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ALIGNING MARKETING AND TECHNOLOGY TO DRIVE INNOVATION

Successful breakthrough innovation depends on integrating marketing and technology functions, a study of 32 companies demonstrates.

Ronald Cotterman, Alan Fusfeld, Pamela Henderson, Jonathan Leder, Carl Loweth, and Anthony Metoyer

OVERVIEW: *Creating breakthrough innovations requires alignment of both marketing and R&D processes within organizations. In a study aimed at determining the most effective practices for developing innovative new products, executives from 32 successful technology companies were interviewed. Success in achieving breakthrough innovation was found to depend strongly on the nature of a firm's organizational structure, market research processes and corporate culture. Those companies with a history of successful breakthrough innovation have established processes that integrate marketing and technology functions. They utilize cross-functional teams that identify more strongly with the innovation project than with their functional orientation, participate in idea generation processes that marry marketing pull and technology push, engage both marketing and R&D staff in market research processes, and integrate R&D and market inputs when selecting innovation targets.*

KEY CONCEPTS: *levels of innovation, organizational structure, market research, corporate culture.*

The study reported in this paper sought to differentiate between practices leading to incremental versus breakthrough innovation. The goal was to identify proven and effective practices that consistently drive breakthrough as opposed to incremental innovation. To accomplish this we looked across companies to see the commonalities rather than highlighting one company's practices in depth. This study thus adds to and expands upon the innovation literature by providing normative rather than simply descriptive findings regarding drivers of disruptive innovation.

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Our study sought to explore more deeply the extent to which companies with a strong record of breakthrough innovation were able to align robust working relationships and processes between marketing and technology functions. How did they identify and commercialize successful innovations? How did they define the roles and responsibilities of marketing and technology groups? What was the balance between "technology push" and "market pull" for successful projects? How did they merge the unmet needs of the market with the potential of advanced technology to deliver solutions that had a strong value proposition for both the customer and the company? What were the specific organizational structures, market research methodologies, and integrated development processes that drove these innovation successes? How did the practices used by the various companies compare, and which were in general most successful?

We used an open-ended, in-depth interview process with a senior executive from each of 32 companies with a history of successful new product introductions and technology development to discover what they attributed their success in innovation to, and what the key innovation drivers and effective practices were. Analysis of these case studies produced a framework that emerged from and subsequently defined distinctively different behavior across the broad innovation elements of corporate culture, market research processes and organizational structure.

Four Levels of Innovation

Interview data were summarized and the companies classified into four levels of innovation, from 1 (lowest level) to 4 (highly innovative), with the sample set being distributed across all four levels:

Level 1 – Limited product change and not satisfied with innovation approach and results.

Innovation level is a function of the firm's organizational structure, market research processes and culture.

Level 2 – Incremental products and somewhat satisfied with innovation approach and results.

Level 3 – Some breakthrough products and somewhat satisfied with innovation approach and results.

Level 4 – Breakthrough products and fully satisfied with innovation approach and results.

Analysis of the data collected in this study indicates that a company's innovation level is a function of three elements: 1) organization of the people involved in uncovering unmet market needs; 2) market research tools and processes that are employed; and 3) the corporate innovation culture. In general, companies with high levels of breakthrough innovation have well-developed capability in all three of these areas. Figure 1 illustrates the degree to which companies at varying levels of innovation have implemented processes in these areas.

While other papers in the literature, including those cited, describe organizational structure, processes and

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culture associated with innovation, none developed a framework for Levels of Innovation that distinguish among innovative companies. This paper explores common practices for incremental innovation which differ significantly from those used in breakthrough innovation. The methodology used in this paper furthers the field of innovation research by enabling insights to be gained by leveraging the consensus and divergence often found in corporate practices. In addition, this effort highlights the often overlooked area of market insight as a driver of breakthrough innovation (*1*). It shows the evolution of methodologies used as well as the appetite for greater innovation around these methodologies.

Organization

Companies in the study that are at Level 1 tend to focus on current business and demonstrate relatively low levels of new product development. They are organized without specific new product development (NPD) groups.

In Level 1 and some Level 2 companies, either Technology *or* Marketing (or sometimes, Sales) takes responsi-

The most successful firms have effective systems for generating and managing ideas.

bility for leading product development. These departments offer project teams either technical or market research and services. These companies do not have designated new product development groups, and members of the development team also handle existing product lines.

One of the characteristics of Level 3 and 4 companies is the presence of dedicated NPD or innovation groups within their organizations. These groups are either at a division or corporate level and consist of *both* technical and marketing staff, and often other functions playing a part as well. They have dedicated resources, thereby avoiding borrowing time from individuals from different departments; sometimes they have common goals and metrics.

