Finding Your Innovation Sweet Spot

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Finding Your Innovation Sweet Spot

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Most ideas for new products are either uninspired or impractical. A systematic process, based on five innovation patterns, can generate ideas that are both ingenious and viable.

MARKETERS WILL TELL YOU that the best sources of new product ideas are customers, both current and potential. Increasingly, though, we're seeing that customers lack the imagination to envision innovative products that address their emerging, or even existing, needs or desires. For example, participants in focus groups typically opt for product innovations that feature only minor changes from the current version. When these products hit the market, they often fizzle because small improvements aren't enough to alter customers' entrenched buying habits.

Alternatively, as a way to get beyond predictable product extensions, developers are encouraged to "think outside the box." Give free rein to your creative impulses, they are told, and try to imagine products that respond in truly innovative ways to customer needs. But more often than not, this kind of brainstorming yields a flurry of ideas that, while appealing, are just too far out, given the company's brand image or capabilities. They are quickly discarded or, if they make it to market, simply flop. A classic example is Scott Paper's erstwhile and unsuccessful foray into disposable paper party dresses. Whatever

the merits of the concept, Scott–known for utilitarian products such as toilet paper–was probably not the company to bring this or any fashion-driven product to market.

So how can product developers hit the innovation sweet spot–far enough from existing products to attract real interest, but close enough to fall within a company's existing positioning and capabilities? We've seen many companies achieve impressive results using a method we call systematic inventive thinking. It represents a complete overhaul of traditional brainstorming, replacing the creative free-for-all with a highly disciplined "inside the box" approach to idea generation. And, unlike most new product development methods, it starts with an existing product and its characteristics rather than with customers and their unmet needs. The method's main thrust: Don't just listen to the voice of your customers; listen to the voice of your product.

You begin by listing the essential elements of a product, both its physical components and its attributes, such as color and expected useful life. You also look at the product's immediate environment, again identifying both its physical components and its attributes, such as ambient temperature and type of user. Then, following one or more of five generic innovation patterns, you manipulate these elements to come up with something new.

Don't be alarmed if what emerges initially seems more bizarre than the output of even the most freewheeling brainstorming session. A hallmark of the process is the idea that function follows form–that is, only after visualizing a rejiggered version of the product do you assess its likely success in the marketplace and the viability of producing it.

In fact, this process, by drawing new product ideas out of current products – and tapping existing skills and technologies – reduces the chance that you will come up with ideas that are impractical to produce or market. And using systematic patterns, rather than the preconceptions of customers or marketers, to generate ideas liberates your thought processes from the straitjacket of existing concepts and assumptions.

Powerful Patterns

At the core of our process are the five innovation patterns. These "templates of innovation" have emerged from our historical analysis of product development trends, which in turn grew out of research by the Russian engineer Genrich Altshuller. (For more on Altshuller's research, see the sidebar "Seeing Patterns in Creativity.") Our research indicates that most successful product innovations fit into at least one of these five patterns. Indeed, we have found that the patterns can help predict the emergence of new products before the appearance of signals indicating market demand. The patterns, or templates, are therefore useful not just for categorizing new product ideas but also for generating them. Let's look first at the simplest – and perhaps the most surprising – of the bunch.

Subtraction. In developing new products, people intuitively tend to add features to an existing product. These new features are conceived as responses to the perceived wants and needs of customers – that is, form follows function. While this is a perfectly logical approach, it can result in those incremental improvements that have little impact on customers' buying patterns. It can also lead to "feature creep," in which the growing complexity of using the product–think of today's videocassette recorder–outweighs whatever benefits the new features offer.

In applying the pattern of subtraction (or reduction, as we sometimes refer to it), you take the opposite approach: Instead of trying to improve a product by adding components or attributes, you remove them, particularly those that seem desirable or even indispensable. (Taking out an undesirable component – lead in gasoline, sugar in soft drinks, caffeine in coffee – is typically a customer-driven move and isn't an example of the subtraction pattern at work.)

Philips Consumer Electronics, for example, used the subtraction pattern and came up with the idea of removing the local display and all the control buttons on its DVD player. Clearly, this was a radical notion – a little too radical, in fact. But in testing the idea both internally and externally, the company found it could get by with just one button able to control the most common functions. Buttons for the remaining operations could be moved to the graphical user interface, easily accessible by one button on the remote control. Not only did this help counteract feature creep, it also contributed to an elegant ultra-slim design that, along with the removal of the control panel's local display screen, communicated simplicity and differentiated Philips from the competition. The result was the company's award-winning Slimline Q-series of DVD players.

