

It's not just a dual-wake-up alarm clock, it's a CD player and an aromatherapy machine, too!

But wait, there's more – it has a shortwave transmitter and a Dictaphone function for recording late-night brainstorming.

Defeating Feature Fatigue

And that's not all...

by Roland T. Rust, Debora Viana Thompson, and Rebecca W. Hamilton

A MOUSE PAD IS A SIMPLE THING. Essentially an oversized coaster, it keeps the incessant scotching of a computer mouse from destroying a desktop's finish. Beyond that, the most it might do is amuse, soothe, or advertise with the artwork imprinted on it. Or so we thought. Enter the mouse pad/clock/calculator/FM radio. Recently, one of us was the reluctant recipient of this innovation in office equipment. Thoughtfully, it featured a pair of earphones. Less thoughtfully, it did not include the two batteries required to operate it. A glance at the

IT'S ALIVE . . . WITH FEATURES!

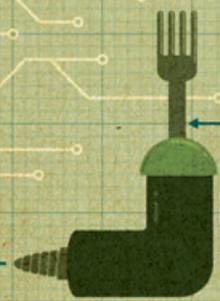
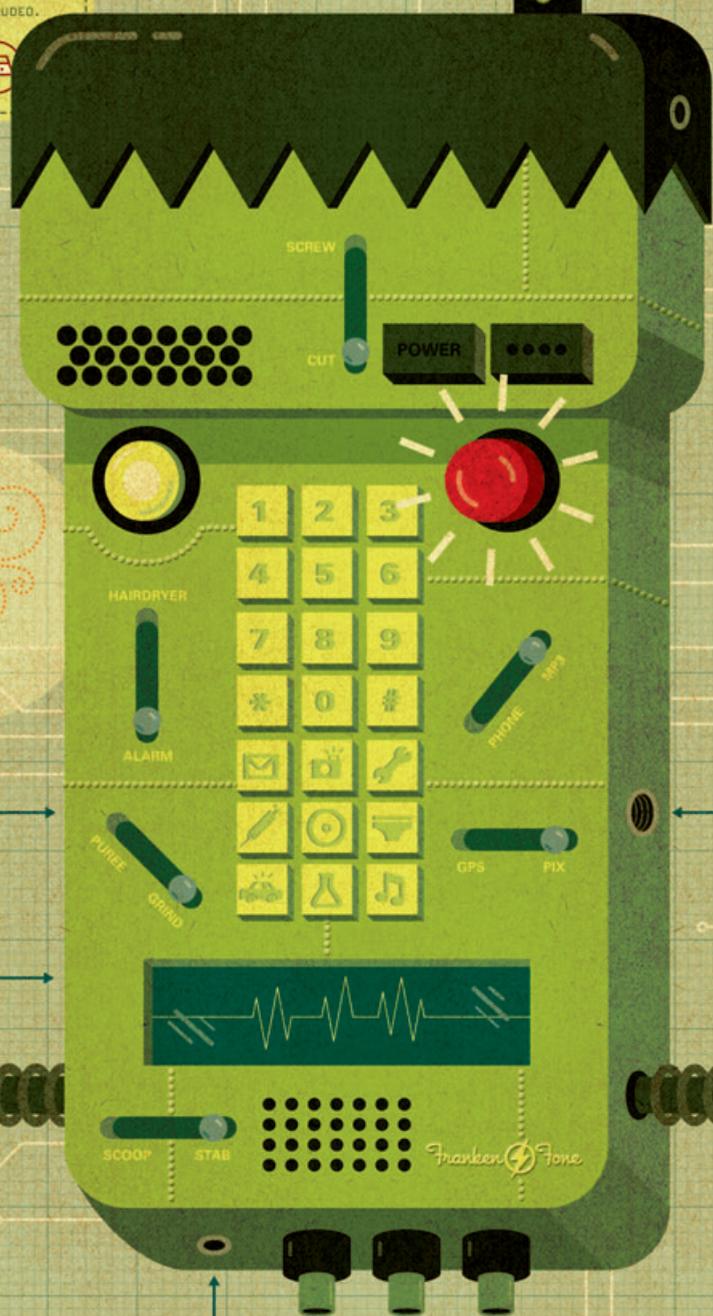
- ⚡ IT GRINDS FRESH MEAT!
- ⚡ IT JUICES FRUITS AND VEGETABLES!
- ⚡ IT MAKES DELICIOUS ICE CREAM!

