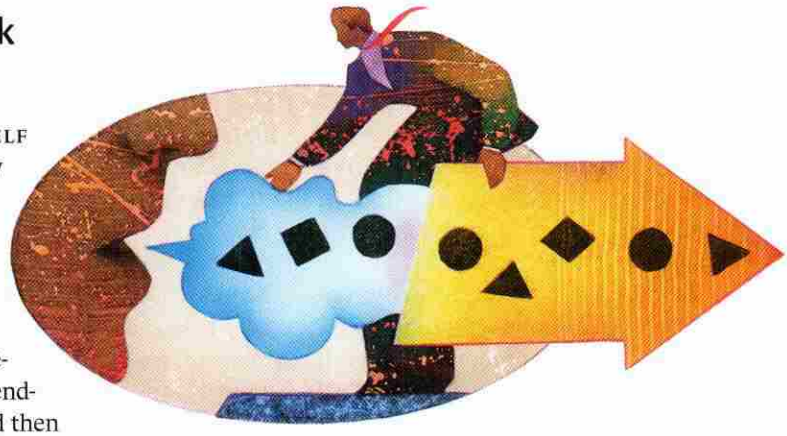
Lots of companies ask customers what they'd like to see in new products and services – but they go about it all wrong. A new methodology for capturing customer input promises to galvanize the innovation process.

Turn Customer Input into Innovation

by Anthony W. Ulwick



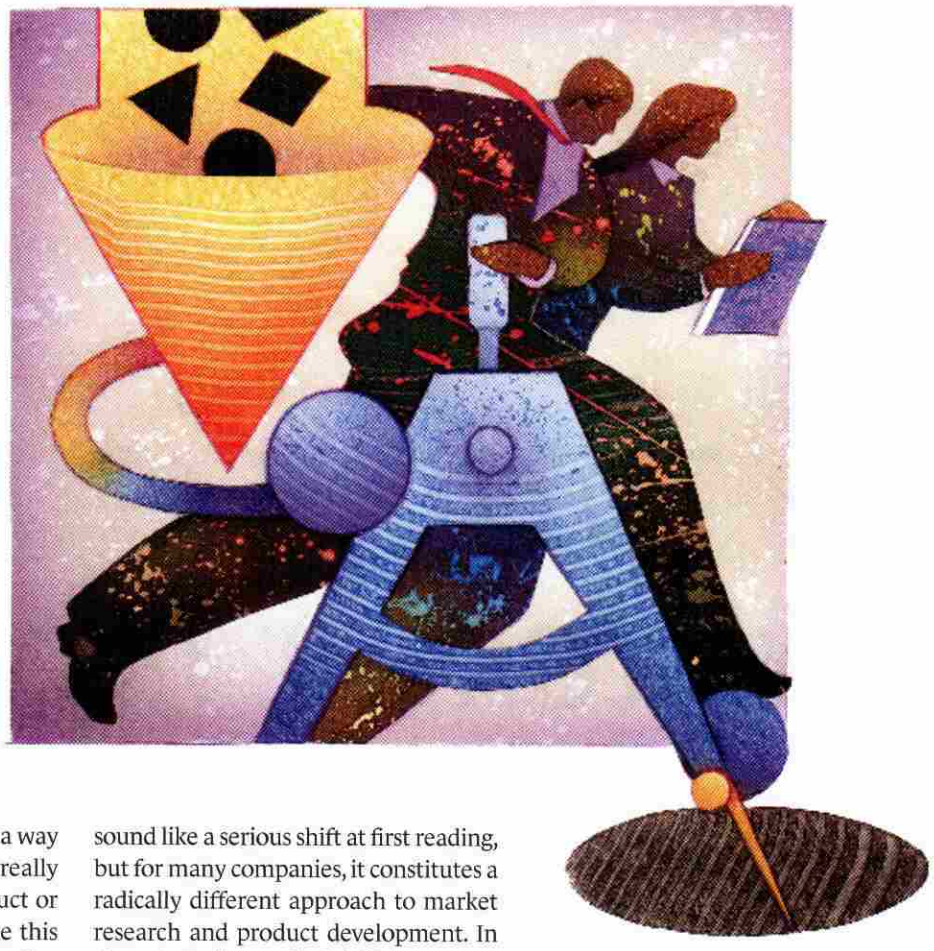
EVERY COMPANY PRIDES ITSELF on giving customers what they ask for. Healthier fast-food products. Nicotine-free cigarettes. Bigger engines in cars. After all, giving people what they want will guarantee success – or so you would think. Customers often describe the solutions they want in endless focus groups and surveys and then sit back and wait while R&D rolls up its collective sleeves and gets to work on materializing their ideas. How sad it is, then, when the product or service is finally introduced – and the only reaction in the marketplace is a resounding ker-flop.

