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The movement to standardize processes has gone overboard. Some require an artist's judgment—and should be managed accordingly.

When Should a Process Be Art, Not Science?

by Joseph M. Hall and M. Eric Johnson

Included with this full-text *Harvard Business Review* article:

Reprint R0903D

When Should a Process Be Art, Not Science?

The Idea in Brief

Ironically, process standardization can undermine the very performance it's meant to optimize. Many processes work best when treated like artistic work, rather than rigidly controlled.

To decide if a process should be more artistic than scientific, look for these conditions:

- Inputs to the process are variable (for example, no two pieces of wood used to make a Steinway piano soundboard are alike)
- Customers value variations in the process's output (pianists appreciate the distinctive sound quality of their own pianos)

If your process *is* artistic, train employees in the judgment required to respond creatively to variable conditions. Ritz-Carlton recaptured its reputation for unrivaled service when it empowered employees to improvise their responses to individual guests' needs.

The Idea in Practice

Hall and Johnson recommend these steps for managing your processes once you've determined which ones should be artistic:

DEVELOP AN INFRASTRUCTURE TO SUPPORT ART

These practices can help:

- **Create appropriate metrics.** Artistic processes must rely on external measures of success. So continually expose artists to customer feedback.

▶ Example:
At Steinway, piano voicers (who adjust completed pianos to perfect each instrument's feel and sound) interact directly with professional pianists.

- **Manage artistic and scientific processes separately.** In a surgery center, repetitive work that can be standardized (such as high-volume hernia repair or Lasik corrective eye surgery) is managed separately from more complex inpatient surgery that requires individual judgment.
- **Build effective training programs.** Provide employee "artists" with experiences such as apprenticeship with a master, stories of outstanding customer service, and extended time with a customer. These experiences will help them develop an understanding of customers' needs, the judgment required to act without perfect information, and the ability to learn from both good and bad outcomes.
- **Tolerate failure.** The variations characterizing artistic processes make it impossible to satisfy every customer on the first try. So institute extensive quality inspections to prevent failures from affecting customers. And systematically analyze failures to identify which ones could be prevented or minimized in the future.

PERIODICALLY REEVALUATE THE DIVISION BETWEEN ART AND SCIENCE

Regularly ask yourself:

- What new technologies can help make a science of art?
- Do my customers still value variation?
- How do the costs of art stack up against the benefits?
- What opportunities does art allow that science doesn't?

▶ Example:
MinuteClinic has hundreds of walk-in medical offices. It has lowered costs and improved quality of basic health care by developing decision-support software that leads nurse practitioners and physician assistants through a step-by-step process for diagnosing and treating common ailments (strep throat, bladder infection, conjunctivitis). MinuteClinic continually evaluates the line between art and science: Though it keeps exploring ways to enhance its software and related processes to treat additional diseases, it also gives its clinicians enough freedom in their interactions with patients to deliver a personal customer experience.

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Can a successful European sales process be rolled out worldwide, or should regional teams be allowed to perform their individual magic? Does it make sense for a manufacturer to invest in developing and documenting a detailed process that complies with the latest ISO standards, or would more employee training and empowerment lead to higher quality? Can quality be improved by managing surgeons like nurses or auditors like mechanics? Executives in almost every industry face similar questions about how to handle their processes. There are some processes that naturally resist definition and standardization—that are more art than science. Helping executives understand which should not be standardized and how to manage artistic and scientific processes in tandem is the purpose of this article.

The idea that some processes should be allowed to vary flies in the face of the century-old movement toward standardization. Process standardization is taught to MBAs, embedded in Six Sigma programs, and practiced by managers and consultants worldwide. Thousands of manufacturing companies have achieved tremendous improvements in quality and efficiency by copying the Toyota Production System, which combines rigorous work standardization with approaches such as just-in-time delivery of components and the use of visual controls to highlight deviations. Process standardization also has permeated nearly every service industry, generating impressive gains.

