

# RIGHT PROCESS, RIGHT PRODUCT

*In their efforts to create products and services that meet with greater market acceptance, some companies are moving beyond quantitative research toward more innovative ways of integrating customer value into the development cycle*

Sheila Mello

**OVERVIEW:** *Companies often cite poor product definition—what the product or service must provide customers—as one of the leading contributors to a product’s disappointing performance in the marketplace. This is due, in part, to the inherent difficulty in managing the product definition process. Organizations must clearly identify product requirements in order to better direct and stimulate design innovation. However, in most instances, product development teams base design direction on marketing documentation that contains product features rather than specific requirements. A closer look at a more user-focused product definition process shows that efficient integration of customer requirements and close interaction of functional groups can facilitate the product definition process, cut down on misdirected effort and dramatically increase resolution of the design problem.*

Experts rank early product definition high among key factors that contribute to new product success, along with product superiority, quality marketing and solid research and analysis (1). In fact, in a survey of 330 product developers, poor product definition was cited as *the* single biggest reason products fail to meet market needs (2). Unfortunately, companies often frame their market worldview and define product attributes in terms of what the company has to offer rather than what the customer may actually want. This is particularly surprising when one considers that 70 percent of product life-cycle costs are determined during the crucial product definition phase (3). Clearly, it is important for an organization to

make the right product decisions before launching into full-scale product development.

One could fill a museum with products that were launched with the highest hopes, the best intentions and the worst preparation in terms of analyzing market trends and understanding customer desires. Consider, for example, the classic battle between VHS and Beta videotape formats. Had Sony understood the consumer’s mindset from the very beginning (i.e., the desire to record many hours on a single tape vs. marginally better picture quality), video recorder history—and Sony company profits—might have taken a different course.

## **Balancing the Quantitative and the Qualitative**

To ensure product stories with happier endings, today’s companies and their engineering managers must evaluate internal product development processes and identify more reliable ways to determine customer requirements *well in advance* of designing solutions for their market.

One approach that numerous companies have introduced into their product development life cycles bases design goal and product definition decisions on data collected from a select set of users or customers. This customer-focused or “market-driven” methodology places data collection, processing and analysis in the hands of a cross-functional team of product developers within an organization.

The methodology employs quantitative and qualitative techniques from sociology, anthropology, psychology and other disciplines to collect and analyze descriptive customer data. The data reflect customer likes and dislikes in products/services, record usage patterns, indicate future needs, and lead the way to more innovative solutions. This combination of gathering the statistically verifiable and melding it with “read-between-the-lines” information results in something that technology managers can readily integrate into the design process: data that provide more succinct, less ambiguous direction to engineers—and everyone else involved in product development and manufacturing—and are more likely to result in products and services that meet or exceed customer expectations.

This is particularly relevant when one considers the all-too-common gap between engineering and marketing in

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valuing customer requirements. A recent study revealed that 70 percent of engineers and scientists find it critical to distinguish customer requirements from product features, while marketers value the distinction at a rate of less than 40 percent (4). This disparity helps explain why the typical market requirements document contains mostly features, leaving engineers without a clear understanding of the customer.

Buzz Sztukowski, director of commercial operations at bioMerieux, a leading producer of medical devices and proponent of customer-focused product development, notes: "Often, marketing simply hands engineering a list of product features to execute. Using a market-driven approach, everyone on the development team sees product requirements at the same time and ranks them together. This makes a big difference later on as you approach trade-offs in the development process, say between time-to-market and costs. The team can then come together and make those trade-offs in a much more intelligent manner."

This customer-centric approach also helps to minimize the tunnel vision that can often creep into sometimes insular departments involved in everything from concept development to production. Moreover, it tends to eliminate political infighting, which can divert corporate focus away from customer needs, lengthen time-to-market and, ultimately, sabotage an organization's chances for success.

Reynolds and Reynolds is an information management company that provides retail management systems, services and support programs to automotive markets. According to Sukhdev Nanda, director of Product Lifecycle Processes, integrating a customer-focused process from the outset enables his development team to be more proactive than reactive in designing applications. "As a result, we're better prepared to hit our mark, which means key personnel can move on to other projects, rather than continually fixing problems after the fact."