WARNING! SOME FEATURES MAY BE INCOMPATIBLE WITH WINMAC 2.0. SEE YOUR INSTRUCTION MANUAL FOR FURTHER DETAILS. 30-DAY LIMITED WARRANTY COVERS HYPOTHETICAL USE ONLY. BATTERIES NOT INCLUDED.



**SOLD
SEPARATELY**

**ALSO
AVAILABLE**



two closely printed pages of instructions indicated the learning curve involved. Our new mouse pad soon found its true calling: gathering dust in a bottom drawer.

It's a story that's playing out in homes and offices around the world. Consumers can now purchase a single product that functions as a cell phone, game console, calculator, text messaging device, wireless Internet connection, PDA, digital camera, MP3 player, and GPS. The BMW 745's dashboard alone has more than 700 features. Appliance maker LG Electronics sells a refrigerator with a TV in the door. (The ad copy on one retailer's Web site sums up the value proposition: "Why integrate a TV into an LG refrigerator? Why not?") People in the software business like to refer to this phenomenon as "feature bloat"; other terms are "featuritis" and "feature creep." It's a kind of arms race to escalate the functionality of formerly single-minded devices.

The problem is that tacking features on to products makes them harder to use. Even when the extra bells and whistles don't add wholly different realms of functionality (such as phones that are also cameras), the complexity they introduce to the task at hand can be mind-boggling. The Bosch Benvenuto B30 espresso and coffee machine, for instance, doesn't stop at delivering a demitasse; its digital screen asks the user to select from 12 drink options and to make myriad decisions about energy-saving modes, timer programming, and water hardness settings. Every additional feature, to quote usability expert Jakob Nielsen, is "one more thing to learn, one more thing to possibly misunderstand, and one more thing to search through when looking for the thing you want." It makes sense intuitively that an overload of features detracts from a product's usability; it's also been proven over and over again in research. Recently, for example, the research and design firm Usable Products Company compared cell phones and found that it took twice as long (about 12 minutes, instead of six) to download and install a ring tone on Cingular's Nokia 6620 as it did on Sprint's Samsung SPH-A680. For a ring-tone-addicted public, this is a serious shortfall. And it has everything to do with Nokia's inclusion of ringer profiles, picture messaging, MP4 playback, and RealPlayer—all features absent from the Samsung model.

Now, don't get us wrong. Ringer profiles are definitely cool. The ability to have calls from your brother announced by the tune to "He ain't heavy..." or to hear the refrain from Chris Rea's 1978 hit "Fool (If You Think It's Over)" and know your divorce lawyer is on the line constitutes a breakthrough in ironic living. For the customer

who wants all the additional functions, and is willing to learn how to use them, an extra six minutes here and there may be bearable. But the reality is that **most customers don't use anything close to the full functionality of a highly complex product. For them, more functions translate to lower value in use.**

Our recent research, funded by the Marketing Science Institute, has focused on the trade-off companies must face between making their products more capable—that is, increasing the number of useful functions they can perform—and making them more usable. Our findings demonstrate that managers struggling to achieve the right balance are forced to choose between maximizing initial sales and maximizing long-term customer satisfaction. For reasons we will explain, the usual market-research techniques don't provide a solution to this dilemma. Managers committed to winning repeat business and growing the lifetime value of their customers need a new model.

It Slices, It Dices

Why do manufacturers persist in making monstrosities of their products? One reason is to serve their own efficiency goals. To begin with, adding features costs next to nothing. As faster and faster chips offer ever-increasing memory capacity—at a lower cost—engineers can't resist the temptation to equip existing electronic components with more functions. Of course, they are not looking at the whole equation, which includes the intangible costs of reduced usability.