Why does this happen? Because companies go about listening to customers all wrong – so wrong, in fact, that they undermine innovation and, ultimately, the bottom line.

My company has spent the past 12 years watching organizations get market research and product development wrong – and right. The problem, when there is one, is simple: Companies ask their customers what they want. Customers offer solutions in the form of products or services. "I'd like a picture or video phone," they say, or, "I want to buy groceries on-line." Companies then deliver these tangibles, and customers,

very often and much to everyone's chagrin, just don't buy.

The reason is also quite simple. Customers should not be trusted to come up with solutions; they aren't expert or informed enough for that part of the innovation process. That's what your R&D team is for. Rather, customers should be asked only for outcomes – that is, what they want a new product or service to do for them. Maybe they want to feel a closer bond to people when talking on the phone or to spend less time traveling to and from the grocery store. What form the solutions take should be up to you, and you alone.



Over the years, my colleagues and I have developed a methodology for capturing customer input that focuses on outcomes, not solutions. The methodology gathers data in a way that reveals what the customer is really trying to achieve in using a product or service. Any company can execute this methodology on its own, following five steps. First, develop a different style of customer interview. Then conduct the interviews, organize the data, and rate the outcomes. Finally, use the information to spur in-house innovation. In the following pages, we'll look at each step in turn.

Before that, however, let's confront one of the essential implications of adopting this methodology. Using it means a company must admit to itself that it is not entirely customer-driven. It is informed by customer input, yes, but it must also accept the heavy responsibility for coming up with new products and services on its own. That may not sound like a serious shift at first reading, but for many companies, it constitutes a radically different approach to market research and product development. In short, it marks a radical shift in strategy.

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The Problem with Listening to Customers

People in your organization may resist this new approach. But the fact is, the traditional approach of asking customers for solutions tends to undermine the innovation process. That's because most customers have a very limited frame of reference. (To learn more about the psychology of customers' needs, see the sidebar "The Limitations of Listening," by Harvard Business School professor Dorothy Leonard.) Customers only know what they have experienced. They cannot imagine what they don't know about emergent technologies, new materials, and the like. What customer, for example, would have asked for the microwave oven, Velcro, or Post-It Notes? At the time the transistor was being developed, radio and television manufacturers were still requesting improved vacuum tubes.

By asking your customers for solutions, then, your company turns into a counter clerk at a fast-food restaurant. You take orders and rush to fill them. Compare that with the waiters at a small café. They can listen to customers – "Do you have anything with fruit and chocolate for dessert?" and "The cod was too salty, but the sauce was wonderful" – and use this information to help the chef come up with new and inventive menu items that customers could only dream of.

There are several concrete dangers of listening to customers too closely. One of these is the tendency to make incremental, rather than bold, improvements that leave the field open for competitors. Kawasaki learned this lesson when it introduced its Jet Ski. At the time, the company dominated the market for recreational watercraft. When it asked users what could be done to improve the Jet Ski's ride, customers requested

ILLUSTRATION: JAMES ENDICOTT

extra padding on the vehicle's sides to make the standing position more comfortable. It never occurred to them to request a seated watercraft. The company focused on giving customers what they asked for, while other manufacturers began to develop seated models that since have bumped Kawasaki – famed for its motorcycles, which are never ridden standing – from its leading market position.

Meeting customer demands to the letter also tends to result in "me-too" products. Customers merely ask for missing features that other manufacturers already offer. In the mid-1980s, for example, market studies conducted by U.S. automakers Ford, Chrysler, and GM revealed that customers wanted cup holders in their vehicles. Because Japanese manufacturers had provided this feature for years, when American companies finally added the frequently requested cup holders, none gained an advantage; customers merely said, "It's about time."