With success, though, has come overuse. Process standardization has been pushed too far, with little regard for where it does and does not make sense. We aim to rescue artistic processes from the tide of scientific standardization by offering a three-step approach to identifying and successfully integrating them into any business. We argue that artistic and scientific approaches need not be at odds but must be carefully harmonized.

What Is an Artistic Process?

What we call "art" is often described as "judgment-based work," "craft work," or

"professional work." The common thread in such work is variability in the process, its inputs, and its outputs. Art is needed in changeable environments (for example, when raw materials aren't uniform and therefore require a craftsperson's adjustments) and when customers value distinctive or unique output (in other words, all customers don't want the product or service to perform or be performed the same way).

If both of those conditions aren't present, a mass or mass-customization process, not an artistic process, is the answer. If a firm is operating in a highly variable environment and produces variations in products or services that customers do *not* value, chances are it has nascent or broken processes. In those instances, a firm needs to learn how to bring the environment under control. (See the exhibit "The Process Matrix.")

Let's look in more detail at the conditions that favor artistic processes:

Highly variable environment. Scientific process management calls for blindly reducing variability. But sometimes variability cannot be avoided. Take the inconsistencies in the wood used in the soundboards of pianos. In other cases, the costs of decreasing variability outweigh the benefits—for instance, if doctors applied a cookbook approach to treating complex diseases. The traditional scientific approach to such situations is to try to tame the environment by imposing complex rules that spell out what to do in every possible circumstance. Not only does that reduce accountability, but it often causes workers to switch to autopilot instead of trying to understand the specifics of each job.

That was a conclusion reached in 2006 by executives at Ritz-Carlton, the hotel chain renowned for its high quality. After decades of demanding that employees strictly adhere to a 20-point list of customer service basics, the company's management realized that the specified routines weren't adequately addressing the widely ranging expectations of the luxury chain's customers, who had become younger, more diverse, and more tech savvy, and often traveled with children and other family members. The company's leaders also saw that expanding the list to address every possible situation that an employee might encounter would be futile. As a result, they shifted to a simpler 12-point set of values that allowed employees to use their judgment and improvise. Tightly defined process dictums (like "always carry a guest's luggage," "escort guests rather than point out directions to another area of the hotel," and "use words like *good morning, certainly, I'll be happy to,* and *it's my pleasure*") sometimes felt stuffy and out of place. Management replaced them with looser value statements (such as "I build strong relationships and create Ritz-Carlton guests for life" and "I am empowered to create unique, memorable, and personal experiences for our guests"). The change encouraged employees to sense customers' needs and act accordingly. Customer satisfaction improved.

Output variation that creates customer value. In highly erratic environments, variation in outcomes is natural—and is frequently a good thing in customers' eyes. Consider the Steinways played by the majority of the world's concert pianists. Steinway & Sons knows that each of its concert grand pianos expresses a different "personality," and the company promotes that as a positive—an indication of the richness of the materials and the craftsmanship that go into its products. Likewise, master winemakers know that their job is to make the most of the distinctive qualities of each year's harvest.

Artistic processes are often required where no consistent definition of quality exists. (See the exhibit "Many Processes Are an Art.") If customers value—or demand—uniqueness or variation, then it must be created by artists who devote considerable effort to understanding individual customer preferences. Artistic processes can capably and reliably produce innovative products and services that many scientific business processes cannot mimic. While a scripted greeting and forced smile at the front desk ensure a minimum level of service, a greeting crafted by an employee at the Ritz will pick up on verbal and nonverbal cues to fit that particular guest at that particular time and place.

A Process for Managing Art

Successfully developing and supporting art in an organization requires a three-step approach that is at odds with the standardization-focused training of many managers. Each step addresses a key question that managers must explore: Where will art add value? How should art be supported? How should artistic

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processes evolve? Our guidelines for answering these three questions are derived from our research and consulting experience.

Step 1: Identify what should and shouldn't be art. Begin by taking a hard look at your processes, clearly identifying where art or science will add value for customers. Use the process matrix to assist you.

