identify and assimilate the opportunities from the outside has led to its successful acquisition strategy.

Since 2001, Google has acquired more than 50 companies to accomplish its growth objectives. Some of the more significant recent acquisitions have been AOL's broadband internet access for \$1 billion in 2005, followed by YouTube in 2006 for \$1.65 billion in stock. In April 2007, Google acquired DoubleClick for \$3.1 billion and the acquisition gave Google access to DoubleClick's web publishers and advertising agencies. More recently, the company has acquired Grand Central, which subsequently changed to Google Voice. Google has also purchased AdMob, a mobile display and technology provider, which allowed the company to bring innovation and competition to mobile advertising.

Overall, a combination of factors identified in the research literature has continued to keep Google as one of the fastest growing and innovative companies. Its ability to recruit and manage innovative individuals, its design of a structure and culture promoting freedom and risk-taking from within, its skill at identifying opportunities from the outside, its leadership, that is, willingness to invest the resources in bold business ideas, and its ethos of integrating numerous initiatives into a streamlined vision within the company's broad boundaries. Ultimately, Google's managers have been able to anticipate the

changing industry realities and to use the resources at their command to accelerate innovation and place the company in an advantageous strategic position.

The Walt Disney Company

The Walt Disney Company is the largest media and entertainment conglomerate in the world. Founded in 1923 as Disney Brothers Cartoon studio, the company was reincorporated in 1929 as Walt Disney Productions. In 1984, the then CEO Michael Eisner renamed the company The Walt Disney Company, which substantially increased its scope (Kirkman, 2001).

The Walt Disney Company operates four primary divisions: The Walt Disney Studios, which includes its film, recording label, and theatrical businesses; the Parks and Resorts business, which features the company's theme parks, a cruise line, and other travel-related assets; the Disney consumer products division, which produces toys, clothing, and other merchandising based on Disney-owned properties, and the Media Networks business, which includes ABC TV network, and 10 owned TV stations, radio networks, and other internet-based businesses. By 2009, The Walt Disney Company had 144,000 full-time employees and revenues of over \$36 billion (Hoovers, 2010).

A broad analysis of Disney's approach to innovation reveals that it tends to harmonize three distinct management strategies. First, the company has internally generated, brought to the mainstream, and popularized several frame-breaking product ideas. For example, the concept and production of the first full-length feature film with animated characters in a movie began with the Disney hit film "Snow White and the Seven Dwarfs," paving the way for a succession of future animated films that remain popular to this day. Second, the company, through its creativity and innovation, has reshaped and redefined the boundaries of industries. The Walt Disney Company challenged the existing tradition of amusement parks as being somewhat messy and rather folksy and created the concept of a "theme park" (Croce, 1991). These "theme parks" envelope the visitor in a carefully constructed, thematically focused atmosphere (King, 1981). The theme parks not only showcase the studio characters, but also carefully control the illusion of entering Disney's cartoon and movie world, leveraging their film business. The execution of the theme park concept relied largely on the six tenets of Disney's culture further

discussed below. Finally, through its history, the company has reinvented and transformed its businesses, products, and services as technology and customer preferences have evolved. Through their transformation, they have built synergies across their businesses. For example, the Disney characters Mickey Mouse and Sleeping Beauty are used in their movies, theme parks, and television broadcast programs (Kirkman, 2001).

Walt Disney's core management principles continue to remain at the heart of the company's culture and strategy (Capodagli and Jackson, 1999) and form the bedrock of its innovative reputation. Here we outline six of those principles. The first principle, "make everyone's dream come true," outlines the importance of allowing individuals to dream and develop their creative talents and also to meet customer desires. The second, "never a customer, always a guest," emphasized the need to understand and integrate the wishes of all guests and treat them with respect and honesty. The third, the principle of "all for one and one for all," highlights the importance of teamwork and structural empowerment of the employees. Teamwork is described as a method of fostering intense loyalty, enthusiasm, and commitment. The fourth principle, "dare to dare," encourages a culture of risk-taking as a method for cultivating innovative ideas. The fifth principle is "practice, practice, practice," which outlines the importance of formal and continuous training. The sixth principle, "make your elephant fly," stresses the creation of a long-run, sustainable, institutionalized orientation on innovating for excellence rather than disjunctive creative leaps. The Walt Disney Company recognized the importance of creativity but felt that it required careful and constant management (Capodagli and Jackson, 1999).