Another danger arises in the common practice of listening to the recommendations of a narrow group of customers called "lead users" – customers who have an advanced understanding of a product and are experts in its use. Lead users can offer product ideas, but since they are not average users, the products that spring from their recommendations may have limited appeal. Consider what happened to U.S. Surgical, a medical instrument manufacturer now owned by Tyco. Acting on recommendations from lead-user surgeons, U.S. Surgical introduced a set of instruments that could rotate and move in many directions. The

The Limitations of Listening

by Dorothy Leonard

Over the last decade, much has been written about the importance of listening to customers, and companies have spent millions of dollars trying to get inside the heads of their users. Yet the question of how to listen to "the voice of the customer" remains a matter of debate. Why? Because what researchers hear depends upon the degree to which customers know what they are talking about.

Generally speaking, customers can say what they want if they are asked to make selections within a familiar product category. For example, Nissan Design managed to figure out – through questioning and using leather samples – how U.S. customers wanted their new cars to smell. Harley-Davidson's devoted customers can talk about how their motorcycles sound. They are able to express what they want because of their extensive experience with the product category and their educated, sophisticated tastes.

But when customers are asked to make new product recommendations or to venture into territory about which they have limited or no knowledge, they tend to run into at least two kinds of blocks. The first is what psychologists call "functional fixedness" – the human tendency to fixate on the way products or services are normally used, making people unable to imagine alternative functions. For example, people asked to perform a task requiring the use of a wire are strikingly less likely to think of unbending a paper clip if they are given the clip attached to papers than if they see the clip loose. Another problem is that people may not be able to conceive of a solution because they have apparently contradictory needs. Kimberly-Clark wrestled with this problem when it developed Huggies diapers. Parents told researchers they didn't want their toddlers to wear diapers any more; at the same time, they didn't want their children to wet the bed. The solution, the pull-up diaper, dealt with this contradiction.

Asking customers to focus on desired outcomes is an effective way to deal with both of these psychological blocks. Moreover, the further into the future or the unknown one goes, the more one has to eschew direct inquiry for open-ended questions or other techniques. A focus on desired outcomes can help companies identify difficult-to-articulate needs. After all, asking someone what he wants to drill a hole for is likely to yield better information than asking about the desired size of the drill bit. Another technique, behavioral observation, is also useful in determining what customers are trying to achieve. In "Spark Innovation Through Empathic Design" (HBR November–December 1997), I advanced the notion that especially when customers are unaware of their behavior, observation can help uncover their unarticulated needs. When *Nightline* challenged product development company IDEO to redesign the lowly shopping cart, anthropologists took note of unsafe and inefficient – but unconscious – usage in grocery stores. As a result, the redesigned cart had such features as small removable baskets that customers could take to sections of the store, fill, and then replace in the cart that they had left centrally parked.

How important is the voice of the customer? Very. But discerning the difference between what customers are able to say and what they want, and then acting on those unspoken desires, demands that companies learn to go well beyond listening.

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instruments were unveiled with great fanfare at a national medical show in 1991. Although the initial excitement led to some orders at the show, reorders amounted to less than 5%. The reason: The lead users were simply too sophisticated. While most surgeons applauded the improvements, they found the new instruments too difficult to use.

Finally, a company may be disappointed to discover that customers don't want "new and improved" features and functions. If they are forced to pay for such new features, customers can even begin to resent the company. Software companies, for example, operate sophisticated user laboratories and employ keystroke-tracking technology in an effort to build incremental improvements into their products. Yet most users avail themselves of less than 10% of the software's overall capability – and grumble when they feel forced to pay for upgrades.

The irony is that most organizations truly believe that they excel at listening to customers and delivering on their wishes. In a 1996 survey of 270 companies, we found that 71% were very satisfied with their ability to decipher what their customers want. Yet when companies give customers what they ask for and fail to see the results they hoped for, executives scratch their heads and conclude that customers don't really know what they want.

How to Focus on Outcomes

Let's look at our outcome-based methodology in detail, using as an example Cordis Corporation, a medical device manufacturer in Florida. In 1993, the company's annual sales were $223 million, and its stock was valued at around $20 a share. At the time, Cordis had less than a 1% share of the market for angioplasty balloons, which are used to open the blocked arteries of cardiac patients. Cordis's goal was to deploy a new product strategy to achieve at least a 5% gain in market share.