If a method or practice is still nascent, you'll need to determine whether it should evolve toward a mass or an artistic process. Many managers wrongly discount or ignore the possibility that customers can be persuaded to value variations—a tendency that leads managers to choose the path to mass processes.

Even when a mass process is the right destination, moving too quickly down that path can be disastrous. If you don't yet have a clear view of the causes and effects at work, you need artists, who can operate effectively in chaotic environments. Trying to standardize a nascent process before it's truly understood will alienate key artistic staff—exactly the people you need to manage it during the interim and help you learn how to control it. Until you've reduced the process to a science, you should create an environment where artists can thrive.

The Process Matrix

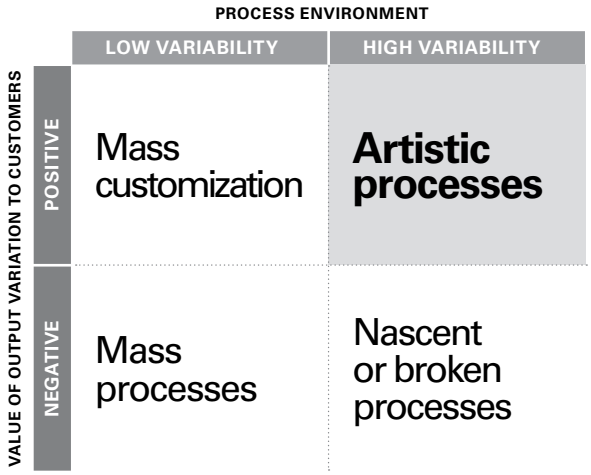
This simple tool can help managers categorize processes and consider how they might or should change.

Mass processes are standardized processes that are geared to eliminate variations in output. They're appropriate when the goal is completely consistent output for a narrow range of products or services. In such cases, all artistic discretion should be eliminated. Steel, cars, and consumer financial services are examples of industries where mass processes are widely applied.

Mass customization uses a scientific process to produce controlled variations in output. Assemble-to-order products like Dell's personal computers and cars in BMW's "Build Your Own" program fall into this category. While the number of possible combinations might be enormous (BMW claims more than 130 million configurations), output variability is limited to combinations of predefined components. In many cases, mass customization represents the best of both worlds: control and variation. But when customers demand true customization ("I want a pink computer with a fabric-covered chassis that complements my office"), it will fall short.

Nascent or broken processes can't produce the consistent output that customers demand. Out-of-control processes are common when a product or process uses radically new materials, technology, or designs. In these situations, managers should consider whether controlling output variation is feasible or desirable. If variation can't be controlled but customers can be persuaded to value it, an artistic process is the solution. If customers won't tolerate variation, the focus should be on understanding its causes and creating a standard process. Boeing did this for its new 787 Dreamliner, the first commercial aircraft with a carbon composite airframe: The company conducted test runs to learn how to standardize the process for manufacturing fuselage sections.

Artistic processes leverage variability in the environment to create variations of products or services that customers value. They rely on the judgment and direct experience of craftspeople. Building Steinway pianos, serving passengers on flights, and developing radically new software applications are but a few of the processes that meet those criteria. Before choosing art, it's critical to make sure that customers really value output variation. Some managers delude themselves into believing they need artistic output when the vast majority of customers really want a standard product.



That said, managers must guard against preserving artistic processes that have outlived their usefulness. If the science has been mastered or if customers no longer value the variations, retaining artistic processes can allow competitors that embrace standardization and become more efficient to leap ahead of you.

Step 2: Develop an infrastructure to support art. This infrastructure has two purposes: to ensure that artists have freedom to practice and refine their art and to ensure that they create the maximum customer value. You should keep those goals in mind when figuring out how to measure artistic results, make art and science work together, train artists, and respond to inevitable failures.