### **What a Market-Driven Process Is Not**

At the heart of a market-driven process is an emphasis on customer interviews and interactions, collected and observed through multiple field visits. Companies must resist the temptation to view these essential visits as opportunities for selling, brainstorming sessions, joint problem-solving exercises, or forums for quantifying product price points or determining specific performance parameters.

Rather, the customer visit should be considered a time for intensive listening. During the visit, customers respond to a series of open-ended questions that reveal, from explicit remarks and implicit meanings, the customers' true needs and feelings.

Customer visits are conducted by a cross-functional product design team, ideally composed of representatives from engineering, marketing, operations, manufacturing, and finance. Involving these functional areas from the outset—especially engineering and marketing—ensures the representation of key perspectives. Consequently, the team is able to more clearly see and hear their intended end user and better understand the corporate environment in which he or she works. In other words, they are well positioned to make the necessary decisions to effectively develop a winning product.

A market-driven process helps companies reach this objective through the following four steps:

#### **Step 1: Gather Customer Information**

By employing one-on-one customer interviews to define product requirements, scientists and engineers discover expressed and latent needs and ultimately reduce the risk of failure. Furthermore, this approach can help save companies from making what often prove to be dangerous assumptions, such as "We know what the customer wants," "We have the best solution," or, "Of course, the customer will buy this."

The data-gathering process should extend beyond talking to one's strongest customers to include in-depth interviews with lost accounts and those using competitor's products. Individuals who might never actually purchase the resulting product or service but can offer valuable experiences or perspectives on key issues should also be involved.

During this stage, the cross-functional team conducts customer interviews in order to uncover problems participants may have with current products, services or solutions. Generally speaking, the team visits 12 to 20 customer sites, listening to answers generated by questions that elicit deeper, more visceral responses about the customer's work life and its challenges. The ultimate goal is to clearly comprehend the customer's motivation.

Open-ended questions, such as "Describe your worst experience with \_\_\_\_\_", or, "Describe ideal results after using \_\_\_\_\_"; help team members learn what really matters to customers.

Edward F. McQuarrie, assistant professor of marketing at Santa Clara University, says that the key to conducting good interviews is to concentrate on open-ended questions that allow the interviewer to be surprised, and on trying to overcome "the number one failing of beginning interviewers, which is the failure to probe, to follow up with 'Could you give me an example?' 'What else would you like to see?' 'Anything more on this?' and so on" (5).

"We visited one controller whose office was covered with computer print-outs," says Reynolds' Sukhdev

Nanda. “He talked about how cumbersome and time consuming it was to sift through these reports in order to analyze information. Developing a tool that would enable on-screen analysis with optional print-outs was just one requirement that surfaced from this interview.”

## Step 2: Process Customer Visit Data

In this step, interview responses serve as the foundation for an “image map”—a diagrammatic representation of the work environment scenes described by interviewees (Figure 1). For example, images in a home theater system environment might include real-life, vivid impressions of family members visualizing the use of home theater equipment. They may describe frustrations with the amount of space consumed, (or with installation difficulties), address factors that contribute to sub-optimal product design, and define the ideal setting for a home theater. Through the image map, team members have a means of revealing the articulated and *unarticulated* needs in customer comments, thus enabling them to begin synthesizing requirements.

“If we had bypassed the image diagram,” Nanda says, “the team would never have understood our customers’ point of pain, and to what level that pain needs to be alleviated if the resulting product is to delight them.”

In conjunction with the image map, team members employ a “customer voice translation sheet” that matches customer-stated themes with images in order to document explicit or implied functionality requirements. This is the point in the process where the team applies all of the data gathered in visits, along with its own collective knowledge, to gain insight into what the customer truly values. For example, if a team were creating a customer voice translation sheet for a home theater system, it might look something like Figure 2. The customer voice translation sheet often puts technical aspects of a product into more anthropologic terms and helps define “delighters” that point to key customer requirements.

“The process allowed us to focus on a much deeper level of what the customer wants,” explains David LaDuke, vp of marketing at Linuxcare, San Francisco, California. Linuxcare is a one-year-old company that has employed a market-driven approach to help provide enterprise-wide technical services for the Linux operating system.

“We got a real sense of the gaps between our world and theirs,” says LaDuke. “It’s a good research tool for the proactive development of services that we believe are going to ‘wow’ customers in the next wave of technological change.”