Having removed an element of the product, developers often see an opportunity to replace it with something better. But to avoid drifting too far from the task at hand, they should first look for that replacement in the "closed world" of the product and its immediate environment. For example, a maker of children's products, applying the subtraction pattern, might visualize a kitchen high chair without legs. Since a chair seat resting directly on the floor offers no immediately apparent marketing opportunities, the aim would be to replace the chair legs with something in the product's environment that would elevate the seat to the proper height. One novel possibility: the kitchen table, to which the chair can be attached. Although the makers of the Sassy Seat and comparable products didn't consciously

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apply the subtraction pattern, they might well have.

Multiplication. The second pattern represents a very different approach to innovation: Instead of taking away elements, you make one or more copies of an existing product component. But then – and this is key – you alter those copies in some important way. The aim is to go beyond a mere quantitative change (for example, a double-bin trash can that holds twice as much garbage) and achieve a qualitative change (such as a double-bin trash can that allows users to separate their garbage into disposable and recyclable goods).

A classic example of this is the Gillette double-bladed razor. Simply adding an extra blade to provide one more shaving surface isn't an example of multiplication, as we define it. But adding an extra blade set at a slightly different angle, which raises whiskers so the other blade can cut them cleanly, does illustrate this pattern.

Or take the case of Kapro Industries, an Israeli maker of measuring tools, which used the multiplication pattern to come up with a new leveling tool. Levels typically have a long, straight surface and a vial filled with liquid and a bubble of air. The vial is set at either a zero- or 90-degree angle, which allows the user to tell if a plane is perfectly horizontal or vertical. Applying multiplication, Kapro's developers envisioned numerous additional vials and then thought about ways they might modify them. Simply adding a vial that would serve as a backup in case the primary one broke wouldn't be true multiplication. But what about vials of different colors that would work in different lighting conditions? Or what about vials set at different angles? In fact, what about two vials at one- and two-degree angles that would help builders laying floors with small slopes–for example, in a bathroom, so that water runs toward a drain? The level that emerged from this process, called TopGrade, now enjoys strong worldwide sales.

Division. By dividing an existing product into its component parts, you can suddenly see something that was an integrated whole in an entirely different light. That change in perspective may lead you to reconfigure those parts in unanticipated ways–or even keep the parts separate in a manner that offers unforeseen benefits. Division can take a number of forms: physical division (a product is cut along a physical line), functional division (product components with different functions are separated), and preserving division (a prod-

Seeing Patterns in Creativity

Systematic inventive thinking is based on the research of Genrich S. Altshuller, a Russian engineer who spent his professional life working to formalize the creative process. Born in 1926, he received his first patent at 15 and spent his early career doing research for the Soviet navy. Fascinated with the process of invention, he searched the scientific literature for clues to making the task of innovation more methodical – and concluded he would have to create such a method himself. He began by examining a large database of his own and other people's inventions. Over the years, he began to see patterns in how people arrived at solutions to certain contradictions – contradictions that he saw were at the heart of the innovation process.

Believing his findings had potential for Soviet science, he wrote to Stalin, seeking support for his research – while openly criticizing the Soviet scientific establishment's approach to innovation. The result was imprisonment. In prison, he was denied sleep because he refused to sign a confession. Here was a contradiction seeking an innovative response: How can I sleep and not sleep at the same time? Legend has it that he made eyes out of two scraps of paper from a cigarette package, drew pupils with a charred match, and stuck the papers to his eyelids with spit. He then sat across from the cell door and calmly fell asleep.

After Stalin's death, Altshuller was released from prison and continued his research. He began a huge initiative in which he analyzed and categorized more than 200,000 patents, identifying a series of common templates and categories, which he called ARIZ, a Russian acronym for Algorithm for Inventive Problem Solving. His students developed his ideas further and began applying them to problem solving in other areas. The TRIZ (Theory for Inventive Problem Solving) technique, based on Altshuller's work, today is widely used by engineers throughout the world. His research serves as the foundation of our own research and consulting work. Altshuller died in 1998.

uct is divided in such a way that each part preserves the characteristics of the whole).