Disney, like Google, has grown through a careful combination of internal generation of ideas and external acquisitions. Some of their significant acquisitions include Miramax Films in 1993, American Broadcasting Company in 1996, The Muppets in 2004, Pixar Animation Studio in 2006, and Marvel Entertainment in 2009. Their acquisitions have reinforced internal capabilities to propel Disney to a more dominant position in key industries like film production and the creation of animated characters. In addition, their innovation system has allowed Disney to expand its capabilities to capture new market segments and enter new industries such as television broadcasting.

Johnson & Johnson (J&J)

J&J is a large, diversified, and well-established firm that is an innovative leader in the health-care industry. J&J was founded in 1886 in New Jersey and operates worldwide today in three segments through more than 250 operating companies within 60 countries, employing over 115,000 workers. Its three divisions consist of pharmaceuticals, medical devices and diagnostics, and the consumer market. The Pharmaceutical division manufactures drugs for a variety of ailments such as neurological conditions, blood disorders, autoimmune diseases, and pain. The Medical Devices and Diagnostics division offers products such as surgical equipment, monitoring devices, orthopedic products, and contact lenses. The Consumer division makes over-the-counter drugs and products for baby care, skin care, oral care, first aid, and women's health. Among its well-known product innovations and brands are Band-Aid bandages, Tylenol medications, Johnson's baby products, Neutrogena skin and beauty products, and Acuvue contact lenses (Hoovers, 2010).

Part of J&J's sustainable success can be attributed to its evolution from a closed to open innovation system, with regard to research and development initiatives. J&J had historically relied on internal sources of innovation until a few decades ago, relying particularly on internal scientific knowledge and competencies, reflecting a closed innovation system. Until a few decades ago, J&J viewed this early paradigm as beneficial, worth the billion dollar investments made. It resulted in high-impact benefits not only to the firm but also to consumers, such as reduced deaths associated with HIV/AIDS, heart disease, and cancer. However, over time, the firm found that adopting a more open innovation system offered better solutions in an evolving environment. Specifically, the shrinking of the drug pipeline and the sequencing of the human genome pushed J&J into more complex areas of human health that required greater collaboration, which was enabled through advances in information technology.

Today, J&J seeks knowledge from other firms, universities, and research institutes across disciplines and geographic areas. It also continues its internal research and development efforts to retain absorptive capacity, to tap a wider range of expertise, capabilities, and resources for more useful technologies, and to find solutions to advance health care (Stoffels, 2009). As J&J mostly generates product innovations rather than adopting them,



protecting its intellectual property is also critical to appropriating new knowledge and economic benefits, particularly within the open innovation model where multiple sources may have varying rights to an innovation (Johnson & Johnson, 2010).

J&J is also structured such that both centralization and decentralization processes drive its innovations process. J&J allows its global operating companies to be extremely entrepreneurial in character and to function as individual small businesses closely aligned to customer needs. They can offer creative and high-quality solutions while also drawing from and sharing the immense competencies, know-how, and data that exist within the larger corporation, such as scientific breakthroughs, marketing insights, and manufacturing expertise: "... it's like having dozens of strategic partners at their fingertips" (Johnson & Johnson, 2010).

The innovation processes discussed above at J&J have been described as pervasive and systematic and are executed through individuals, teams, culture, structure, training, and an overarching set of clear and measurable objectives. A council of innovation leaders helps develop strategy and align all divisions to common innovation objectives. This strategy continuously nurtures an innovative culture that spawns a community of practice in which the best innovation practices are shared throughout the firm. Innovation training is provided to leaders to best facilitate innovation project progression. Goals and metrics are created to judge the effectiveness of the innovation efforts (Frey, 2010). Innovation is not a passing fad at J&J; it is a lifestyle.

The future – key trends and emerging issues for managers

Nanotechnology

The first emerging area of innovation management that we would like to highlight pertains specifically to nanotechnology (Roco, 2005; Shea, 2005; Meyer, 2007; Islam and Miyazaki, 2009). Nanotechnology refers to innovative processes for manipulating materials on the atomic and molecular level ("nano" refers to one-billionth of a meter). As such, it enables the creation of novel structures and materials and is at the forefront of an emerging paradigm shift whose impact may equal or surpass that of computers and the Internet. Nanotechnology has attracted massive public and private investment and promises to dramatically change protocols in many different fields, even creating whole new

industries (www.nano.gov). Some expect that it will usher in numerous inventive processes that could transform a broad swath of technical domains. For example, according to the United States National Nanotechnology Initiative, the budding applications of nanotechnology are said to touch areas as diverse as aerospace, agriculture, biotechnology, homeland security and national defense, energy, environmental improvement, information technology, medicine, and transportation.