Common training in techniques (rapid commercialization, voice of customer, etc.) leads to a common language and methods. Focused cross-functional NPD groups work together from the beginning of a project. A Level 4 participant emphasized the importance of securing this relationship, "The relationship is built over time between marketing and technical [staff]." It is important for these two sides to work together, but the relationship is built by working closely and cooperating.

Instead of viewing themselves as separate departments, marketing and technology groups in Level 3 and 4 companies capitalize on their diverse perspectives to create innovative new technologies that match market need. Cross-functional communication and teamwork allow structural processes to run smoothly, increasing successful results. People may be chosen for these teams in part because of their ability to network with other functions.

Level 3 and 4 companies in our sample consistently involve both technology and marketing team members with the customer from the earliest stages. Their early involvement improves information retention, identifies key needs and performance indicators, and speeds up the development process. Cross-functional team involvement in the initial market research and idea generation reduces the likelihood of losing information, and the

Participating Companies

Acuity Specialty Products Group
Agilent Technologies
Albany International Research Co.
Arctic Cat
Baldor Electric Company
BASF
Caterpillar Worldwide
Colgate-Palmolive
Dow Corning
DSM Corporation
Energizer
Ford Motor Company
Gateway
Graco International, Inc.
Hewlett-Packard Labs
Honeywell International
Illinois Tool Works, Inc.
John Deere
Johnson Controls Automotive Group
Leggett & Platt
Masterfoods USA
Microsoft Corporation
Milliken Research Corporation
Novozymes Biologicals Inc.
PPG Industries
Praxair, Inc.
Rohm & Haas
Scientific Atlanta, Inc.
Sealed Air
Teknor Apex
Tektronix
Tyco Electronics

		Level 1 Low innovation	Level 2 Incremental	Level 3 Some breakthrough	Level 4 Breakthrough and incremental
Organization	**New product development group**	No specific NPD	Divisional NPD		Corporate NPD & Divisional NPD
	Cross-functional teams	Separate departments		Within same product group	
	Idea generation processes	None	Informal processes		Informal & formal processes
Market research processes	**Unmet needs**	Informal processes	Quantitative methods		Qualitative methods
	Customer validation	After market	Pilot and prototype	Concept and feasibility	Continual
	Team involvement	Sales and marketing	Marketing and technical		Marketing and technical highly integrated
Corporate culture	**Idea origination**	Market-focused	Technology-focused	Balanced marketing and technology	
	Leadership support	Recognized importance	In transition		Model behavior
	Reward structure	Not reward-focused		Annual rewards	Frequent rewards
	Creative time	None recognized		Encouraged	Designated resources

Figure 1.—The 32 companies studied are classified into four levels of innovation, each of which is a function of the three elements listed at left. The boxes show how practices differ as one moves from Level 1 to Level 4 companies.

information gathered is more easily transformed into breakthrough ideas. In addition, technology and marketing bring different perspectives to the development process; each notices aspects of customer needs or product ideas that others would miss. This stimulates creativity (*2*).

The most frequently mentioned challenge to new product development teams is the tension between new and existing product groups. Both product groups must succeed for companies to thrive, but it can be difficult to ensure each is valued equally (*3*). If employees work on both new and existing products, new products often take a back seat. As one Level 4 participant explained, "It winds up being a battle between the urgent and the important. And often the urgent wins, so you end up spending your time on the smaller projects that don't move you forward very much. That's why we don't have the same people working both types of [new and existing] projects." Respondents whose companies separated their product development teams from teams dedicated to existing products reported fewer complications and more focused progress in each area (*4*).

Level 4 companies in our sample have developed effective systems for generating and managing ideas. The most successful companies use multiple systems for developing and collecting ideas, and employ some level of infrastructure to sustain these systems. The most effective systems involve discussions in which ideas can be reviewed and developed further. Highly innovative companies typically have an intranet system for collecting and advancing ideas, often through a management group with representatives from both Technology and Market-

ing. Quick response maintains interest in developing more ideas. While some respondents feel these systems could be more efficient, the regular review of ideas shows the value of innovation and keeps a constant stream of ideas flowing into the system.

Across all four levels of innovation some form of an operational roadmap was used to move new product projects from idea to launch. The most widely used system was the Stage-Gate® process, with fairly similar stages being utilized including the concept, development and launch phase. Respondents describe the first stages as more flexible or "fuzzy" than the later phases (*5*). The stages not only allow for assigning the right resources to attractive opportunities, but also allow companies to discontinue projects early in order to prevent making large financial investments in unattractive opportunities. However, it is important to note that Stage-Gate was not seen as a driver of success and its use was not a differentiating factor among the four levels of innovators.