Functional division is the source of numerous product innovations. The old hi-fi, with its speaker and turntable integrated in one cabinet, has given way to modular speakers, tuners, and CD and tape players that allow users to customize their sound systems. Designers realized a different kind of benefit by applying this logic to car radios and CD and tape players. Separating the front panel and operating controls from the rest of the unit allows the owner to remove the panel from the car when it is unoccupied, thus reducing the likelihood of theft.

The preserving division pattern was used by Caesarea Creation Industries, an Israeli-based maker of household rugs, to come up with an unusual new type of rug for children's rooms. The company took a standard-sized rug and divided it into four "ruglets," each with a different color and pattern – for example, a representation of one of the four seasons – that would work alone or as part of a larger design. Fitted together like a puzzle, the ruglets create one rug large enough for a group of children to play on. But each piece can also be used separately, so a child can take one into another room – for example, the TV room, where it can be used as a mat. And the modularity is only one benefit; joining the ruglets together and taking them apart is an enjoyable activity in itself.

Task Unification. You can often realize significant product innovation by assigning a new task to an existing element of the product or its environment, thereby unifying two tasks in a single component. The basic rationale for this bundling of tasks: If something exists in the closed world of the product and its environment anyway, why not just see whether it can be made to do double duty?

A classic example of task unification involves the defrosting filament in an automobile windshield. By assigning it the extra task of enhancing radio reception, automakers were able to get rid of the separate radio antenna, long an ugly appendage on the car's body. Or consider the suitcase with wheels, which eliminates one of the most unwieldy products ever devised: the bungee strap-equipped foldable luggage cart.

Newell Rubbermaid applied the task unification pattern in the development of one of its products to eliminate a similarly annoying item: the pesky assembly instruction sheet, so often misplaced by customers. Developers of Rubbermaid's modular garage cabinet first considered integrating the assembly instructions into the cabinet itself. That turned out to be tricky, but the team identified an element of the product's immediate environment that could assume the task of the instruction sheet: The instructions were printed on the product packaging. This saved the paper costs of a separate booklet, simplified the packing process, and reduced the chance that instructions would be misplaced. There was also an unexpected marketing benefit. Rather than take up valuable real estate on the package surface and compete with the product pitch, the instructions actually help sell the product by showing how easy it is to assemble, directly addressing customers' biggest complaint about shelving products.

Unlike most new product development methods, systematic inventive thinking starts with an existing product and its characteristics rather than customers and their unmet needs.

Attribute Dependency Change. This pattern – whose name, admittedly, is quite a mouthful – involves the dependent relationships that exist between attributes of a product and attributes of its immediate environment. For example, some product characteristics (color, for instance) have a strong dependent relationship with a characteristic of the environment (the user's gender, for example). In other cases (the product color and the age of the user, say), there's a weak or nonexistent relationship. You can spur innovative thinking by trying to create new dependencies where they don't ordinarily exist and to modify or dissolve dependencies where they do.

Take a standard pair of eyeglasses. There is no dependent relationship between the color of the lens and external lighting conditions. By creating a dependent relationship, you come up with a lens that changes color when exposed to sunlight, eliminating the need to buy a separate pair of glasses for sunny days.

You can also create dependencies that exist between two unrelated attributes of a single product. For example, a relationship typically doesn't exist between the dimensions and stiffness of a mattress. By visualizing such a dependency, you could imagine a product in which the stiffness depended on the size of the mattress – which probably wouldn't make much sense. It might make more sense, however, to vary the stiffness along the length of the mattress, providing additional support where it's needed, as some mattress makers have already done.

The attribute dependency pattern often generates what later seem like inevitable products. Men and women had used the same type of razor for decades before marketers realized the potential of designing a model especially for women. Had product developers consciously looked for relationships between attributes of the product and its environment, instead of waiting for a marketing rationale, products such as the Gillette for Women line might have appeared years sooner.

