Manufacturing quality today: Higher quality output, lower cost of quality

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Good quality doesn't have to mean higher costs—in fact, it often means lower recall and warranty costs as a culture of quality takes hold.

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Disaster has a way of concentrating the mind. Massive recalls and lawsuits—over luxury cars, over-the-counter medicines, medical devices, or mobile-phone batteries—become almost totemic reminders of what a lapse in quality can mean. And for manufacturers everywhere, simultaneous increases in supply-chain complexity and media reach mean that the aftershock of a quality lapse is likely to be much larger than in the past.

But despite their impact, these events are only part of the story. Indeed, as important as it is to keep rare disasters from happening, focusing too closely on them can distort an organization's understanding of what quality really means. Fundamentally, quality is about meeting or exceeding customer expectations: every day, every shipment, year after year. That's where the true value is, measured not only in higher revenues from greater customer satisfaction but also in higher operational efficiency and effectiveness due to increases in productivity and innovation—and even employee engagement.

Yet organizations face constraints. Rising margin pressures, particularly in consumer-oriented industries such as fast-moving consumer goods and medical products, limit how much companies can spend on quality practices. Organizations therefore cannot just be good at quality—they need to be smart about it as well.

To achieve the right balance, organizations must learn to think about quality systematically. At the very earliest stage of quality awareness, organizations start to hear the voice of the customer more clearly, while stabilizing their operating systems and promoting greater transparency about quality problems (see sidebar, "More than compliance"). As these practices take hold, the next stage of maturity centers on strengthening cross-functional accountability and collaboration for

quality—such as with new performance standards so that quality standards inform the design of products and the management of supply contracts.

At the third stage, quality informs much of the organization's decision making, embedding itself so deeply that it becomes a part of the culture and essential to the company's value proposition. Finally, among a small group of the very highest performers, quality becomes the basis for their reputation. These exceptional organizations expand their perspective on quality to address customer problems in ways that push their businesses into new areas, building on behavioral research and process analytics to develop deeper solutions and customer relationships.

Achieving these outcomes requires investment. But the good news is that the organizations whose quality practices are the most sophisticated are not necessarily the ones that spend the most on quality. Instead, these leaders prioritize, so that what they spend on quality is highly effective. At each stage of maturity, the advantages build: from essentially nonexistent to basic, from basic to average, from average to advanced, and from advanced to industry-leading.

For example, a multinational industrial manufacturer that was at an early stage reduced its cost of nonquality—such as for warranty claims, waste, and rework—by about 30 percent. A midlevel biopharma facility reduced product

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MORE THAN COMPLIANCE

Especially in highly regulated industries such as pharmaceuticals or financial services, organizations often see quality mainly in compliance terms. There's good reason: as products become more complex, compliance and quality start to overlap, with some standards explicitly incorporating minimum quality targets. Medical-device manufacturers, for example, face a gauntlet of reviews both to win initial regulatory approval for a product and to keep that product on the market. Life insurers face similar reviews.

Yet even the most intricate of standards may not incorporate all of the factors that customers include in deciding whether a product is fit for purpose. Instead, regulators have traditionally focused on the most critical variables, usually centering on safety: physical for medical devices, financial for insurance.

And although at least some regulators are broadening their perspective on quality—for example, assessing new drugs based on holistic health or life-span effects rather than just control of symptoms—companies nevertheless have substantial room to expand their understanding of quality to encompass the standards that customers want met, and improve on them. That's what organizations build as they move through the stages of quality maturity.

deviations by more than 50 percent and waste by three-quarters, while also freeing more than 25 percent of the employees allocated to catching quality issues for reallocation to other activities. And, pushing still further, at a "best of the best" medical-device company, waste and rework costs were only one-fifth those of the median producer, while in pharmaceuticals the top producer's costs were a mere one-fourteenth of the median level (Exhibit 1). At every stage, therefore, companies across industries are achieving higher quality at competitive cost, building capabilities that prepare them for further stages of quality evolution.

Four evolution stages of quality 'maturity'