Using our methodology, Cordis conducted outcome-based customer interviews with cardiologists, nurses, and other laboratory personnel. The interviews focused not on what features these professionals would like to see in an angioplasty balloon but rather on the results they wanted to achieve in doing their jobs – before, during, and after the surgery. Cordis used the data from interviews to formulate a completely new product strategy that addressed important, unsatisfied needs in new market segments. The data also led Cordis to conclude that some of its products then in development were likely to fail, and so it suspended costly further work on them. As a result, Cordis's revenues nearly doubled within two years, reaching $443 million by June 1995.

Cordis gained a market leadership position in angioplasty balloons, but that was just the beginning. With the data obtained from the outcome-based market studies, it quickly recognized the potential value of a device that could be placed in a treated artery to prevent a blockage from recurring. The company went on to develop the stent, which became the fastest-growing product in medical device history, producing nearly $1 billion in revenue in its first year. In 1996, Johnson & Johnson acquired Cordis at $109 a share.

Here's the process Cordis used to achieve this remarkable growth.

Step 1:
Plan outcome-based customer interviews.

To be successful, outcome-based customer interviews must deconstruct, step by step, the underlying process or activity associated with the product or service. In our example, Cordis began by defining each aspect of the angioplasty process. Simply stated, this included inserting the catheter into an artery, placing the balloon at the lesion or blockage, opening the artery by inflating the balloon, and then removing the catheter from the patient.

Once you define the process, carefully select which customers will participate. It's important to narrow interviewees to specific groups of people directly involved with the product. Open the interviews to too wide a group – distributors, retailers, stakeholders, salespeople, and so on – and you end up with extraneous information that can complicate the research effort and lead your company astray. Cordis, for example, chose to interview customers who could judge the value of its product from a user standpoint and from a cost perspective – cardiologists (who perform the procedure), nurses (who assist in the procedure), and hospital administrators (who focus on financial issues).

It's also important to select the most diverse set of individuals within each customer type. The more diverse the group, the more complete the set of unique outcomes that is captured. In Cordis's case, interviewees included both cardiologists that performed many angioplasty procedures each month and those who performed only a few. The company also sought to include cardiologists in varying age groups and from different parts of the country, as well as doctors who belonged to HMOs and those who did not.

Step 2:
Capture desired outcomes.

Capturing desired outcomes requires a moderator who can distinguish between outcomes and solutions and can weed out vague statements, anecdotes, and other irrelevant comments. The moderator digs beneath the surface of customers' words – clarifying and validating the statements – and makes sure participants consider every aspect of the process or activity they go through when using a product or service. Whenever a customer comes up with something that sounds like a solution, the moderator redirects the question to force him or her to think about the underlying process. For example, Cordis's moderator asked the participants to discuss what difficulties they typically encountered when performing the angioplasty procedure. The moderator also asked them to describe how the procedure would ideally be performed, barring any technological limitations. The participants then talked freely about each step in the angioplasty process; the

moderator made sure all the steps were covered in detail.

Most interviews begin with participants rattling off statements or adjectives in the form of loosely stated ideas or solutions. Such statements offer a starting point for capturing outcomes. During the Cordis interviews, for example, cardiologists told the moderator they wanted a balloon that was "easy to maneuver," "smooth," and "stiff." They also requested several solutions such as a "thinner balloon" and a "coated guide wire." Nurses said they wanted the device to be "brightly packaged" and "easy to open."

After the moderator captures a handful of these statements and adjectives, he or she translates each one into a desired outcome. A well-formatted outcome contains both the type of improvement required (minimize, increase) and a unit of measure (time, number, frequency) so that the outcome statement can be used later in benchmarking, competitive analysis, and concept evaluation. The moderator addresses one statement at a time, rephrasing it to be free from solutions – words that inherently describe specifications or constraints – or ambiguities (words such as "easy," "reliable," and "comfortable"). Then the moderator confirms the translations with the participants to eliminate guesswork after the interview ends.