Nanotechnology is a potential radical innovation, which brings with it a new bottom-up approach to manufacturing and design. It is, in a sense, a general-purpose technology that can contribute to a wide variety of process and product innovations due to its ability to introduce advanced components and manufacturing techniques and, thus, create super-functional properties of materials at nano-scale. To cope with this new technique, organizations must be prepared to explore this frontier prudently and strategically adapt their product and process base to consider new business models, policies, and sources of competitive advantage. Amazingly, we are only in the embryonic phase of this technology. In addition, whereas there are many who recognize its future possibilities or possible dangers of research, there is little innovation-related literature on how organizations should manage this emerging area. Yet, its reach is rapidly spreading to almost every field of science and technology, and it has been identified as one of the most promising new growth technologies. Thus, taken together, nano-technological advances promise to have a pervasive effect on future innovative activity.

Ethical Issues on Biotechnology

The second area we focus on relates to ethical issues where, for example in biotechnology, innovative activity proliferates and is directly intertwined with ethical challenges. In its simplest form, biotechnology is technology based upon biology. While this can encompass many different and established areas such as breeding animals, developing useful crops, and the creation of cheeses, more recent advances have allowed applications at the cellular level with DNA serving as the cornerstone of research and applications. Armed with cell and DNA information, multiple industries are being revolutionized by new innovations. In health care, genetic diseases and predispositions to diseases can be identified as can best treatments and dosages for a particular patient, revolutionizing the health-care

industry from a reactive to proactive stance on health management. In addition, pollution-eating microbes can be harnessed to facilitate hazardous waste clean-up and genetically modified crops that are pest-resistant can reduce the need for pesticide application, subsequently improving the quality of food, soil, and water. In addition, the creation of bio-fuels from plant cellulose offers an alternative fuel source (BIO, 2008).

While the biotechnology discipline offers high potential for product innovations, it also offers potential for process innovation. Understanding the molecular basis of a given process allows many products to be tested in cells, saving firms time and money and leading to better products. For example, pharmaceutical firms can use biotechnologies such as cell-culture and microarray technologies to test the safety and efficacy of drugs and observe their side effects early in the drug development process (BIO, 2008). In addition, the targeted nature of biotechnology based upon DNA knowledge can offer more precise health management with fewer side effects for patients.

However, with this advancing biotechnology knowledge and subsequent applications come several ethical concerns. Accessibility of biotechnology products and processes is an important concern to developing nations. Intellectual property rights associated with biotechnology have resulted in limited product diffusion worldwide, and the vast majority, up to 90%, of biotechnology research dollars are spent on the needs of the wealthiest 10% of the world's population with perhaps too little focus on the needs of developing nations (Daar, 2006). For example, the societal benefits for biotechnology, such as improved and sustainable foodstuffs and quality health care, are in great need in developing nations where there are fewer financial resources. The cloning of animals and humans is another hotbed of ethical debate. While many agree with the premise that human cloning crosses clear ethical lines (BIO, 2008), animal cloning is less clear. On the one hand, animal activists argue that such cloning violates animal rights and welfare. On the other, some scientists argue that cloning of food-producing animals raises health concerns for human consumption. Other scientists argue that if properly controlled and managed, animal cloning can offer benefits to humans with regard to treating diseases and organ transplants (BIO, 2008). Another ethical challenge is the use of embryonic stem cells. Embryonic stem cells serve as undifferentiated cells

offering greater benefit than other forms of differentiated stem cells. However, the use of embryonic stem cells and the related religious and legal issues associated with how these stem cells are gained, has resulted in a complex and fluid maze of restrictions across national and regional boundaries that are only beginning to be understood (Chivian and Bernstein, 2008). Finally, issues related to medical privacy and genetic discrimination are an ethical concern. Since biotechnology offers the unique benefit of individualized health care based upon genetic makeup, irresponsible use of this information, especially information on the predisposition to certain afflictions, can result in discriminatory practices in unintended ways in contexts such as employment or health insurance.

Challenge of Social Networking

The third emerging idea concerns how aspects of information technology and social networking affect the creation, diffusion, and assimilation of innovations. Social networking is facilitated by networking sites such as MySpace, Facebook, LinkedIn, and Twitter; these sites comprise an online community that allows users to share information. Together, they act as collaborative platforms allowing entire networks to grow in value as the user base increases (Schmugar, 2009). Today, social networking is seen as a major, potentially disruptive technology, which affects the way businesses interact and build relationships with their constituencies, whether they are clients, prospects, or current or prospective employees (Connell *et al.*, 2009).