### What scenes or images come to mind when you visualize home theater systems?

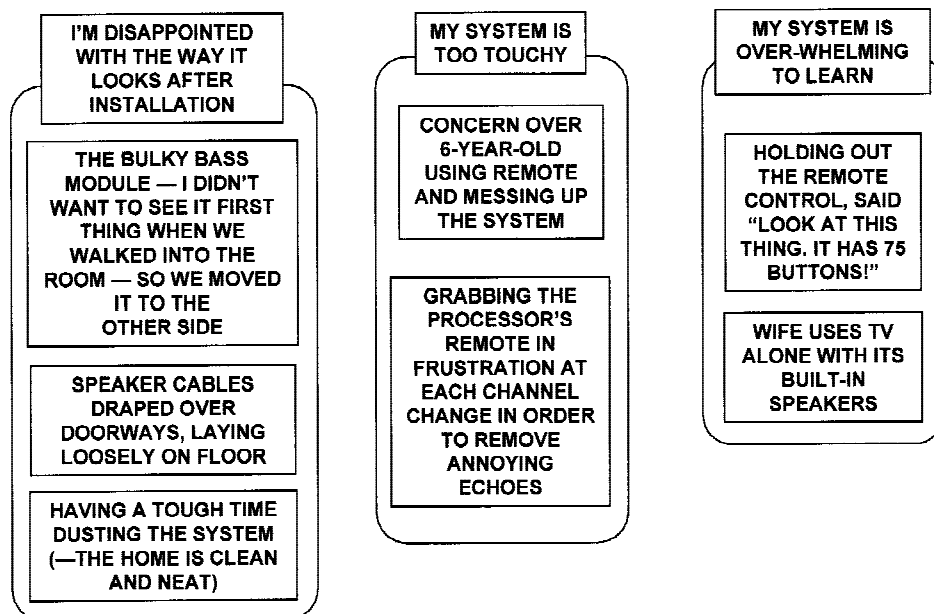


Figure 1.—An image map provides a verbal, impressionistic characterization of the customer's environment; what life is like for the customer and what motivates him or her. It is not intended to be a statement of the customer's requirements for the product.