It's also cheaper to produce feature-rich products that can satisfy the needs of heterogeneous consumers than to produce targeted products with fewer features. For instance, a company that designed a calculator with financial analysis functions might add a set of functions useful to biochemists, aiming to hit two birds with one stone.

Often, companies don't nip the efflorescence of features in the bud because engineers and early adopters don't see the problem. Consider one lead user's opinion, posted on a consumer feedback site:

I was stuck between the T610 and the P800. Having gotten used to the A830 for about four months, I preferred to have a phone with similar features (MP3 player, Bluetooth, Triband, organizer, etc.) so in the end, I went with my instincts and went for this beauty—P800. And boy, am I glad I did. All I can say to those who gave the P800 bad reviews is "bad luck." But then again, I would think that for some of you,

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the P800 just simply had too many features for you to handle....

As hinted in this individual's posting, his was a minority view. But it's clear that he was a highly knowledgeable and opinionated reviewer who had considerable experience with the product and its competitors. Whose favor do you think product engineers court more: lead users like this one or the easily flummoxed masses?

Even marketers, who are trained and paid to understand the majority of consumers, are led to believe that more is better by economic theory and standard market-research techniques—both of which use models that predict that increasing the number of positively valued features makes products more appealing. At least since Kelvin Lancaster's work in the early 1970s, economists have recognized that consumers choose not so much between goods as between their characteristics; economic theory models consumers' preferences using an additive utility function to link product attributes to consumer demand. In other words, each positively valued attribute is assumed to increase the net utility to the consumer, no matter how many other attributes already exist. Similarly, market research techniques such as conjoint analysis and discrete choice analysis view products as bundles of attributes and estimate part-worths for each attribute. According to these models' predictions, each positively valued feature will increase a product's market share relative to products without that feature. At the very least, marketers see every new feature their company dreams up as a point of differentiation (however fleeting) and every feature competitors dream up as a necessary parity point.

A friend of ours uses a phrase to describe the products that grow out of such thinking, things like combination telescope/microscopes and wristwatch/metronome/tuners. She calls them "the answer to the question that nobody asked." But that's not entirely true. So far, we've been reviewing the supply-side explanations for the proliferation of product features, but there's also a demand side to consider.

It Engages, It Enrages

We conducted three studies to gain a better understanding of why consumers keep buying products they will live to curse. (See the sidebar "You Made Your Remote-Control-Adjustable, Dual-Firmness Mattress, Convertible Bunk and Trundle Bed—Now Lie in It" for a closer look at our research. Additional details can be found in our November 2005 article in the *Journal of Marketing Research*, "Feature Fatigue: When Product Capabilities Become Too Much of a Good Thing.") First, we wanted to know how additional features affect consumers' perceptions of



You Made Your Remote-Control-Adjustable, Dual-Firmness Mattress, Convertible Bunk and Trundle Bed – Now Lie in It

We ran three studies to examine consumers' intuitions about how adding features to products would affect the products' capability (what they could do) and their usability (how easy it was to use the products effectively). In particular, we wanted to determine whether participants would weigh those two factors differently before and after they'd used the products.

In all three studies, we presented our participants, undergraduate students, with two kinds of devices they were already familiar with and valued: digital audio players and digital video players. This ensured their high level of involvement in the tasks we gave them and their ability to make reasonable judgments about the products' capability and usability.

What Appeals to Consumers

We simulated an in-store experience and presented participants with three models of either a digital video player or audio player. Each model differed only in its number of features (seven, 14, or 21).