Elgo, an Israeli maker of garden sprinkler products, used the attribute dependency pattern in its development of a new product line. Looking for dependent relationships between characteristics of the product and those of its environment, it juxtaposed two somewhat oddly paired attributes: the product's

distribution channels and the time of year. Did the type of distribution channel depend on the season? Well, no, because most of Elgo's products were in fact sold in the summer, when demand for sprinklers is high. But that opened up a new avenue of thinking. While there may not have been a dependency between the distribution channel and the season, there certainly was between the product and the season. What if you dissolved this dependency and offered sprinklers throughout the year? Although the idea seemed foolish, the company's developers pursued the concept, trying to visualize uses for its sprinklers in the winter. Eventually, their thoughts turned to gardeners who grow plants indoors. That led them to experiment with an indoor sprinkler kit, which they recently began selling in Europe.

Function Follows Form

These five patterns may seem relatively straightforward, but applying them takes some practice. "Listening to the voice of your product" requires you to perceive it in an entirely new way. Begin by breaking down the product into its essential physical components. Don't waste time in endless debate about which ones should be included, but do take the time to compile a thoughtful list. A telephone, to take a mundane example, consists of a microphone, a keypad, a speaker, a handset, and a base, along with wires and other components to connect and package these parts.

If you are going to apply only a single pattern, such as multiplication, this is all the deconstruction you need to do. But to get a complete picture of your product – and to apply the entire array of patterns – you need to itemize further. List the product's attributes (our basic home telephone model, you might say, comes in four colors and lasts about 20 years) and the physical and other aspects of the environment in which it is used (it sits on a flat surface and is typically purchased by older customers).

With this list in hand, you can use one or more of the five patterns to rearrange the elements of the product and its environment. Doing this will allow you to imagine a number of what we call virtual products. It is important at this point that you not judge these new forms, no matter how strange they seem. Too often, developers quickly filter out product ideas because their value to customers isn't immediately apparent – or because their uselessness appears obvious. At first blush, Kapro's "almost-level" leveling tool seemed a contradiction in terms. So did a handheld nonrecording tape recorder – until Sony stumbled upon an untapped billion-dollar market of walkers and joggers for its Walkman tape player.

Once you have consciously visualized a virtual product, and only then, you can begin to think about its potential function. Are there any conceivable customer needs that this form might satisfy? What benefits might it offer that existing products don't? What drawbacks does it have compared with existing products? What are the challenges to alleviating these shortcomings? If they can be alleviated, what is the market potential of this product? Are we as a company well positioned to take advantage of that potential? Do we even have the capabilities to produce the product?

Clearly, many of these questions can't be answered definitively at this early stage. But a multidisciplinary product-development team – with expertise not only in marketing and development but also in production and logistics – can make some educated guesses. A multidisciplinary team is also best situated to engage in the iterative process of adjustment and rethinking that can turn a seemingly harebrained idea into a viable product. Of course, most virtual products will in fact be dropped as objections arise, but the key is to explore each one fully. As with the Philips Slimline DVD player, a good idea may emerge from a bad one. (For a depiction of this process, see the exhibit "The Reinvention of a Business Card.")

This process is hard work, and people usually take a while to feel comfortable with it. But if the process were easy, it would have much less success. With innovation, the best results typically come by following the nonintuitive route – what we call the path of most resistance. Look at the subtraction pattern, for example. Instead of taking the usual step of adding desirable components to a product, you try to remove them. Instead of immediately replacing the missing component with something else, you first try to come up with a product that would operate without it. If you do decide to replace the missing component, you look for an existing element of the product itself or its immediate environment – what we call a closed-world resource. Only when you have exhausted these possibilities do you bring in an external replacement.

Choosing the Right Tool

In using our method, how do product developers know which of the five patterns to start with? There are no hard and fast rules, but there are some guidelines. For example, in the case of highly complex products, start with subtraction and look for features that may no longer be necessary or may detract from the product's appeal for a significant group of users – those who prefer simplicity to high performance.

Or when controlling costs is the aim, try task unification, which encourages more efficient use of existing resources, or subtraction, which can eliminate costly product components. When you find yourself following the classic product-development method of seeking quantitative improvements – for example, a larger or sharper or additional razor blade – switch to the idea of multiplication. Properly applied, this pattern, with its altered copies of components, can lead you out of the "more of the same" trap and toward qualitative change.

Attribute dependency change, applicable in a variety of situations, is often the most fruitful pattern, but it is also the most difficult to apply. To help organize your thinking, it is useful to create a matrix, with columns for, say, a half-dozen internal attributes of the product and rows for those same internal attributes and for roughly a half-dozen external ones. This will allow you,

by pairing different variables, to look for dependencies – or the lack thereof – between internal attributes and between internal and external ones.