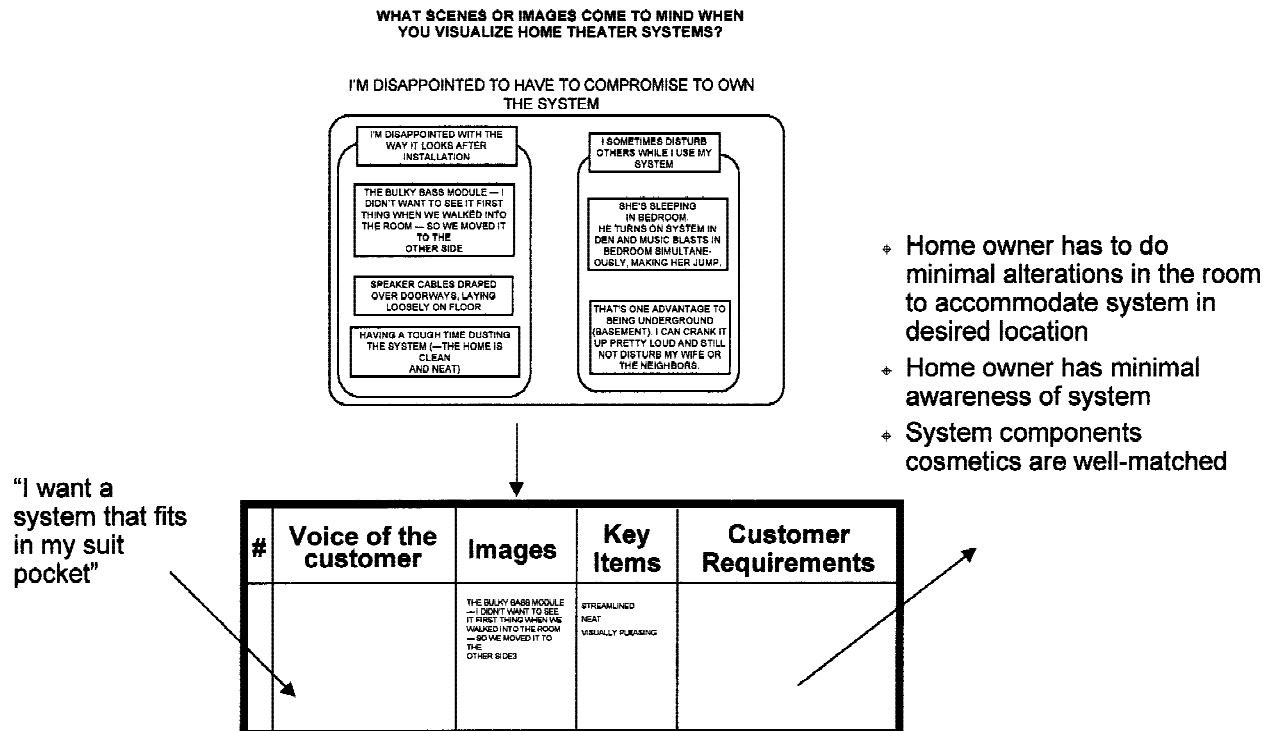


Figure 2.—The customer voice translation sheet combines the voice of the customer with image map results to help identify key customer requirements.

After the customer voice translation sheet is complete, team members create a “requirements diagram” that segments needs into major categories. For example, the needs categories of a large hospital lab might include the customer/vendor relationship, ergonomic/human factors issues with instrumentation, future time/budget challenges, and the pressures placed on lab workers by a demanding medical institution. (See Figure 3.)

### Step 3: Analyze Customer Requirements

After each important customer requirement is identified, a corresponding metric is created to verify that the product will meet the requirement. Metrics are then validated and requirements are prioritized using a Kano survey (6). This is a market research methodology designed to discover how customers *feel* about particular requirements.

Survey results are plotted onto a four-quadrant Kano graph to determine which customer requirements result in satisfaction or dissatisfaction (versus functionality and dysfunctionality), and which are considered “must-be,” “attractive,” “indifferent,” or “one-dimensional” (see Figure 4).

Steve Binder, business manager for platform development at Bio-Rad Diagnostic Group in Hercules, California, who recently used this product definition approach,

cites Kano surveys as one of its many valuable components. “This was one of the largest surveys ever done by our company,” says Binder. “It gave us real, solid data about what our customers care about. One thing we found out was that certain features we felt were really important to customers were relevant, but much less important than we originally believed.”

As a result, one product feature, in particular, long believed to be a customer “must” was revealed to hold low significance in customers’ minds. This discovery enabled Bio-Rad to channel budget dollars from the less-relevant development areas into those of greatest customer interest.

After Kano survey results are mapped, the team creates a “competition analysis matrix” to establish the competition’s ability to meet the hierarchy of requirements (Figure 5). Using resulting survey values, team members calculate how well—or poorly—current competitive products meet customer requirements.

Basically, the Kano scores for all “attractive” and “one dimensional” requirements (those falling within the “satisfaction” plane) are added together, multiplied by 100 and divided by the total number of responses. The resulting number represents an “If Better Than” (IBT) score—a weighting factor that identifies functionality at a level *beyond* which the customer is accustomed. Scores



WHAT ARE THE KEY CUSTOMER REQUIREMENTS FOR A HOME THEATER SYSTEM?

I'M PROUD TO OWN AN ATTRACTIVE HIGH PERFORMANCE SYSTEM THAT IS LEARNED QUICKLY, IS EASY TO USE AND ISN'T A HODGE PODE OF COMPONENTS.