We asked the 130 participants (50.8% females, average age 20.5 years) to perform the following tasks:

- Rate their expertise with digital video and audio players in general.
- View the user interface and the list of features for each of our three models.
- Rate their perceptions of each model's capability and usability. Regarding capability, we asked whether the products were likely to perform poorly or well, offer few or many advantages, and add little or much value. We measured usability by asking participants to agree or disagree with eight statements, such as, "Learning to use this product will be easy for me," "Interacting with this product will not require a lot of mental effort," and "It will be easy to get this product to do what I want it to do."
- Provide their overall evaluation of each model's utility according to six measures (bad/good, unlikable/likable, not useful/useful, low/high quality, undesirable/desirable, unfavorable/favorable).
- Choose one of the models, indicating how confident they were about their decision and how difficult it was to make the decision.

Participants who chose more features perceived their products to have more capability but less usability than the products with fewer features. But in the end, most participants (62.3%) chose high-feature models.

Consumers know that products with more features are harder to use, but before they purchase a product they value its capability more than its usability.

What They Choose to Add On

We asked the 141 participants (55.3% females, average age 21.1 years) to perform the following tasks:

- Imagine that they were about to subscribe to and download a new digital audio player or digital video player.
- Choose the features they wanted from a list of 25 features that had been identified as ones that offer positive value.
- Rate their familiarity with each feature and its importance.
- Rate the perceived capability and usability of their customized product.

Of the 25 features, participants chose an average of 19.6 for their customized products – nearly as many as were included in the first study's high-feature product. Approximately half of the participants chose more than 80% of the available features.

The number of features participants selected increased perceived product capability for both products and decreased perceived product usability for one of the products. The connection between adding product features and decreasing usability seems to hold even when the consumer is able to select each feature. And because participants nevertheless chose high-feature instead of low-feature products, **it seems clear that, prior to purchase, the desire for capability drives decisions more than the desire for usability.**

Even when consumers are allowed to customize a product, they load on the features, worrying little about the learning curve they are setting for themselves.

What Makes Them Happy in the End

We created two working models of the digital video player—one with seven features and one with 21—and allowed some participants (the “after use” group) to use one of the models; they consulted a user’s manual and performed a series of four tasks with the product. The other participants (the “before use” group) only considered features on a virtual product.

We then asked the 190 participants (52.1% males, average age 20.5 years) to perform the following tasks:

- Evaluate the product’s capability and usability.
- Provide an overall evaluation of the product.
- View the user interface and the list of features for two other models (for instance, those who had used the high-feature model were shown the low- and medium-feature versions) and rate their capability and usability.
- Provide an overall evaluation of each model’s utility using the six-item measure in the first study and one item about product satisfaction.
- Choose one of the models, indicating how confident they were about their decision and how difficult it was to make the decision.

Participants’ choices of players before and after use suggest a substantial decrease in the share of the high-feature model. The majority (66%) of participants in the before use group chose the high-feature model. But only 44% of the participants in the after use group who had used the high-feature model chose it—even though they had already invested time learning how to use it. Those who used the high-feature model were less confident in their choices and rated the choice as more difficult than those who used the low-feature model.

Once consumers have used a product, their preferences change. Suddenly, usability matters very much.

a product and their purchase decisions. Do they perceive that a product with more features truly has more capabilities? Do they suspect it will be harder to use? Second, we wondered what weight consumers place on usability relative to capability when given the opportunity to customize a product for their own use. Third, we wanted to find out if consumers judge the overall utility of a product differently once they’ve used it. If capability counts for more than usability in “expected utility” (evaluated before use), does the same equation hold for “experienced utility” (evaluated after use)? Or does usability become more important?

Our first study proved that consumers know full well what they’re getting into. In fact, people have a good understanding of the double-edged sword that features present. They expect features, reasonably, to add valuable capabilities to a product. They also expect them to make the product more complicated and difficult to use. In our laboratory, just as in life, people balance the upside and the downside before making a decision.

When it’s time to choose, however, capability wins. In a simulated store setting, we presented our study participants, undergraduate students, with models of digital audio and video players that differed only in the number of features. The findings were clear: As the number of features grew, perceived capability increased and perceived usability decreased. And overwhelmingly, participants thought the high-feature model offered the highest overall utility. It was the one they would choose to own.