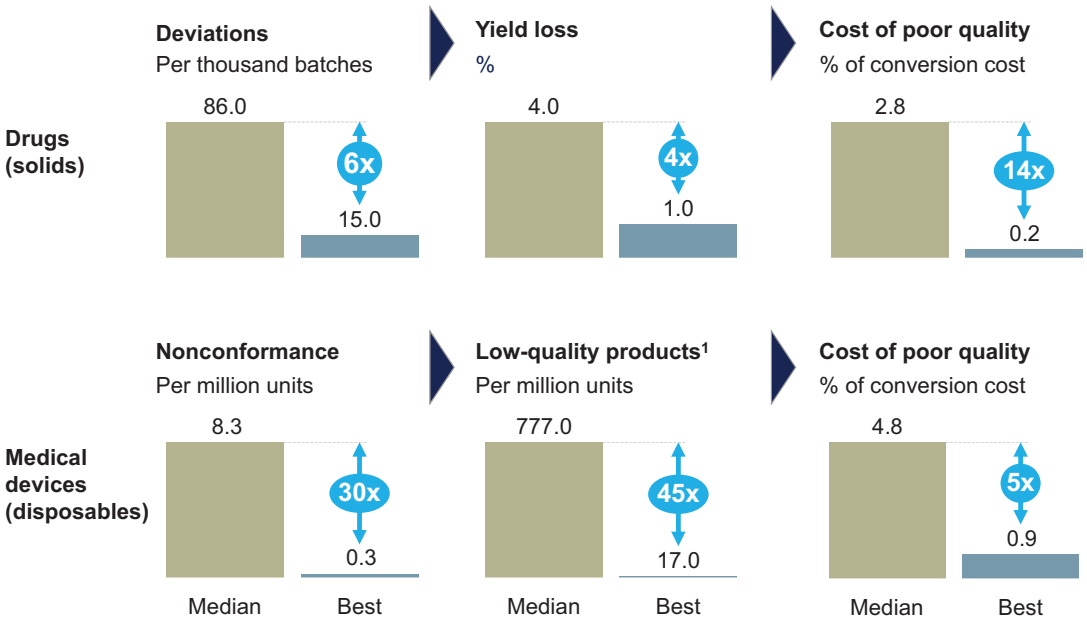
In assessing an organization's quality practices, we focus on three foundational elements of quality.

The first is the operating system—the manufacturing processes for an automaker or the service operations for a retail bank, for example—gauging how well it can contribute to quality. Second is the quality system itself, including enterprise-level capabilities such as measuring quality output, or incorporating quality standards into the design of products and processes. The third element is the cultural dimension of quality—the way employees think about their contribution to product quality, and how they behave to ensure good quality.

How an organization performs in these three areas determines its stage of maturity (Exhibit 2). Although the boundaries between the different stages are not precise, each nevertheless correlates with a few important characteristics.

From the experiences of organizations that are investing in quality, a few broad lessons stand out. Most important, investments can pay off at every possible starting point, from stage zero, when a company has very few quality capabilities, to

Exhibit 1. Best-of-best medical-product plants produce both better quality and lower cost.



1 Products subject to complaints or recalls.

Source: POBOS Quality

stage four, when it is among the standard-setting organizations that are redefining what quality can mean.

A further, related lesson is that the impact from investing in quality tends to increase with the organization's quality maturity. That's partly because of scale: as maturity increases, quality involves more and more of the organization. And it's also because quality increasingly informs strategy so that its effects are broader and longer lasting.

The final lesson, however, is that progress from stage to stage is neither smooth nor automatic—nor even necessary, depending on an organization's circumstances. Instead, progress

Exhibit 2. 'Triggers' push companies to new stages of quality maturity.

Maturity stage	Operating system	Quality system	Culture
0. Starting	Inconsistent manufacturing performance	Reactive, minimal compliance	Limited attention to quality
	Typical evolution trigger: Opportunity to reduce quality costs (e.g., financial, reputational), compliance requirements		
1. Basic	Progress toward repeatable, standardized manufacturing	Development of individual quality processes Establishing basic compliance standards Launch of separate quality function	Increased transparency about product quality Focus on improving compliance
	Trigger: Opportunity for quality to generate positive value and reduce quality risk exposures and failure costs		
2. Stronger	Robust manufacturing, some identification of improvement opportunities	Quality systems established in all functions Greater cross-functional accountability Active problem solving for quality	Quality as customer value Focus on reducing cost of quality
	Trigger: Opportunity for quality to rise from "table stakes" to substantial part of value proposition		
3. Embedded	Continuous improvement cycle for manufacturing	Quality and customer satisfaction drive product design and solutions, strategic decisions	Quality is the way the company works Focus on anticipating customer needs and continuous improvement
	Trigger: Opportunity to redefine what quality means		
4. Standard-setting	Adoption of advanced manufacturing and control technologies, and advanced analytics to inform new product and process design	Quality draws on unique capabilities and innovation, becomes a source of insight and an enabler of breakthrough products	Quality is one of the most valuable company attributes, focus is on developing solutions beyond the company's traditional boundaries

comes from triggers that share certain features, even though the details are inevitably specific to the organization.

Building the basics of customer focus, transparency, and stability

The first trigger typically occurs when the organization recognizes that simply reacting to quality problems is no longer tenable. Often, it simply costs too much—in recalls, warranty expenses, and lost reputation. And it's a lesson that applies equally to a start-up that has focused mainly on growth, a state-owned enterprise protected from market demands, and a company in a high-demand industry.

That was the case for the multinational industrial manufacturer, a giant in a sector that was suddenly becoming far more competitive as global demand plummeted. The leaders recognized that stronger quality would be essential to survive the industry's downturn. Current quality levels were not meeting customer expectations. At one facility alone, more than a tenth of production was defective in some way. Deliveries were often late—so often that it damaged the company's credibility with crucial customer segments. And claims costs were far too high.

The underlying issue, the company found, was a mentality in which quality was the responsibility of the quality organization—and no one else.