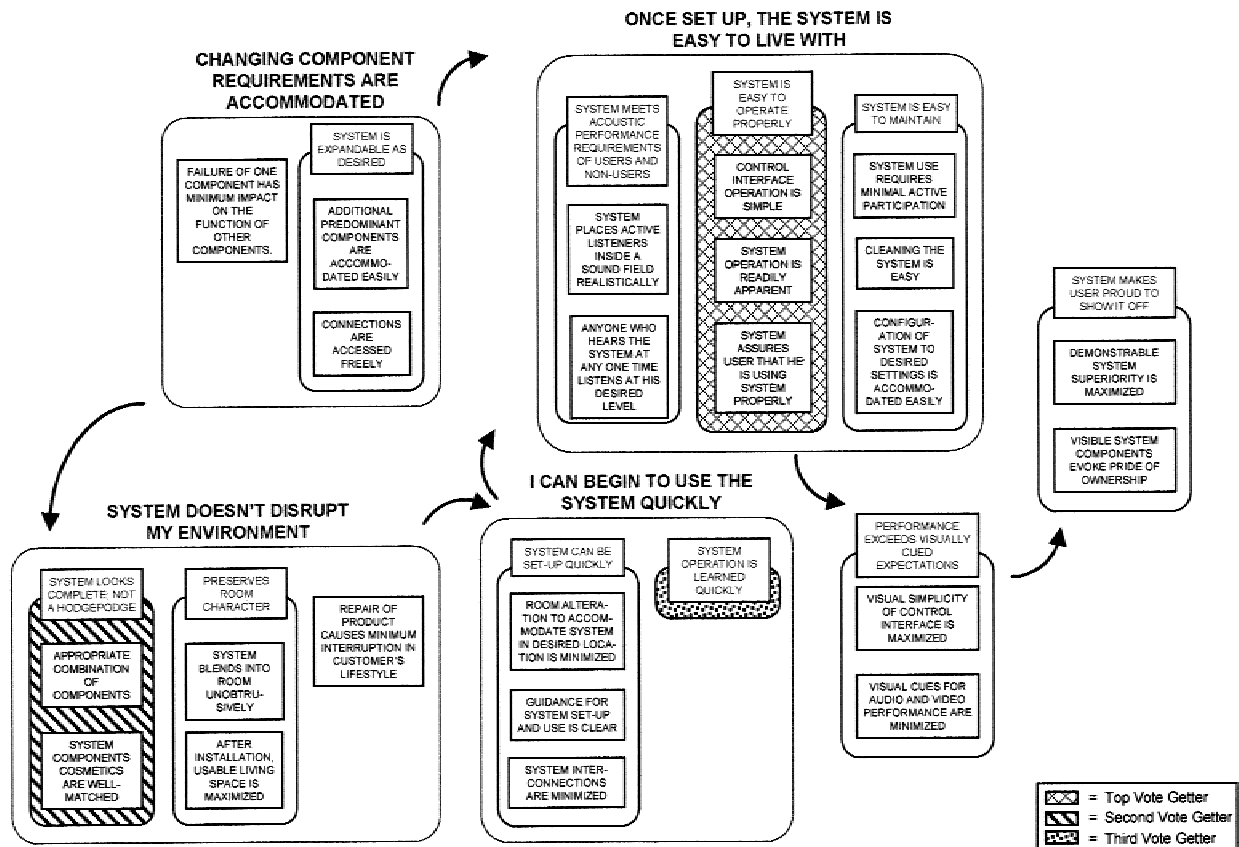


Figure 3.—Team members organize customer inputs using a requirements diagram, enabling them to identify crucial messages and reach a consensus on the key customer requirements.

for “must-be” and “one dimensional” requirements (falling within the “dissatisfaction” plane) are calculated in the same manner. This number equals an “If Worse Than” (IWT) score, identifying functionality at a level *below* that of the customers’ expectations.

After IBT and IWT scores are calculated and posted to the matrix, the team rates competitive products—and their own—for meeting customer requirements, compared to the “best solutions” currently in the marketplace. Products are rated “worse than,” “same as,” or “better than” best solutions, with values of -1, 0 and +1, respectively. In turn, these values are multiplied by the IBT or IWT scores for each requirement. The resulting scores provide a measurement that helps team members further prioritize requirements and identify areas in which they must excel in order to differentiate or outdistance themselves from the competition.