The Cordis moderator, for instance, asked cardiologists why they wanted the device to be "easy to maneuver." Cardiologists replied that they wanted to move quickly through tortuous vessels; the moderator then documented the outcome as "minimize the time it takes to maneuver through a winding vessel." The moderator then asked the cardiologists to confirm that this wording accurately represented the desired outcome. Similarly, when asked to describe why they wanted a balloon to be "smooth," cardiologists explained that they wanted to prevent it from inadvertently dissecting the vessel or from entering side vessels. The moderator then translated the desired outcomes as "minimize the risk of dissecting a vessel" and "reduce the number of side vessels that are inadvertently entered." Again, the cardiologists confirmed these desired outcomes.

Like most companies we've worked with, Cordis found that about 75% of the customers' desired outcomes were captured in the first two-hour session. The second session yielded another 15% to 20% of the desired outcomes; in the third session, 5% to 10% more came to the surface. Upon completing the interviews with 30 or so participants, Cordis was confident it had captured more than 96% of the customers' desired outcomes.

Step 3:
Organize the outcomes.

Once the interviews are complete, researchers make a comprehensive list of the collected outcomes, removing duplicates and categorizing the outcomes

into groups that correspond to each step in the process.

Cordis categorized its outcomes into the four groups that comprise the angioplasty process: making an insertion, placing the device at the lesion, opening the artery, and removing the device from the patient. The final lists for cardiologists, nurses, and administrators each contained between 30 and 45 outcomes. After reviewing the lists, one Cordis manager commented that this was the first time he had seen such useful customer information documented in one location, finally making it possible for the company to understand how its customers measure value.

Step 4:
Rate outcomes for importance and satisfaction.

Once you have a categorized list of outcomes, you must conduct a quantitative survey in which the desired outcomes are rated by different types of customers. Survey participants are asked to rate each outcome in terms of its importance and the degree to which the outcome is currently satisfied. The ratings are fed into a mathematical formula, revealing the relative attractiveness of each opportunity. (To learn more about the rating system and how to recognize new market possibilities, see the sidebar "The Opportunity Algorithm.")

Step 5:
Use the outcomes to jump-start innovation.

The final step entails using the data to uncover opportunity areas for product development, market segmentation, and better competitive analysis. The data are also used to formulate concepts and to evaluate the potential of alternative concepts.

Using the survey results from Step 4, Cordis identified several new product opportunity areas. The outcomes that customers deemed most important and were least satisfied with – such as "minimize the recurrence of a blockage" – represented the greatest opportunity areas. Those of lesser importance and that were reasonably well satisfied by existing products weren't worth pursuing.

The survey results also allowed Cordis's engineers to understand the "natural order" of segmentation in the angioplasty balloon market. For example, the company discovered that one group of surgeons valued precision and accuracy in balloon placement; another group valued the speed at which they could complete the procedure. Recognizing these differences, Cordis created a set of products that satisfied the desired outcomes of each group. The new products helped the company to dominate each of those segments – segments that its competitors never knew existed, having divided their own markets according to artificial, less relevant classifications such as price point, business size, or geography.

The Opportunity Algorithm

How can a company uncover and prioritize the most promising new product and service opportunities? Executives struggle with this question every day – and outcome-based research offers a surprisingly simple answer. The best opportunities spring from those desired outcomes that are important to customers but are not satisfied by existing products and services.

Selecting the richest areas of opportunity from a long list of desired outcomes is critical, since chasing after less promising ones drains resources. Fortunately, a simple mathematical formula that we call the "opportunity calculation" makes it possible to discover the most promising areas. The formula [Importance + (Importance – Satisfaction) = Opportunity] yields highly accurate results. Companies ask their customers to quantify on a scale of one to ten the importance of each desired outcome and the degree to which it is currently satisfied. Those rankings are inserted into the formula, resulting in an overall opportunity score. To see how this works, take a look at the accompanying chart, which lists some of the many outcomes Cordis culled from cardiologists who use balloon angioplasty devices. In Outcome 1, users gave a very high rating (9.5) to the importance of "minimizing restenosis (or the recurrence of a blockage)." They gave a much lower score (3.2) when asked to rate the degree to which this need was currently being satisfied. Those rankings were inserted into the formula, [9.5 + (9.5 – 3.2)], yielding an opportunity score of 15.8. Outcome 3, "minimize the amount of damage caused to any vessel," was equally important with a rating of 9.5 but was satisfied to a much greater degree (7.5 versus 3.2). As a result, Outcome 3 represents a much lesser opportunity, as indicated by its opportunity score of 11.5.