Clearly, capability has a stronger effect on expected utility than usability does. And, as our research shows, this isn’t true only—or even particularly—for highly knowledgeable customers. We distinguished between participants who were experts in using digital audio and video players and those who were novices. There was a difference in how the two groups perceived the products’ usability; not surprisingly, novices expected a bigger usability penalty from additional features than experts did. But both groups preferred the high-feature model in the end.

Our second study pursued that finding. Plenty of anecdotal evidence suggests that consumers do not use all the features of the products they buy. We wondered if, given the opportunity to customize a product to fit their own interests and needs, consumers would limit the number of features. We presented participants with a list of 25 features and told them to create the digital audio or video player they would prefer to own if the incremental price of features were no object. In theory, this meant that each feature had to pass a simple test in which the capability gain would exceed the usability pain. In fact, the typical customizer was like the proverbial kid in a candy store. Participants saw very little they objected to and piled on the extras, creating products with an average of 19.6 features—virtually the same number included in the

As faster and faster chips offer ever-increasing memory capacity—at a lower cost—engineers can't resist the temptation to equip existing electronic components with more functions.

high-feature model in our first study. As in that earlier study, we asked participants to evaluate the products they had created in terms of capability and usability, and again, they clearly understood that adding capabilities would increase the usability penalty they'd end up paying. But they also foresaw greater capabilities in the feature-rich products, and that carried the day in their impressions of their products' overall utility.

While the first two studies examined consumers' intuitions before using products about how adding features to them would affect their capability and usability, the third study directly compared consumers' ratings of capability and usability and their overall product evaluations before and after using products.

What came to light in the findings was a significant and interesting shift. Before use, capability mattered more to the participants than usability, but after use, usability drove satisfaction rates. As a result, satisfaction was higher with the simpler version of the product, and in a complete reversal from the earlier studies, the high-feature model was now rejected by most participants.

This, then, is what lies behind the pervasive problem of feature fatigue: The experience of using a product changes the equation underlying consumers' preferences.

People initially choose products that do not maximize their long-term satisfaction because different considerations are salient in expected and experienced utility. Put simply, what looks attractive in prospect does not necessarily look good in practice. Consumers often become frustrated and dissatisfied with the very cornucopia of features they originally desired and chose. This explains a recent nationwide survey that found that after buying a high-tech product, 56% of consumers feel overwhelmed by its complexity.

Even experts – people who are highly product literate – don't escape the effects of feature fatigue. In our study, the shift in preferences before and after use occurred just as strongly for experts as for novices. If anything, our studies might understate the truth. First, our sample represented a segment – college students – that tends to be more open to new technology and new features than other segments. Second, our high-feature prod-

uct had only 21 features, a relatively low number in some product categories. Finally, our studies considered only features that added functionality to the product and were reasonably familiar to the participants. The negative effect of unimportant or highly complex features may be even stronger. To underscore the depth of feeling that featuritis elicits, let us refer you to the World Wide Web, home to highly informed consumer reviews of thousands of complex products. One blogger on topics of product design, Kathy Sierra, expresses her frustration this way:

My new Subaru-factory-supplied car stereo uses that most evil of designs—modes. With so many features to support, they ran out of controls...so every control does multiple things depending on which mode you're in. None of it is intuitive or natural. Lose the manual and I'm screwed. Ten years ago, if you'd told me I'd one day need a manual to use my car radio, that would have been inconceivable. All I want to do is find a frickin' radio station!

Products That Do Too Much

If you are a manager in a consumer products company, our research presents you with a dilemma. Adding features improves the initial attractiveness of a product but ultimately decreases customers' satisfaction with it. So, what should you do? If you give people what they want, they will suffer for it later, and that has three follow-on effects.

First, many of them will return the product. Recently the Consumer Electronics Association, a U.S. trade association, commissioned a survey on consumers' experiences in a complicated new product realm: home networking. The survey found that 9% of consumers had returned a home networking product (for example, a hub, router, bridge, adapter, or modem) within the previous year. Only 15% of the returns were the result of broken or defective products; most of the remaining returns were simply because people couldn't get the equipment to work.