Market Research Processes

Level 4 companies have evolved their market research processes to effectively capture unmet needs, continuously validate project assumptions with customers and involve team members from both technical and marketing functions.

Companies use a wide variety of market research methods to uncover unmet customer needs, both quantitative and qualitative. Figure 2 shows the differences we

found among the four levels. Level 1 companies often use informal processes as their main source of information about customer needs, such as information relayed by sales and marketing from customer visits, tradeshows and conferences. Level 2 companies tend to also rely on quantitative methods such as surveys and conjoint analyses.

Our results show that the trend among Level 4 companies is toward observational methods and the gathering of voice-of-the-customer data in a structured way. In this sense, the term "customer" may mean the end user of a product that is several steps down the supply chain, rather than the direct purchaser of the company's own product. This end user may be in another business in the case of B2B companies, or a home consumer for B2C.

Level 4 companies reported dissatisfaction with more traditional methods. As one Level 4 participant told us, "Traditional tools like focus groups are not good to identify new technology and new trends."

The more innovative a company, the more it tends to rely on qualitative methods over quantitative or informal ones. Innovative companies seek to identify customers' true needs by understanding the customers' world and the issues customers face. Through observational methods, such as ethnography and customer visits, new ideas and different ways of thinking can appear. Observation enables companies to see what the customer needs, so that they can evaluate both what customers say and what they do.

This Level 4 participant expanded on the benefits of observational methods: "I think it is pivotal for us to get our engineers out to see what customers are facing: how they are using their current products, what are their frustrations, what do they hate, what do they love? Hearing that from a marketing presentation doesn't have the clout

A corporate culture that facilitates and rewards innovation is essential for success.

or the impact of having the engineers directly interacting with the customers."

We also found that highly innovative companies see the use of focus groups as a tool for incremental innovation, rather than breakthrough innovation. The most innovative companies validate new ideas with customers as early as product concept and throughout the product development process. Highly innovative companies begin their validation early in the development process and use the prototype stage to gain final insights into features, ease of use and price.

A Level 3 participant explained the downside of not following this principle: "Our product didn't have this key characteristic that we had just learned about two weeks before and it was going to affect like half the product sales . . . We killed that product—and we are talking a lot of money. The moral of the story is that we really should have done more customer research earlier and validated the need for these capabilities."

Among B2C companies, products typically are shown to a large sample of customers to gain feedback. Among

Levels of Innovation				
	Level One	**Level Two**	**Level Three**	**Level Four**
Sales feedback	☑	☑		
Quantitative				
Surveys	☑	☑	☑	☑
Conjoint/Kano/QFD		☑	☑	
Qualitative				
Focus groups		☑	☑	☑
Voice of customer			☑	☑
Observation/Ethnography			☑	☑

Figure 2.—The research methods used by the different levels of companies (listed at left) are both quantitative and qualitative.

How the Study Was Conducted

We evaluated 32 successful companies, with annual sales from $500 million to nearly $100 billion, to compare how they approached innovation, especially in the front end. The study focused on companies that were publicly recognized as successful in innovation. They were drawn from *Business Week's* "Top 100 Most Innovative Companies" list as well as Industrial Research Institute representatives who had presented cases of successful innovations. Approximately two-thirds of the companies interviewed were business-to-business (B2B), the remainder business-to-consumer (B2C), ranging across industries and at different points in the supply chain.

The first phase of the study focused on understanding the approaches successful companies take in developing innovative solutions to meet customer requirements. The Disruptive Market Research® (DMR) approach developed by NewEdge aided the interviewing. The DMR is designed to explore new places for companies to play and create rather than just validate new offerings. It has been used in over 1,000 projects. It inverts many research principles, e.g., sampling selectively rather than broadly and looking for divergence rather than convergence. The method positions the interviewees as industry experts framing the discussion both in terms of what they see happening within their organization and beyond looking at the industry.

A high-level innovation leader in each of the 32 companies was interviewed. Each executive had a role integral to innovation at either a corporate or divisional level. Our sample set included leaders in both marketing and technology, to gain a clear view across functions and to highlight differences within and between these two groups. Average interview time was approximately one hour, with several having follow-up discussions.

Initially the participating organizations were viewed as very homogeneous; all were noteworthy innovators within their industries. As the interviews progressed it became evident that there were differences among them; namely, some companies described their innovation functions as consistently achieving breakthrough innovation while others described themselves as achieving incremental innovation. Satisfaction with their innovation functions was linked to the extent to which the organizations achieved breakthrough versus incremental innovation.

Once the commonalities among and divergence between groups were recognized, differing levels of innovation began to emerge. Based on the interviews, the participant companies were then categorized into four levels of innovation, depending on their level of success and their level of satisfaction. "Success level" was defined from the respondents' description of innovation examples and whether those examples represented minor product improvements, incremental innovation or breakthrough innovation. "Satisfaction level" was a combination of subjective assessment of their company's innovation as well as a reflection of quantitative new product success in terms of revenue, market share, and financial and overall company performance.