Social networking increases the number of active connections that each person can maintain and increases their number of social ties; it also raises the ability of businesses to target specific target market niches even if they constitute smaller numbers (AT&T White Paper, 2009). All of these factors produce tools that foster a collective intelligence, collaborative work, and support communities that influence each other's behavior and emotion (Ellison *et al.*, 2007; AT&T White Paper, 2009). Social networking also provides numerous opportunities for corporations in terms of how they innovate and diffuse innovations. These opportunities include the ability to turn customers into fans, evangelists, and sales people through peer-to-peer recommendations as well as allowing product ideas and technologies to be accepted faster, increasing product usage and reducing uncertainties (Connell *et al.*, 2009). Networking will also



increase the extent to which activities of corporations become transparent. Consequently, firms will need to rethink their image control. Finally, changes in communication and collaboration will change the structure and dynamics of direct marketing; they will enable better understanding of customer needs, aid faster launches of new products, transform Customer Relationship Management (CRM) in “personalizing” the contact with customers and reconnecting with the web and online service centers for a better customer experience and retention (AT&T White Paper, 2009). Broadly, social networking will affect the way customers communicate about products and, therefore, stories of successes and failures will be transmitted more rapidly through the community of users. Information exchange occurs instantaneously and can have profound consequences on how products are developed, commercialized, marketed, and serviced.

Emergence of Globalization and Sustainability

The fourth emerging area of innovation management pertains to large systems, specifically globalization and sustainability. To the issue of globalization, the most effective organizations are embracing the internationalization of business processes by transforming their innovative activities to leverage the expanded resources which lie beyond traditional national and corporate borders (Gerybadze and Reger, 1999; Doz, Santos and Williamson, 2001; Narula and Duysters, 2004). The trend toward globalized innovation is such that the term is practically redundant. Multinational firms and localized competency centers are uniting to change the landscape or arena where innovation takes place. Trans-national innovation “systems” are thus bringing together resources and combining knowledge bases to produce rapid and significant advances both in the public and private sectors. It is not unusual for companies to have innovative labs, institutes, or other facilities on numerous continents, simultaneously supporting and complementing efforts. In fact, it is becoming more difficult to tell where company and national boundaries begin and end, such as in the significant Indian, Russian, Chinese, Brazilian, Eastern European, or American outposts integrated within foreign corporations’ governance structures.

From an organizational perspective, the globalization of innovation has increased the collaborative potential that powers the innovation engine. Advances in communication and transportation

technologies have enabled a sharing of knowledge, processing of information, utilization of techniques, insight into market developments, and leveraging of technical expertise unparalleled in modern history. Research scientists and management professionals are linked together around the world in virtual networks to operate as high-performance project teams to spread out the risks and challenges of innovation, gain access to new science and technology discoveries, exploit cost differentials, increase efficiencies, and tap into the cross-fertilization of ideas that come with internal off-shoring or external out-sourcing. Of course, these opportunities do not come without challenges such as the management of cultural differences, communication linkages, and process complexities. In this sense, the trend toward global innovation value chains, R&D networks, and open systems innovation will represent a continuing and growing area of focus.

To the issue of sustainability, the most effective organizations are embracing the “greening” of business processes by transforming their innovative activities to address this central societal and business challenge (Bansal and Roth, 2000; Kessler and Wong-Mingji, 2009; Marcus and Fremeth, 2009; Taylor, 2009). Sustainability refers to the challenge of advancing current standards of living without impinging on future standards of living. It is often represented by a triple-bottom line of the “3P’s” – people, profits, and planet. Meeting the call of sustainability has moral as well as strategic implications. Organizations that can harmonize efforts to “do well” and (vs/or) “do good” and recognize the synergistic/reinforcing (vs conflicting/trade-off) nature of the two goals will gain significant advantage over their competitors. For example, in automotive industries, firms that have harnessed green technologies and innovations to leapfrog others by appealing to resonant needs have gained increased revenues and market share. More than these immediate effects, the challenges of green business can serve as a critical catalyst to inspire innovative activity that, in the spirit of the aphorism that necessity is the mother of invention, propel rather than inhibit win-win thinking about being simultaneously financially successful and environmentally responsible. This type of thinking is evidenced by worldwide efforts to increase funding for eco-friendly, energy-saving, and life-enhancing technologies. Those managers who adopt this innovative mindset will open new doors for the most forward-looking companies not just to

garner much goodwill but also to address new market opportunities, gain premium pricing, enhance knowledge resources, and improve processes and products.

Actions – guidelines for managers

Whereas the preceding sections have effectively laid out the fundamental insights of the field [the *Past*], best practices of select firms at the forefront of these areas [the *Present*], and key trends and future developments that promise to impact organizations [the *Future*], this final section offers resultant prescriptions for action that can guide managers as they seek to incorporate this information to promote effective innovation practices and programs. Our first guideline for action, which is based on the insights of the past, is the following:

Managers should firmly ground their innovation initiatives in solid theoretical and empirical frameworks ... or live (and perhaps die) with a sub-optimally structured and capriciously managed innovation program.