Take a mobile phone. Some obvious internal attributes are the phone's color, the type of ring, the information provided by indicators on the LED screen, and the remaining charge in the battery. Some relevant external attributes are the user's age, the user's gender, the caller's identity, and the time of day when use is heaviest. In pairing the attributes, you will see that there is a dependency between, for example, battery status (internal) and available information (internal). You'll also see there is no dependency between type of ring (internal) and caller identity (external). Might you dissolve, or at least modify, the existing relationship in one case and create a new one in the other to come up with two virtual products?

In a standard mobile phone, nothing works when the battery is dead, including the LED indicators. Partially dissolving the relationship between these two attributes would produce a phone in which a particular indicator – for example, the one announcing the number of an incoming call – would function regardless of battery status. This feature, which would let users know when a particular person was trying to reach them, even when the phone is dead, might be realized through the addition of a small extra battery dedicated exclusively to this limited task. Now look at the second pair of attributes. Creating a dependency between the caller's identity and the type of ring would result in a phone with a special ring when an incoming call was from, say, your boss or your spouse. Clearly, once you have visualized virtual products such as these, you need to assess their appeal to customers and the challenges in actually producing them.

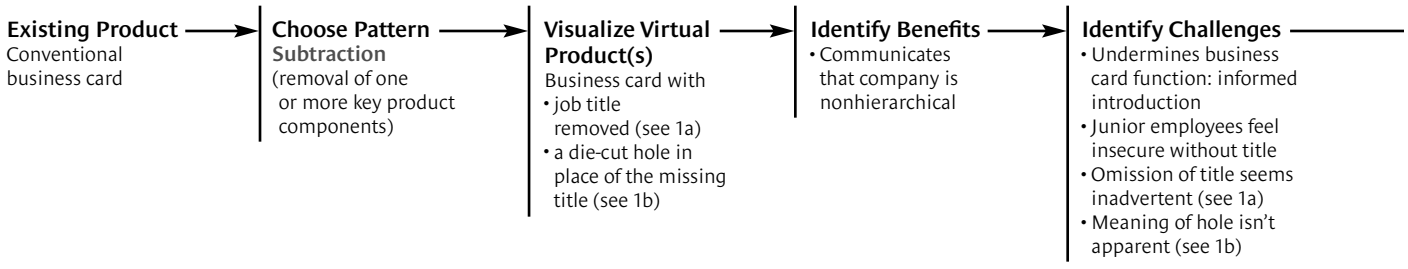
Patterns are often used in conjunction with one another. Ethicon Endo-Surgery, a subsidiary of Johnson & Johnson, has recently been working on a new device to be used in hospital operating rooms. Starting with the subtraction pattern, the design team considered which of the device's basic components could be removed. One possibility was

The Reinvention of a Business Card

The five innovation patterns described in this article are at the heart of a creative process founded on the notion that function follows form. You start with an existing product, apply one or more patterns to come up with variations of it, and then determine what, if any, benefits these variants might offer customers. We see here how Systematic Inventive Thinking (SIT), the consulting firm of two of the coauthors, applied the subtraction and task unification patterns to the redesign of its business card.

First, the elements of the product were identified. Then, applying the subtraction pattern, one of the seemingly essential elements – the job title – was removed. To make the subtraction as dramatic as possible and to ensure that it wouldn't seem inadvertent, the title wasn't merely edited out; rather, the development team envisioned a hole punched in the card where the title previously appeared.

The question was then: So how could this odd form conceivably address the needs of customers, in this case the company's employees? What would be the virtual product's unforeseen potential benefits, as well as its drawbacks, both in the marketplace and in the produc-



Existing product

Virtual product 1a: Subtraction

Virtual product 1b: Subtraction

the backup battery system. But how could the device be counted on to deliver uninterrupted performance without a backup system? Applying the task unification pattern, developers looked for elements in the environment that could assume this role. One idea: using the battery backup systems of other operating-room equipment, thus reducing the cost, the complexity, and the size of the new device. Applying task unification to the backup-battery problem got the team thinking about other possible ways to "borrow" technology within the operating room environment.