Second, consumers who are dissatisfied with a product after using it will take their business elsewhere in the future. Certainly, it's true that you can't satisfy a customer

Before You Add That Next Feature, Do the Math

How many features should a product include to contribute most to the bottom line? A fairly straightforward model, applied to data any company can collect, provides the answer.

First, to simplify matters, let's assume that adding features costs nothing (as is the case with many information-based products, such as software), so that increasing profitability is purely a matter of increasing revenue. In our model, we'll call the incremental revenue created by adding new features R . And, as we discuss in the article, we know that R is actually the net of two perceived effects: a capability bonus (C) and a usability penalty (D). Stated as an equation, $R=C-D$.

But recall from our research that adding features has a less positive impact on perceived capability after use than before use. The capability value of features, in other words, is not static. So let's distinguish between C_1 and C_2 – capability as perceived before and after use. C_1 is one multiple (d) of the features (F) we added, and C_2 is another, lesser, multiple (e) of those same features.

$$C_1=dF$$

$$C_2=eF \quad C, d, e > 0 \text{ and } d > e$$

Also recall that usability is perceived to decline with the number of features, and this decline appears to accelerate as more features are added. So the total usability penalty consists of the negative effect (a) of the first set of features plus the even greater negative effect (b) of the next set of features:

$$D=aF+bF^2 \quad a, b > 0$$

We can now create the basic equations required to think about long-term profit impact—one for the first period's revenues (R_1) and one for revenues from subsequent periods, which for now we will limit to one subsequent period, R_2 .

$$R_1=C_1-D=(d-a)F-bF^2$$

$$R_2=C_2-D=(e-a)F-bF^2$$

But arriving at total revenues, stated at their net present value (R_{tot}), isn't quite as simple as adding R_1 and R_2 . There's one more variable we must introduce. In some companies, subsequent purchases matter more to the lifetime value of the typical customer than they do in other companies. One reason for this variability is that some product categories are more conducive to repeat sales than others. (Other reasons include differences in companies' discount rates, the typical duration of customer relationships, and the lengths of planning horizons.) To recognize that variability, we need to add a weighting factor (w) to the second period.

$$R_{tot}=R_1+wR_2$$

We now have all the variables in place to discover how to choose a feature set that will maximize long-term revenues

and profits. Put together and stated in the most mathematically efficient form, the equation takes shape as follows:

$$R_{tot}=R_1+wR_2=[(d-a)+w(e-a)]F-(1+w)bF^2$$

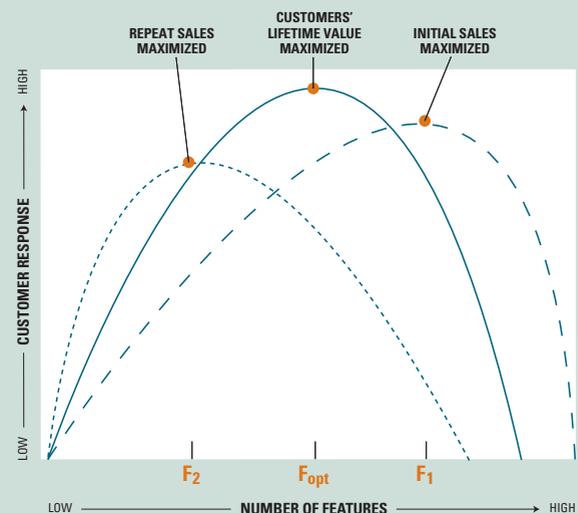
Now, let's say a company is hoping to find the number of features that will initially attract the most customers and will therefore maximize short-term, first-period profits. This amounts to maximizing R_1 with respect to F . It is easily shown that R_1 is maximized when $F_1=(d-a)+2b$. In the chart below, this is the curve that peaks farthest to the right. But if the company is hoping to maximize repeat sales (and hence second-period profits), that means maximizing R_2 with respect to F , leading to the optimal value of $F_2=(e-a)+2b$. This curve peaks farthest to the left in the chart.