Interviewees reported different levels of success with respect to achieving breakthrough innovation. They further expressed different levels of confidence in their organizations' ability to achieve breakthrough innovation in the future. Further analysis showed that those companies expressing success in breakthrough innovation differed in their practices, organizational structures, market research processes and culture, independent of one another.

We explored whether self-reported success with incremental or breakthrough innovation was related to any financial outcomes. We learned that each company defines the financial success it is seeking from innovation within the context of its industry/competitive set. Examples of measures include number of products in market launches in recent years, profits from incremental versus breakthrough, growth rates and margin increases above base. As a result, it was not possible to use an external metric. Instead, we relied on executives' reports of the extent to which breakthrough innovation was achieved as they defined it and the extent to which it accomplished their goals. The fact that across a broad range of industries and metrics companies achieving or not achieving their goals, independent of one another and unaided by discussion, described the same drivers of success and failures attests to the robustness of the results.—**The Authors**

B2B companies, it is more common to expose a product only to select customers prior to a product launch.

Corporate Culture

A corporate culture that facilitates and rewards innovation is essential for success in both breakthrough and incremental innovation. The key characteristics of highly innovative companies are their balance of new ideas, leadership support, reward structure, and use of creative time. Level 1 and 2 companies in our sample typically originate ideas from either technical or marketing and have limited opportunities for rewards or creative time.

Source of new ideas

The most innovative companies strive to create a culture that emphasizes and supports a balance of technology push and market pull when creating new ideas. Highly innovative companies involve both marketing and technology groups in idea origination processes, most often working together from the initial stages.

"[Market need and financial return] has to be laid out up front for the project to move forward," said one Level 4 participant. "The kernel of the idea might have been tech push, but if there's not a market need, it's not going to go anywhere."

In addition, Level 3 and 4 companies stressed the need to balance the development portfolio between technology-driven ideas leading to longer-term, riskier breakthroughs, and more incremental improvements based on market demand. When technology and marketing groups work together from idea origination, and when both are valued by management, this sets the tone for cooperation and more successful product development.

Leadership support

Our study reinforces the criticality of leadership in establishing and reinforcing a culture supportive of innovation (*6*). Leadership needs to model behavior so that new ideas will not be resisted but, rather, valued in a spirit of positive, controlled experimentation. The Level 4 companies in our study experience more management involvement in aligning goals across functions than Level 1 and 2 companies. By modeling teamwork in successful companies, innovation becomes a valued, productive element in the organization (*7*).

A Level 4 respondent who has experienced the challenges and successes with getting the leadership support aligned told us, "Once the leadership is aligned, it works. We've been doing this a couple years and it's been pretty effective. Don't get me wrong; the first time is painful."

Reward systems

Highly innovative companies install reward systems for recognizing innovation. These systems reflect a culture that accepts creativity and new ideas, and focuses on innovation. There is a wide range of rewards among the highly innovative companies, including:

• Individual bonuses for ideas submitted or accepted.

• Team recognition for project success or for killing projects early.

• Patent or publication awards.

• Team-oriented product launch rewards.

The most successful awards tend to be frequent and smaller. This provides constant encouragement and support, which interests more employees. These rewards become part of the daily culture, rather than an event that generates competition.

Creative time for employees

The final characteristic of Level 3 and 4 companies in our sample is that they typically permit employees to devote 10–20 percent of their time to personal projects. This kind of support puts the focus on innovation, and constantly encourages idea generation. Organizations that actively encourage creative thinking within a structured new product development process create a culture in which innovation is a core focus.

Summing Up

Companies that succeed in achieving breakthrough over incremental innovation have evolved common practices that work together to support the drive for breakthrough innovation. The job of developing the projects in these companies rests with both marketing and technology groups, whose members work together in highly integrated cross-functional teams that are dedicated to the job of innovation. These groups are often co-located in a single facility, and develop long-term relationships that foster trust. These teams examine market needs from many perspectives, including technical, commercial and behavioral. Not only are a wide variety of tools used to uncover unmet market needs, but members from both the marketing and technology functions are trained together in the application of these techniques.

Finally, senior management in the most innovative companies is deeply involved in the innovation process, not only as gatekeepers of major projects, but in a more fundamental sense of implementing a culture of innovation and even of participating in the actual project development process.

We believe that organizations can use these findings, and particularly Figure 1, as a self-assessment tool for evaluating which level their practices most closely match to rank themselves and then evaluate how to move forward or leapfrog to Level 4 by adopting their leading practices. ◉

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