Creating appropriate metrics. The simple, internally focused metrics for a scientific process, designed to make sure everyone executes it the same exact way, will not work for art. An artistic process has to rely on external measures of success. Artists need continual exposure to customer feedback, which prevents them from constructing their own idiosyncratic notion of quality.

Sometimes this feedback must come from a broad swath of customers. For example, medical professionals obviously have to work closely with all afflicted patients to diagnose and treat complex diseases—to obtain a complete picture of their symptoms and track their reactions to remedies. With other processes, including those used to produce Steinway's high-end pianos, feedback from a select group of customers can suffice. At Steinway, piano voicers, who adjust completed pianos to perfect the feel and sound of the instrument, regularly interact directly with professional pianists, whom the company's longtime president Bruce Stevens (now retired) called "Steinway's biggest fans and its harshest critics."

Getting art and science to work together. If businesses employ both artistic and scientific processes (the rule rather than the exception), managers should work to separate them and then carefully manage the areas where they intersect. To begin, managers must evaluate whether one process is being asked to perform both art and science. If it is, it should be divided. Consider sales. It often pays to use a standard process for low-risk, low-reward sales efforts but to assign sales artists who thrive in an uncertain environment to tackle high-risk, high-reward efforts. Given the differences in the sales approaches as well as the compensation schemes that each requires, integrating the two can be counterproductive and sometimes disastrous. Similarly, in an ambulatory surgery center, separating repetitive work that can be standardized, such as a high-volume hernia repair or Lasik corrective eye surgery, from variable in-patient surgery that requires more art will lower costs and improve outcomes. If demand for either the artistic or the standardized process isn't high enough to make segregating them economical, it's often best to exit one of the businesses.

Managers should also separate any artistic process from support processes that can be standardized. It's crucial that the latter not be treated as art; rather they must be organized and operated to provide a stable platform for the artist. (See the exhibit "Science as a Platform for Art.")

Many Processes Are an Art

A wide range of processes lend themselves to artistic approaches, which produce unique or tailored results. Here's a sampling:

Leadership training. Developing decision-making capabilities and self-awareness in individuals takes time and one-on-one coaching.

Auditing. Applying the broad principles of new international reporting standards requires understanding the implications for each firm and using judgment to determine the right response.

Hedge fund management. While computer models can spit out risk estimates, making final bets often entails personal calls.

Customer service. Satisfying individual customers might require frontline employees to go "off script" and do what they feel is best.

Software development. Writing code for a new application often involves iterating with customers to learn how to refine the program to address their needs, as well as decisions on which corners can be cut.

Account relationship management. Keeping valued customers happy often means adding a touch of tailored service to standard offerings.

Business development. Spotting new opportunities and envisioning how the business could exploit them can't be reduced to a formula.

Industrial design. Integrating the customer's needs with a compelling design takes imagination and experience.

Top salespeople, for instance, rely on customer relationship management systems to provide basic, consistent information to tailor pitches to individual customers. Any missing or incorrect information weakens the salespeople's ability to execute and clouds the feedback loop that allows them and their managers to judge their performance. Similarly, Steinway's voicers require consistent strings, hammers, and action assemblies (the mechanisms that connect the keys to the hammers that strike the strings). Without such standard components, the challenge of perfecting the feel and sound of instruments for individual professional pianists would be far more difficult.

Building an effective training program. Artists, of course, must learn the skills of their trade. They often have to undergo a formal apprenticeship or informal mentoring and a probationary period during which their freedom is curtailed. They might even have to pass a formal exam to be certified.

But whether the artists are insurance claims adjusters, civil engineers, or software architects, their training entails more than just mastering new skills. It also involves developing an understanding of customer needs, the judgment required to act without perfect information, and the ability and willingness to learn from both good and bad outcomes. Often organizations with artistic processes have a strong culture that guides artistic judgment. Steinway wants its voicers to identify with world-class concert pianists—to understand the tension they feel onstage when they're playing before a breathless crowd and how they depend on their pianos to deliver.