There is, however, a middle ground. If the company focuses neither on initial nor on longer-term profits but on maximizing the net present value of the customer's profit stream, which financial analysts would consider optimal, they must maximize R_{tot} with respect to F . The optimal value can be found through the following equation:

$$F_{opt}=[(d-a)+w(e-a)]+[2b(1+w)]$$

To achieve this happy medium, as we can see in the chart, companies must take care not to include too many features in their products in an attempt to maximize initial sales, or to include too few features, as they might if they focused strictly on maximizing repurchases.

Further implications of the model are noted in our November 2005 *Journal of Marketing Research* article, from which the chart is also adapted. The key point here is that companies can discover the optimal number of features for their products, and that number depends on their goals.





The first step for many companies may simply be to take stock of the complexity they have built into their products and the toll it is taking on their customers.

you've never won in the first place. Many companies may believe 'tis better to have sold and lost than never to have sold at all. But that's a dangerous attitude for any company focused on growing customer equity – the lifetime value of their customers. A company looking for repeat business should hesitate to pit its features against its future.

Finally, frustrated product owners, like the blogger we quoted above, will spread the word of their dissatisfaction. This appears to be the case with BMW, whose 7 Series cars feature the complicated iDrive system, which, as we said, offers about 700 capabilities requiring multifunction displays and multistep operations—even for functions that formerly required the twist of a knob or the flick of a switch. BMW included instruction sheets in the glove compartment because it is almost impossible to give the car to a valet parker without an impromptu lecture. According to industry news reports, sales of the 7 Series in the United States in the first half of 2005 were down about 10% relative to the same period in 2004. Past studies have established the power of positive word of mouth and the much greater prevalence of its negative form – and most of those studies were conducted before the Internet gave every dissatisfied party a global sphere of influence.

In light of these long-term consequences, how should companies today be designing products? It's undeniable that, in a store setting, consumers reach for the product that boasts the most features. But how much of a good thing is too much?

Finding the Happy Medium

To achieve lasting prosperity, companies must find a way to resolve the dilemma we've described. The first step for many companies may simply be to take stock of the complexity they have built into their products and the toll it is taking on their customers. Executives at Mercedes-Benz recently did just that and, as a result, removed more than 600 functions from its cars. In 2004, Stephan Wolfsried, vice president for electrical and electronic systems and chassis unit at DaimlerChrysler's Mercedes Car Group,

said that integrating all those functions caused truly important electronic parts to malfunction occasionally and made testing the system more expensive. Moreover, Wolfsried said, the functions were ones that “no one really needed and no one knew how to use.” One example he noted was the storage of a driver's personal seat position in the car key. “It was done with good intentions, but if I take my wife's key at some point and can't find my own seat position any more, that tends to be annoying for me instead of comfortable.” We suspect that in many companies, simply gaining this kind of heightened awareness of customer impact would help contain feature bloat. Beyond that, we offer five other pieces of advice.

Consider long-term customer equity and not just customers' initial choices. To get the right mix of capability and usability in a product, managers need much more guidance than the general advice that “less is more.” On the basis of our results, we developed an analytical model to help managers balance the sales benefits of adding features against the customer equity costs of feature fatigue. The model steers decision makers away from the extremes – too few features to capture initial sales or too many features to ensure ease of use – and toward a middle ground that maximizes the net present value of the typical customer's profit stream. The model also demonstrates that the optimal number of features depends on a company's objectives. (See the sidebar “Before You Add That Next Feature, Do the Math.”)

Build simpler products. In general, our results suggest that managers should consider offering a wider assortment of simpler products instead of all-purpose, feature-rich products. Perhaps this is the intent behind electronics giant Koninklijke Philips Electronics' new brand promise: sense and simplicity. The concept is that products should be easy to use and should improve the quality of people's lives. The company apparently wants to take this idea beyond sloganeering: It created a Simplicity Advisory Board, a think tank consisting of designers, health care specialists, and technology experts, to help translate the message into new products. Meanwhile, we like the salute to simplicity offered by Adam Baker, a Web-based commentator:

I have an electronic garage door opener. It works perfectly: I just push a big, obvious button on a simple, single-function control, and the garage door opens (or closes, depending on whether it was open or closed to begin with). I only needed to use the device once before I understood how it worked. It doesn't do anything else, and it doesn't have any fancy gimmicks.