Most developers apply only two or three patterns to each product. Indeed, we have found that nearly half the useful ideas likely to emerge from an existing product will be generated by just a single pattern – no matter which one you start with. Applying one pattern is often enough to push a design team to think in new and unusual ways. Because of some overlap among the patterns – task unification, for example, often results in the subtraction of an existing product component – using two or three patterns usually guarantees that nearly all the "good ideas" will emerge.

The Discipline of Inventiveness

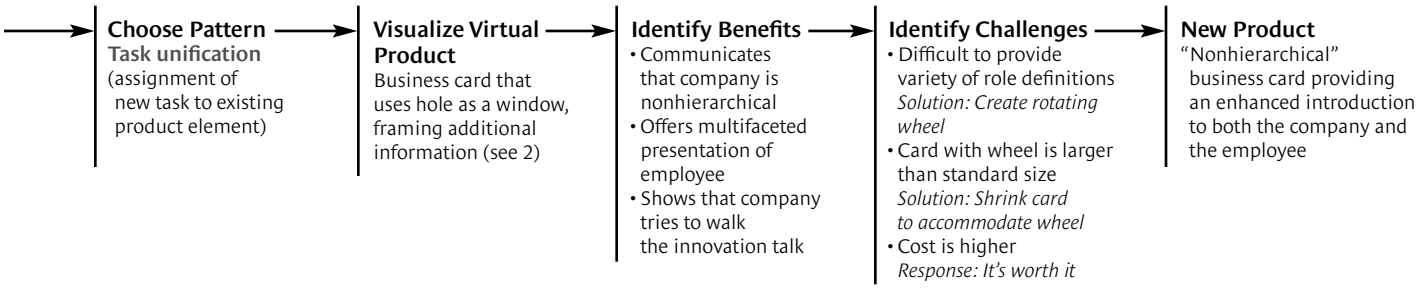
As you work with this pattern method, its value – the simultaneous shaking up of your preconceptions and channeling of your thinking – will become apparent.

In a famous experiment from the 1920s, social scientist Karl Duncker illustrated what he called "functional fixedness." Two groups of volunteers would be instructed to attach a candle to a wall in such a way that the wax wouldn't drip onto the floor. One group would receive a box of matches and a box of wall tacks. The second group would receive an empty matchbox, with the matches next to it, and an empty tack box, with the tacks next to it. While the first group often couldn't figure out a workable solution to the problem, the second group would almost always come up with a viable and elegant solution – that is, to base the candle on the matchbox or the tack box. That's because the second group was able to see

tion process? How could the virtual product be modified to deliver the benefits and overcome the challenges?

Despite the obvious problems with the die-cut hole, it was now seen as an element of the card that might present an opportunity. Applying task unification, the development team wondered whether the hole might assume a function besides conveying the firm's nonhierarchical nature. Might it serve as a "window" into the card owner's identity, providing information that went beyond job title? Consulting with a designer, the development team decided to implement this idea by adding a revolving wheel with five definitions of the owner, each visible through the window as the wheel was turned.

In the end, the firm came up with a business card that was a conversation piece, one that allowed employees to communicate an array of personal and professional roles and signaled to clients that SIT was a business that believes in breaking rules. These benefits were seen as outweighing the card's relatively high cost. Applying the two patterns took the company where it wouldn't have otherwise gone. Besides, it gave Shira a lot of pleasure!



that the boxes were more than mere containers of matches or tacks; they had an existence separate from what they contained and thus could be used as construction objects.

The patterns of innovation work the same way: They upset developers' assumptions about the fixedness of products. In the first television sets, for example, the controls were always at the bottom. This was a minor annoyance to users, who had to bend over awkwardly to change the dials; more important, it severely limited the design of TV sets. But the controls had to be there because, if these fragile devices were on top or on the side of the television, the heat rising from the cathode tubes would damage them. After a decade or so, the problem disappeared: Electrical devices had improved to the point where television controls could work well in a warm console and, in any case, the cathode tubes weren't throwing off so much heat. But the controls stayed at the bottom for decades, until product developers realized they could put them wherever they wanted. If they had applied an innovation pattern that forced them to confront their assumptions about product structures, they might have changed the design much earlier. (The innovation patterns we describe can help companies break out of fixedness in many contexts, including advertising. See the sidebar "Beyond Product Development.")