This algorithm also lets companies overcome the limitations associated with traditional gap analysis, an approach that considers only the difference between importance and satisfaction. Using gap analysis, for example, Outcomes 2 and 5 – both with a "gap" of 4.1 – would represent equal opportunities. Using the opportunity calculation, the opportunity associated with Outcome 2 is 36% higher (12.4 versus 9.2) because of its greater importance.

It is also important to note that in the formula [Importance + (Importance – Satisfaction) = Opportunity], the amount in parentheses can never be less than zero. In other words, high levels of satisfaction do not detract from importance. An outcome with an importance rating of 6.5 and a satisfac-

Before brainstorming new product ideas, Cordis used the interview data to define its desired competitive position. For example, Cordis could see from the research data that the frequency of restenosis was a competitive weakness throughout the industry. The company set itself a target of reducing restenosis to 20%. It conducted a similar analysis on several other areas of opportunity, defining aggressive target values that would give Cordis a competitive position that was unique from its competitors and valued by its customers.

With the target values in place, Cordis had a framework for concept generation. The R&D team went to work, systematically formulating more than a dozen product concepts. Engineers devised stiffer distal tips for quicker entry, added markings for better tracking, and developed new materials that improved maneuverability. Cordis also devised a stent that was successful in achieving the goal of reducing restenosis to 20%.

Lastly, Cordis managers evaluated each product concept to determine the degree to which it satisfied each outcome. They found that the improvement over competitive offerings would be 30% or more in most products. Cordis also abandoned development on certain products as it was clear from the data that they would be of minimal value to customers. For example, one angioplasty product that focused on maximizing blood flow while the balloon was inflated was dropped because that outcome was already satisfied and near the bottom of the prioritized opportunity list. Confident that they were on the right track, Cordis moved forward with a new product portfolio – and achieved market gains that far exceeded the company's expectations.

The results of using the outcome-based methodology speak for themselves. Between 1994 and 1995, Cordis introduced 12 new angioplasty catheters and saw its market share in interventional cardiology grow from less than 1% to nearly 10% in the United States; market share approached 18% in Japan, 20% in Europe, and 30% in Canada. Net sales shot up 30%, and the company's $50 million cash position allowed it to reach into new markets.

As the Cordis story shows, coming to an understanding of what customers value is a far more fruitful exercise than merely asking them to submit their own solutions. The process of innovation begins with identifying the outcomes customers want to achieve; it ends in the creation of items they will buy. When desired outcomes become the focus of customer research, innovation is no longer a matter of wish fulfillment or serendipity; it is instead a manageable, predictable discipline.

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tion rating of 8.5 would be put in the formula as: [6.5 + (6.5 – 8.5)] or [6.5 + 0], yielding an opportunity score of 6.5 rather than 4.5. This helps to maintain the integrity of the formula.

Not surprisingly, users in different segments of the market rate outcomes with varying levels of importance and satisfaction, resulting in a different opportunity prioritization for each segment. These differences can form an important foundation for product strategy. Cordis, for example, was able to identify and prioritize opportunities across the total market and within various segments. The outcomes received a unique opportunity score in each segment. Cordis successfully focused its research and development efforts on the opportunities with the highest opportunity scores in each segment.

Cordis's Angioplasty Balloon Market-Opportunity Scores

Desired Outcome Segment 1: Interventional Cardiologists	Importance	Satisfaction	Opportunity
1. Minimize restenosis (or the recurrence of a blockage)	9.5	3.2	15.8
2. Minimize the amount of force required to cross the lesion with the balloon	8.3	4.2	12.4
3. Minimize the amount of damage (dissection) that is inadvertently caused to any vessel when putting the guide wire in place	9.5	7.5	11.5
4. Minimize the time it takes to place the balloon across the lesion	9.1	8.4	9.8
5. Minimize the time it takes to complete the procedure	5.1	1.0	9.2
6. Minimize the time it takes to move the balloon through a winding vessel	7.7	6.6	8.8

When companies use this algorithm to identify and prioritize market opportunities, they eliminate not only the hazards of solution-based research but also the guesswork.