Particularly in cases where a company has packed one model with many features to address market heterogeneity, consumer satisfaction might be greatly enhanced by tailoring products with limited sets of capabilities for various segments.

Give consumers decision aids. We've just suggested creating and marketing more narrowly targeted products. Admittedly, this makes the decision process more difficult for consumers, forcing them to think carefully about which features they actually need. Moreover, our empirical results suggest that people will be tempted by products that offer greater capability. To help consumers learn which products best suit their needs, managers should consider designing decision aids, such as recommendation agents that "interview" buyers about their requirements, or offering extended product trials—two techniques that can increase the salience of usability in the purchase decision. For example, the companies that sell digital media players RealPlayer and Winamp offer evaluation versions, which give people the opportunity to fiddle with a working model of the product, sometimes with limited functionality and sometimes with full functionality for a limited time. By decreasing the gap between consumers' preferences during choice and use, such strategies may increase customers' satisfaction and their lifetime value.

Design products that do one thing very well. Perhaps the worst outcome of feature creep is the one captured in a *New Yorker* cartoon that shows a man arriving in a store with a simple question: "Do you have any phones that make phone calls?" Too often, in their eagerness to layer on additional functionality, developers lose sight of the product's basic function—the one thing it must do extremely well. Examples abound of products that have captured their owners' hearts by performing their central task admirably. The phenomenally popular iPod, Apple's personal music player, shows how effectively a company can make sales and satisfy customers with a tightly focused solution. As a new digital product, the iPod could have combined numerous features at extremely low incremental cost. Instead, it aimed to be a single-purpose tool that performed so well and so simply that everyone had to have one.

Use prototypes and product-in-use research. One way or another, managers must correct for the misleading information that many market-research techniques deliver. As noted, our findings call into question the predictive power of attribute-based models for determining the op-

timal number of features. If companies conduct market research by asking consumers to evaluate products without using them, too much weight will be given to capability, and the result will likely be products with too many features. Instead, designing research that gives consumers an opportunity to use actual products or prototypes may increase the importance of usability so that its relevance in choice approaches its relevance in use.

Only You Can Fight Feature Fatigue

You probably know someone who owns a Swiss Army knife. They are undeniably useful tools; maybe you carry one yourself. But do you know anyone who owns the WorkChamp XL model? Retailing at \$188, it bristles with more than 20 special-purpose appendages (although it lacks the 13 different screwdrivers of the CyberTool). Victorinox, the company that makes the knife, hardly expects it to be the top seller. The company's most popular offering, however, is no simple, one-bladed pocketknife. It has more features than a single blade—but not many more. And the utility of that classic multipurpose tool has been the foundation of the company's brand image for decades. Victorinox's experience is in line with our findings: The best way to build customer equity is to design products with just enough features to make the first sale and still be highly usable.

Too many companies today are endangering their brands, and their customer relationships, by adding features upon features to their products. They are increasing product capability at the expense of product usability and failing to strike the optimal balance between those two important considerations. The situation threatens to get worse as the marginal cost of adding features continues to decrease, even approaching zero for information-based products like software.

In an interview with the electronics trade magazine *EE Times*, David Hytha, executive vice president of international terminal management at T-Mobile, had this to say: "We spent billions of euros as an industry on advanced-feature phones...Not only have we not gotten any good money back from our investment, but we've even hurt our investment." What was the problem? Insufficient attention to usability. Hytha went on to admit, "There are so many different features that even able users find it difficult to use the phone." The market, he concluded, "truly is choking on technology."

What happened to T-Mobile's market may well be happening to yours. If you care about making your customers happy and maximizing their value to you over the long term, stop exposing them to feature fatigue. 

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