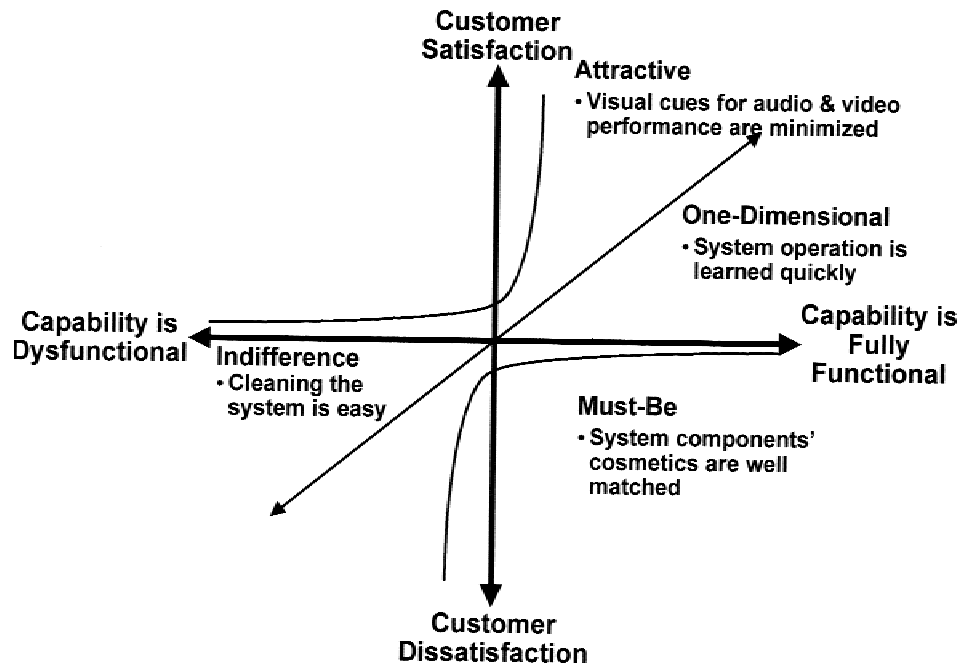
The information gathered in this step plays a major role in the final phase of the process, wherein team members begin to develop strategies for meeting customer requirements. It not only enables team members to apply statis-

tical significance to requirements, but helps them determine which requirements are essential, which are optional and which would “delight” the customer.

“This step really helps the cross-functional team understand what the customer needs are, and then prioritize and rank them against the competition,” offers bioMerieux’s Buzz Sztukowski. “It also goes a long way in building consensus among the people who need to be involved, from engineering and manufacturing to operations and marketing.” In addition, Sztukowski states that the process enabled the bioMerieux team to view their product without the influence of subjective assumptions.

#### Step 4: Generate Solutions

Simply stated, the goal of this step is to make the results of Steps 1–3 real. This is the point in the process at which the team’s ideas on how to solve customers’ requirements take shape. The team begins by assessing the customer information they have collected and turning it into *knowledge*—a true understanding of the customer’s



**“Must-be”** are basic requirements that the product *must* meet (e.g., stop in the shortest amount of time, minimal data entry errors, etc.). Meeting these requirements does not add to customer satisfaction; it is simply expected. However, *not* meeting them results in dissatisfaction.

**“Attractive”** requirements are those that satisfy or “delight” the customer. Generally speaking, they fall into the “more is better” category (e.g., I can use my computer in a maximum number of positions, I can see pictures on my monitor at maximum proximity, etc.), wherein satisfaction rises as functionality increases. These requirements help shape the product’s value proposition, driving teams to develop solutions that are at least on a par with—if not significantly better than—those of the competition.

**“Indifferent”** requirements are those to which customers are apathetic, requirements that do not create strong feelings one way or the other. Identifying these types of requirements can be extremely beneficial to the team when strategizing about features that add real customer satisfaction versus those that may add cost but no measurable value.

**“One dimensional”** requirements are categorized as those that either increase or decrease customer satisfaction. The greater the functionality, the higher the customer satisfaction; the less functionality, the lower the satisfaction (e.g., the higher the gas mileage, the happier the automobile customer, and vice versa).

*Figure 4.—Results of the Kano survey are plotted to rate customer requirements and determine which are “must-be,” “attractive,” “indifferent,” and “one-dimensional.”*

workplace, his or her role in it, and the requirements necessary for that person’s success.

This is achieved by generating a range of initial alternative solutions—ideas and concepts that address the current situation—followed by an analysis of the tradeoffs that must be made among these various solutions. Consequently, the team is able to identify the single solution that offers the most value with the fewest compromises.

Once the solution has been isolated, engineering, marketing and other cross-functional team members brainstorm to address perhaps the hardest step of all: determining how each of their functional areas can

translate requirements into reality. With the market-driven methodology as a foundation, the product design team is well positioned to achieve product design goals in less time, at lower cost and with higher customer satisfaction than previously possible.

“We learned a tremendous amount about our Web site and how we had to structure it to better provide Linux technical services,” adds David LaDuke. “As a result, we completely redesigned our site to make it more of a utility for customers to get the support they need.”