There are many useful corollaries to this recommendation. For example, managers are advised to:

- *Focus on the entire innovation process and range of innovation possibilities:* The impact of innovation is more pervasive and interconnected than is normally understood. Heeding this insight will enable a broader innovation portfolio that spans administrative and technical, product and process, radical and incremental, and architectural or component initiatives.
- *Be congruent in adopting appropriate innovation types at appropriate times:* This will enable a better alignment between your organization, its structure and culture, its overall business strategy, and its innovative enterprises.
- *Establish necessary systems and strategies for innovation:* Innovation is not simply an “a-ha” moment but instead, more often than not, the product of proactive planning and facilitative contexts. Heeding this insight will enable you to more efficiently manage fluid and fuzzy front-end processes, leverage dominant designs, and shape as well as ride technological transitions to achieve both technical as well as business success.
- *Tap internal as well as external and general as well as specific sources of innovation:* The seeds for innovation can be found in a variety of places yet tend to grow in somewhat predictable patterns. Heeding this insight will enable you to

maximally spur and capture innovative ideas by inspiring creativity, connecting with lead users, and empowering “intrapreneurs” (internal) as well as overcoming “not-invented-here” mindsets, constructing absorptive capacity, and facilitating technology transfer (external).

- *Diversify competencies and integrate networks to drive innovation:* Innovation is a multi-level process that involves a variety of actors working together interdependently. Heeding this insight will enable you to hire, motivate, and integrate innovative individuals, structure and manage them within high-performing project teams and design overarching innovative structures to institutionalize these capabilities into your organizational culture and identity.
- *Engage and execute innovation in a way that balances countervailing forces and seemingly contrary expectations:* Indeed innovation is the prototypical “balancing act” – walking the proverbial tightrope between stability and change. Heeding this insight will enable you to proactively destroy (before someone else does) and recreate your advantage while maintaining identity, and mining core competencies during the process of breaking core rigidities, and simultaneously as well as synergistically pursuing speed (*vs* haste), quality, and cost-based metrics.

Our second guideline for action, which is based on an analysis of leading innovative organizations of the present, is the following:

Managers should benchmark against the best innovation practices and profiles of the most innovative companies ... or remain insulated and at a competitive disadvantage.

This suggests that it is useful to constantly seek out and learn from those who have mastered the preceding principles to a greater extent than their contemporaries. Of course, it is not advised to blindly emulate these complex innovative systems – this may lead to problems if one’s ambition exceeds one’s capabilities (Kessler *et al.*, 2001) where, to borrow a phrase, “one’s eyes are bigger than one’s stomach.” Instead, it takes discipline to understand at a deep level how these organizations and managers are able to produce sustainable innovation success. It takes intellectual and physical capacity to process the significant challenges endemic in the innovation process. It also takes vision to customize learned



insights for one's personal situations to effectively engage innovation in one's own domain. Therefore, we do not intend this paper as a blueprint or to be interpreted as a manifest punch-list for innovation. Rather, it should be used to better orient perspective, highlight issues, and inspire action that is proper for the general truths and specific circumstances of the manager's focal organization.

Our third guideline for action, which is based on the forecasts of the future, is the following:

Managers should anticipate, appreciate, and acclimate to emerging innovation trends ... or risk being left behind in a perpetually and even increasingly changing world.

This raises the specter, be it labeled an opportunity or threat (or perhaps more accurately – both!), that innovation processes and paradigms constantly progress. The tools and techniques in which they are deployed are expanding and becoming increasingly customized. The ethical frameworks and social systems in which they operate are changing and raising new managerial

issues. Managers must embrace and assimilate the social phenomena driven by technology adoption. The organizational and system boundaries to which they are oriented are shifting and becoming more complex. Innovative organizations must constantly operate at the vanguard of these evolutions and revolutions.

Taken together, we believe that a broad consideration of the scholarly literature, a prudent benchmarking of its applications, and a progressive projection of its trends necessitate a grounded, systematic approach to the management of innovation. In the highly complex and dynamic competitive business context which characterizes our times, innovation capacity stands out as one of the most important differentiating factors enabling sustainable success. Managers must therefore look beyond the fads, fashions, and headlines of the day to the underlying fundamentals. Indeed, the central message of this paper is that understanding the core insights of the innovation process and mastering the practical principles for its management will enable organizations to be more successful both in their near and long-term pursuits.

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