Companies can employ a variety of methods to instill their culture in new artists. One we've already mentioned: an apprenticeship with a master. Another is storytelling. Ritz-Carlton regularly shares stories of outstanding customer service to inspire its frontline employees. Yet another powerful tool is the "ride-along": having an apprentice spend an extended period of time with a customer.

All in all, turning a novice into a master may take considerable time. Steinway voicers spend one to three years in training before working independently. At the Ritz, receptionists, bellhops, and restaurant waiters receive four to five weeks of formal training during their first year. Frontline Ritz employees—new hires and veterans—meet for 15 minutes each day to share stories of how they wowed guests and discuss ways to improve customer service.

Tolerating failure. The variations that are the hallmark of artistic processes make it impossible to satisfy every customer on the first try. This reality means that a company may have to institute extensive quality inspections to prevent failures from affecting customers. It also may have to develop approaches to recover quickly when they occur. Ritz-Carlton, for example, empowers frontline employees to spend up to $2,000 to fix a customer's problem.

Just because some amount of failure is inevitable doesn't mean that failures should be passively accepted. To the contrary, they must become learning opportunities—both for the artists and for the managers who shepherd the process. Failures should be systematically reviewed with the aim of identifying which ones could be prevented or minimized in the future (for example, by strengthening a standard support process, spotting them earlier, and improving recovery responses).

If you get to the point where failures are rare, it means that the process has become predictable and can be turned into a science.

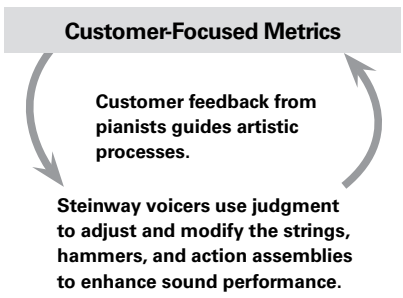
Science as a Platform for Art

The creation of many products and services involves both artistic and scientific processes. In such cases, the output of the scientific processes should provide a stable platform on which artists can then apply their craft. The two kinds of processes need to be separated, however, because they have different goals and metrics of success.

Consider how Steinway & Sons produces concert pianos:

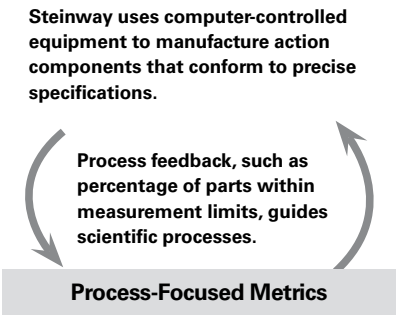
Art

Perfecting the sound and feel of the pianos is an art that requires the judgment of skilled craftspeople—such as the voicers who customize the instruments for individual professional pianists.



Science

Many components of pianos can be standardized. Making them uniform—through scientific manufacturing processes—minimizes the complexity that the voicers have to contend with.



Step 3: Periodically reevaluate the division between art and science. Changing customer needs and new technologies can alter the landscape in ways that make art more or less desirable. Managers must regularly ask themselves: What new technologies can help make a science of art? Do my customers value variation? How do the costs of art stack up against the benefits? What opportunities does art allow that science doesn't?

Diverging customer demands drove Ritz-Carlton to shift toward art, while advances in computer-controlled machine tools for making components prompted Steinway to move in the opposite direction. In health care, some organizations have flourished by replacing artistic diagnostic processes with technology. At its hundreds of walk-in medical clinics, MinuteClinic employs homegrown decision-support software that leads nurse practitioners and physician assistants through a step-by-step process for diagnosing and treating common ailments such as strep throat, bladder infection, and pinkeye. MinuteClinic continually evaluates the line between art and science: While it relentlessly explores how it might enhance the software and related processes to treat additional diseases, it strives to make sure that its clinicians have enough freedom in their interactions with patients to deliver a personal customer experience.