“Our developers felt a lot better about the solutions they came up with,” Sukhdev Nanda says. “The new process gave them the flexibility to be innovative in creating

CR	Customer Requirement	RSOR	IBT	IWT	How to Handle	Best-in-Class	Our Current Product	Existing Solution 1	Existing Solution 2	Existing Solution 3	Existing Solution 4	Existing Solution 5
3		7	54	61		Ours	0	0	-1	-61	-1	-61
4		6	62	64		Existing 1	-1	-64	0	0	0	0
5		9	34	68		Ours	0	0	0	0	0	0
6		61	79	79		Existing 2	-1	-79	-1	-79	0	0
7		64	67	67		Ours	0	0	0	0	0	0
8		61	56	56		Existing 1	-1	-56	0	0	-1	-56
9		8	61	84		Existing 1	-1	-84	0	0	-1	-84
10		10	49	69		Existing 1	-1	-69	0	0	-1	-69
11		46	75	75		Ours	0	0	0	0	0	0
12		60	60	60		Existing 1	-1	-60	-1	-60	0	0
13		1	68	70		Ours	0	0	-1	-70	0	0
14		12	45	66		Existing 1	-1	-66	0	0	0	0
15		45	81	81		Ours	0	0	-1	-81	-1	-81
16		36	4	4		Existing 2	-1	-4	-1	-4	0	0
17		8	63	70		Existing 1	-1	-70	0	0	0	0
18		35	70	70		Existing 4	-1	-70	-1	-70	0	0
19		51	83	83		Existing 1	-1	-83	0	0	-1	-83
20		2	75	75		Ours	0	0	-1	-75	-1	-75
21		42	69	69		Ours	0	0	0	0	0	0
22		3	67	67		Existing 2	-1	-67	-1	-67	-1	-67
23		12	73	73		Ours	0	0	0	0	0	0
24		51	83	83		Existing 1	-1	-83	-1	-83	-1	-83
25		54	67	67		Ours	0	0	-1	-67	0	0
26		68	75	75		Ours	0	0	0	0	0	0
27		47	73	73		Ours	0	0	-1	-73	0	0
28		79	83	83		Existing 1	-1	-83	0	0	0	0
29		68	67	67		Existing 1	-1	-67	0	0	-1	-67
30		64	69	69		Existing 1	-1	-69	0	0	-1	-69
31		6	75	75		Ours	0	0	0	0	-1	-75
32		44	33	33		Ours	0	0	-1	-33	-1	-33
Total scores							-1146	-694	-1137	-1250	-855	

CR #	Customer Requirement	RSOR	IBT	IWT	How to Handle	Best-in-Class	Our Current Product	Existing Solution 1	Existing Solution 2
3		7	54	61		Ours	0	-1	-61
4		6	62	64		Existing 1	-1	0	0
5		9	34	68		Ours	0	0	0
6			61	79		Existing 2	-1	-79	0
7			64	67		Ours	0	0	0
8			61	56		Existing 1	-1	0	-1
9		8	61	84		Existing 1	-1	0	-1
10		10	49	69		Existing 1	-1	0	-1

Figure 5.—The competition analysis matrix enables team members to measure and rate their own products and services and those of their competitors against what are considered “best solutions” currently in the marketplace. RSOR (Reflected Sum of the Ranks) is a market research calculation based on a stack ranking of a self-stated importance survey. For instance, let’s say respondents were asked to rank requirements as “somewhat important, important, very important, and extremely important.” In order to determine which requirement was the most important among those considered “extremely important,” team members would request a stack ranking.

solutions, whereas before we simply did exactly what a small number of customers told us. Using this approach, we learned the real, enhanced customer requirements.”

## One More Critical Factor

No matter how ingenious a product design methodology may be—or how dedicated its cross-functional teams—success cannot be achieved on good intentions alone. It requires the active support of management and a commitment to supplying the resources that make in-depth customer research possible.

Therefore, management must empower team members with the freedom and funds to conduct the research of which they are capable, at the level that customers deserve. Only then can an organization fully grasp what its customers see and feel and articulate those impressions in solutions that create—and ensure—customer loyalty (7). ☺

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- Market-Driven Product Definition (MDPD), developed by Product Development Consulting, Inc., is an embodiment of the customer-focused process described in this article. MDPD is currently being implemented within companies worldwide—including companies mentioned in this article—to aid in the design and development of new products and services. For further information on MDPD, contact Sheila Mello at [smello@pdcinc.com](mailto:smello@pdcinc.com)