To change this long-standing mind-set, the company started by listening to customers more carefully. Partly as a result, it changed its most important performance metric from "units produced" to "quality units produced," a switch that dramatically increased transparency on quality throughout the enterprise. Equally important, a new quality council—headed by a C-suite executive and including business-unit and functional heads—set the tone with a weekly one-hour meeting focusing just on quality improvement. Following basic lean-management structures, a cascade of similar meetings carried the quality message through each level of the company, from plant general managers down to a daily ten-minute quality huddle for each operating shift.

The results? A more stable manufacturing environment in which customer complaints and quality-related costs both fell by more than one-quarter.

Strengthening the culture for tighter collaboration

Once an organization's quality becomes more transparent and stable, new opportunities often arise to increase quality's value and decrease its cost. Our latest research confirms that higher-performing manufacturing sites score better on culture-related factors than their peers (Exhibit 3). Accordingly, at this stage, the goal becomes to enable greater collaboration across the entire organization so that quality becomes embedded in the culture. That collaboration extends outside the organization as well, to include stakeholders, such as partners and regulators. Two pharmaceutical manufacturers illustrate how this stage evolves. One, a generics maker, was facing compliance issues and needed to establish better quality operations on the factory shop floor. The other, one of the world's largest branded pharmaceutical manufacturers, reexamined its already robust compliance practices for ways to improve its quality outcomes and risk profile even further, while reducing costs.

To reinforce the cross-functional nature of quality, both companies expanded their use of broad performance measures, such as error-free or right-the-first-time (RFT) production and on-time, in-full delivery. In team huddles throughout their production sites, the companies focused on daily tracking and discussion of the new indicators. In addition, tying these shared metrics to annual bonuses increased everyone's attention to quality—not just within their particular functional or operational units but also across organizational boundaries.

Exhibit 3. High performers consistently score better on culture-related factors.

Source: POBOS Quality culture survey

As these new practices took hold, productivity at the generic manufacturer's sites increased by more than 15 percent, while its end-to-end RFT percentage rose to more than 92 percent, from 83 percent. Individual sites started passing regulatory inspections more confidently and without any noted compliance issues or regulatory observations. For the branded pharmaco, the changes reduced both the number of quality incidents and its cost of poor quality, improving its risk profile with no added investment in IT, capital, or other resources.

Turning quality into the core value proposition

The third transition deepens the quality culture until it becomes the company's core value proposition. In effect, quality is no longer mainly a question of bottom-line savings but of top-line revenue generation. Tactically, this stage requires renewed investment in human and digital capabilities so that the company can consolidate all available customer data—from every internal touchpoint, and from external sources as well—to identify new openings.

A global logistics company's transformation of its quality approach illustrates the level of commitment required. Previously, the company's focus had been on fast delivery, a goal it had largely achieved. But customers increasingly looked to other factors, such as accuracy in predicted delivery times—speed was not necessarily helpful if a delivery arrived before the customer was ready to receive it. Moreover, the rise of a digital economy meant that deliveries were becoming far more complex: fewer large deliveries to warehouses and retail stores, and more very small deliveries to a vast number of residential addresses.

The new world demanded not just high quality but also quality leadership. The entire organization, from the executive suite to the uniformed drivers, immersed itself in capability-building sessions to understand the competitive reasons for higher quality and the implications for day-to-day

work. Deeper problem-solving methodologies allowed people to identify new ways to serve customers. And new technologies crunched route data to enable wholesale restructuring of delivery practices that minimized the chance of error. The result was a major increase in customer satisfaction and renewed growth.

Setting a new standard with the latest analytics and technologies

The final stage applies the wider range of measurement and analytic technologies to develop solutions that push well beyond the organization's traditional business in predicting emergent customer needs—sometimes before the customers themselves are aware of them. One early example comes from commercial-vehicle manufacturing. Historically, most of the value a manufacturer could earn came from the initial sale. But one large commercial-vehicle maker now monitors more than 100 separate performance indicators in its vehicles. Based on advanced component-wear modeling, the company can deploy repair personnel to its customers before any failure occurs, increasing vehicles' utilization rates while reducing maintenance costs—and rapidly growing the service side of the business.

At the level of individual manufacturing sites, advanced analytics are increasing output and decreasing waste. A passenger-vehicle maker has cut downtime for its manufacturing equipment from days to hours. In chemicals, sophisticated modeling of energy inputs and demands can reduce energy usage by 5 percent or more. An appliance manufacturer used a cloud database to store several sources of information (for example, repair-technician notes, warranty-claims data, call-center records, product information, and manufacturing data), for which predictive analysis gave it early warnings of issues and allowed it to improve its design processes for both future and current products. And in less than two years, a biopharma site more than doubled its yield and RFT levels—with minimum additional process investments—by deploying advanced analytics to better understand important process variables and improve process specifications.

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Not every organization needs to achieve the highest level of quality maturity—and certainly not all in one go. But all organizations should recognize that when a trigger looms, an investment in quality capabilities can often open major new opportunities for competitive advantage.

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