Sometimes the line between art and science shifts simply because of a realization that art produces better results. This is now occurring in the U.S. accounting profession, where the largely rules-based Generally Accepted Accounting Principles are making way for the International Financial Reporting Standards, a simpler set of principles that allow managers and auditors to exercise more judgment. Although a desire to harmonize the standards of different countries is one reason for the shift, another is the growing view that promoting judgment and accountability in accountants and legal professionals will lead to better reporting outcomes than rote adherence to rules does.

When evaluating the division between art and science, managers must be wary of "art diffusion": unwittingly extending artistic freedom to people who surround and support artists. While the heart surgeon might need artistic freedom, those involved in preoperative patient preparation should strive for consistency so that the patient reaches the operating room in a known, stable state. If best practice can be defined and documented in advance, there is little value, and possibly much danger, in allowing the exercise of art.

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In spite of the variability-quashing tendencies of modern process management, we believe that both art and science have important roles to play in many business processes. Art allows for a flexibility, creativity, and dynamism that a purely scientific approach cannot replicate. Well-implemented and managed artistic approaches can also create differentiation that cannot easily be copied, commoditized, or outsourced. For decades, the process management pendulum has been swinging toward the standardization and control of science. It's time to recognize the limits of such processes and consider where artistic freedom should be restored or preserved.

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Further Reading

ARTICLES

The Why, What, and How of Management Innovation
by Gary Hamel
Harvard Business Review
February 2006
Product no. R0602C

For organizations like GE, P&G, and Visa, management innovation is the secret to success. But what is management innovation? Why is it so important? A management breakthrough can deliver a strong advantage to the innovating company and cause a major shift in industry leadership. Few companies, however, have been able to come up with a process for fostering management innovation. The biggest challenge seems to be generating truly unique ideas. Three components can help: a big problem that demands fresh, creative thinking; an evaluation of the conventions that constrain novel thinking; and examples and analogies that help redefine what can be done. No doubt, some existing management processes exacerbate the big problems you're hoping to solve. To identify them, pose a series of questions for each one: Who owns the process? What are its objectives? What are the metrics for success? How are decisions communicated, and to whom?

Deep Change: How Operational Innovation Can Transform Your Company
by Michael Hammer
Harvard Business Review
April 2004
Product no. R0404E

Breakthrough innovations—not just steady improvements—in operations can destroy competitors and shake up entire industries. Just look at Dell, Toyota, and Wal-Mart. But fewer than 10% of large companies have made serious attempts to achieve operational innovation. Why? One reason is that business culture undervalues operations; they're not as sexy as deals or acquisitions. In addition, many executives who rose through the ranks of finance or sales aren't familiar with operations, and they aren't interested in learning more. Finally, because no one holds the title Vice President of Operational Innovation, it doesn't have a natural home in the organization, so it's easily overlooked. Fortunately, all of these barriers can be overcome. This article offers practical advice on how to develop operational innovations, such as looking for role models outside your industry and identifying—and then defying—constraining assumptions about how work should be done.

The Four Things a Service Business Must Get Right
by Frances X. Frei
Harvard Business Review
April 2008
Product no. R0804D

Many of the management tools and techniques used in service businesses were designed to tackle the challenges of product companies. Although they are valuable to service managers, these tools and techniques aren't sufficient for success. In this article, Frei explains why and urges companies to add some new ones to the mix. Drawing on years of research and analysis, she offers an approach for crafting a profitable service business based on four critical elements: the design of the offering, employee management, customer management, and the funding mechanism. Just like a product that's going to market, a service needs to be compellingly designed, and attractively priced. Additionally, however, service firms must manage their customers, who do not simply use the service but also can be integral to its production. Because customers' involvement can wreak havoc on costs, companies must also develop creative ways to fund their distinctive offerings—by providing a self-service alternative, for example. A close look at successful service businesses—Wal-Mart, Commerce Bank, the Cleveland Clinic—reveals that effective integration of the four elements is key. There is no "right" way to combine them; the appropriate design of one depends on the other three. If managers don't get all four pulling together, they risk pulling the enterprise apart.