The patterns or templates process also yields results because the human mind tends to work best within the confines of a defined problem. To be sure, the traditional brainstorming session – breaking rules and freely following your imagination wherever it takes you – can yield highly innovative products. But for all its supposed openness, brainstorming can end up being surprisingly narrow-minded. The first step is to consider all ideas, no matter how crazy. But then you have to trim what is sure to be a substantial list of ideas to a manageable number. So what do you do? Apply quick, common-sense judgment, which usually eliminates the ideas with the greatest potential novelty. By contrast, an innovation pattern typically generates a manageable number of ideas, each of which is given a preliminary plausibility check as part of the ideation process itself.

Furthermore, a brainstorming session can produce, even before the winnowing process begins, fewer truly useful ideas than a more defined process. That's because thinking within a frame of reference enhances inventive productivity: Limited by its inherent rules and constraints, you are more likely to recognize the unexpected idea. Indeed, research by cognitive psychologist Ronald A. Finke has found that creative discoveries are more likely to emerge when people analyze a novel form and then imagine the function such a form might perform than when they try to come up with optimal forms to achieve a particular function.

Do this simple experiment. Try coming up with an exciting innovation – any innovation. Give yourself a minute, and write down what you get. Now pick a simple object on your desk, imagine splitting it in two somehow, and think what benefits this new form might offer you. Between the two attempts at idea generation, you're likely to come up with a more exciting result using the second method. That's because people tend to be paralyzed when facing a

Beyond Product Development

The innovation concepts of Russian engineer Genrich Altshuller have been applied to numerous areas outside engineering and product development. We've found that Altshuller's theories on patterns also work quite well in, of all places, advertising. Our research indicates that some three-quarters of award-winning advertisements – television, print, and outdoor – can be classified according to a handful of patterns. By contrast, these patterns can be identified in fewer than a quarter of ads that haven't won any awards.

Indeed, some of the patterns used in product development are clearly seen in advertising. For example, a television commercial for Amnesty International created by McCann-Erickson in Singapore illustrates the power of subtraction. The agency's creative team removed a seemingly essential component of commercials: images. The commercial begins with a plain blue screen with this text: "The following images are considered too horrific to be seen and are therefore censored." Second screen, all red: "In Bosnia, a mother is made to watch the rape of her four-year-old daughter." The next two screens look the same: pure text describing scenes as horrible as the first. On the fifth screen: "Just because you can't see it doesn't mean it's not happening." Last screen: "Amnesty International. Let's see it stop."

This spot, without a single image, exhibits characteristics common to ads that apply the subtraction pattern. It arouses curiosity and stands out from the clutter because viewers immediately notice the absence of an expected component. It shows respect for viewers, since they are trusted to fill in the missing information by themselves. And, not insignificantly, production costs are minimal.

blank slate but generative when given a framework in which to be creative.

A Complementary Approach

It's important to emphasize that the process we have described, while rigorous, isn't mindlessly formulaic. We have heard some product developers initially complain that imposing these patterns seems to take the fun out of their work. One developer at Johnson & Johnson jokingly compared the patterns to slave drivers.

But the process, by forcing developers to follow a certain path, can actually make the creative challenges more interesting. In another example of applying the multiplication pattern, Kapro developers working on a next-generation leveling tool added not another physical vial but a virtual vial, in the form of a mirror that reflects the image of the physical vial. This led to the Plumbsite feature, which allows the air bubble in a vertical level to be seen from a sight line perpendicular to the wall; carpenters don't have to turn, squeeze their faces against the plasterboard, and look parallel to the wall surface to see the vial. The new tool has saved many carpenters from eye and neck strain while also improving the accuracy of vertical levels.

Let us also emphasize that the process we have described isn't meant to replace all of a company's product development methods. Most large firms have invented hundreds of successful new products over the years, and it would be presumptuous and unwise of us to say they should abandon the methods that have produced that output. Certainly, paying attention to your customers is crucial and allows you to gain vital information about market opportunities and the products that could capitalize on them.

But a method that focuses on the product–What is essential? What can be rearranged, removed, or replicated in new ways? – can enhance a company's current idea generation methods and vastly improve its development pipeline. Imposing the discipline of patterns may be just what's needed to guide product developers to the sweet spot of innovation.

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