

Many organizations use Six Sigma disciplines to decrease the costs of manufacturing or service processes.

They can use the same tools to increase revenues.



Six Sigma Pricing

by ManMohan S. Sodhi and Navdeep S. Sodhi

MANY COMPANIES have become good at managing costs and mastering manufacturing efficiencies. The TQM and Six Sigma movements have seen to that. But the discipline so often brought to the cost side of the business equation is far less common on the revenue side. As a result, many companies continue to leak cash from the top line.

In this article, we describe how a global manufacturer of industrial equipment, which we will call Acme Incorporated, applied Six Sigma rigor to its price-setting process for one product line to great effect. Acme met its target of increasing annual revenue by \$500,000 in less than three months. When Acme subsequently raised list prices across the board, the company reaped the full value of the increase for this product line, but much less in others. And in just six months, annual revenue increases reached an eye-popping \$5.8 million for this product line alone, all of which went straight to the bottom line as well.

Not only did the reforms stem the revenue leaks, they also removed much

of the organizational friction that had long bedeviled the company's pricing process by making it clear who had authority over which pricing decisions. Uncertainty about pricing policy (or rather the appearance of it) may help salespeople in their negotiations with customers, but it does a company no good for its own people to be confused and conflicted on that score.

At Acme, that tension was readily apparent. On the one hand, Acme's sales reps saw their mission as building market share—senior management's stated aim. Being close to the customer, they felt they knew what the best price was. They saw the pricing managers and analysts as an obstruction, out of touch and too slow to respond to changing facts on the ground. They would often circumvent the necessary checks and controls on invoiced prices, potentially eroding the company's profit margins.

For their part, the pricing analysts saw themselves as the guardians of Acme's profitability, providing essential pricing analysis and, in their opinion,

quick turnaround on approvals. As we will see, the Six Sigma project generated hard evidence that significantly reduced the tension in this uneasy Sales–Pricing relationship, which became less influenced by gut instinct or emotion.

The Problem

The trigger for the project was a change in market conditions, which put Acme under considerable pricing pressure. The price of two key raw materials, steel and petroleum, had risen quickly and sharply, threatening to inflict a projected \$20 million in unplanned annual incremental costs on the company. Some of its steel suppliers had even refused to honor existing contracts. Overall, average costs had doubled within the space of a few months.

The company had no choice but to raise list prices. But by how much? Raise prices too much, and Acme stood to lose customers to rivals. Raise prices too little, and it would not be worth the effort to announce and implement the change. Moreover, Acme could not be sure whether a nominal increase in list prices would even hit the bottom line. The organization's pricing processes made it difficult to control the price that was actually invoiced.

Acme's myriad products could each be configured in numerous ways, according to customers' needs, and the company published list prices for every possible configuration. But each sale then had its own individually approved discount and hence its own invoiced price. Prices and discounts were set by the pricing division. Acme's sales division had market-specific blanket ceilings for percentage discounts on all products, and sales reps had to obtain authorization from Pricing to offer deeper discounts. Pricing either approved the request or set a slightly higher approved price, typically expressed as a percentage of the list price. After the transac-

tion was completed, Sales invoiced the customer with a final transaction price, which was (in principle) the same as or slightly higher than the approved price.

But it was well known that top management frowned on losing market share, and the absence of any effective controls encouraged some salespeople to short-circuit the process. A sales representative would ask Pricing for a discount that was much deeper than the guidelines allowed for, and even if Pricing complied, the representative might offer a further, unapproved discount to close a deal. For instance, one order approved by Pricing at \$81,000 was actually invoiced at \$75,000, and another at \$31,000 was invoiced at \$28,000.

With tens of thousands of sales transactions per year, the task of making sure each invoice accorded with the list and approved prices was daunting. But the lack of control over final prices meant that even if Acme could work out how much of a hike in list prices the market could bear, the company still could not be sure it would actually see the increase in each transaction or even overall, across transactions.

The Project

How to get a grip on the situation? Senior managers began by considering what other parts of the organization had done to bring similarly variable processes under control. They knew that Acme had enjoyed considerable success in reducing manufacturing variability by applying the famous Six Sigma discipline. Employees from different functions and organizational levels understood the methodology, and some had company-specific Six Sigma certification, holding titles like Green Belt and Black Belt, following the example of such companies as Motorola and General Electric.

It seemed to Acme's executives that pricing closely resembled many manu-

facturing processes. A product's invoiced price could be considered a final product, the result of a "manufacturing" process encompassing several stages. They decided, therefore, to pilot a Six Sigma pricing project in one of the company's North American subsidiaries. If the project led to better control of final prices, they could roll out the approach throughout the company's entire global operations.

A manager from Pricing was appointed as project manager to carry out the five Six Sigma steps: define, measure, analyze, improve, and control. He was given the help of a Six Sigma expert, or Master Black Belt, recruited from the manufacturing side. The project sponsor was the senior executive responsible for pricing.

Definition. The first step in any Six Sigma project is to clarify the problem and narrow its scope in such a way that measurable goals can be achieved within a few months. Then a team is assembled to examine the process in detail, suggest improvements, and implement those recommendations. In the manufacturing realm, project managers and their sponsors typically begin by defining what constitutes a defect and then establish a set of objectives designed to reduce the occurrence of such defects. (The phrase "Six Sigma" in fact implies a goal of reducing the number of defects to less than 3.4 per million occurrences, assuming that the quality of a product's attributes varies according to a normal bell-shaped distribution pattern.)

Acme's project manager proposed that a defect should be defined as a transaction invoiced at a price lower than the one Pricing had approved (or lower than those allowed by the current blanket guidelines, when approval had not been sought). Note that defects are being defined in relative terms, according to the blanket discount ceilings set for the salespeople and the guidelines established by the pricing analysts. If the market were to take a turn for the worse, the ceilings could be raised; if the market were to strengthen, they could be lowered. A defect occurs only

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when the actual invoiced price is out of compliance with the guidelines.

Once the definition of a defect was set, the project manager, with the help of the sponsor, recommended an appropriate scope for the project—that is, whether it should be limited to only one particular product line or applied to several. In this case, the project sponsor limited the scope to a single product line.

The next step for the project manager is to propose a charter for the project that specifies the expected deliverables. Given the definition of a defective price, it was clear that this project would have to deliver:

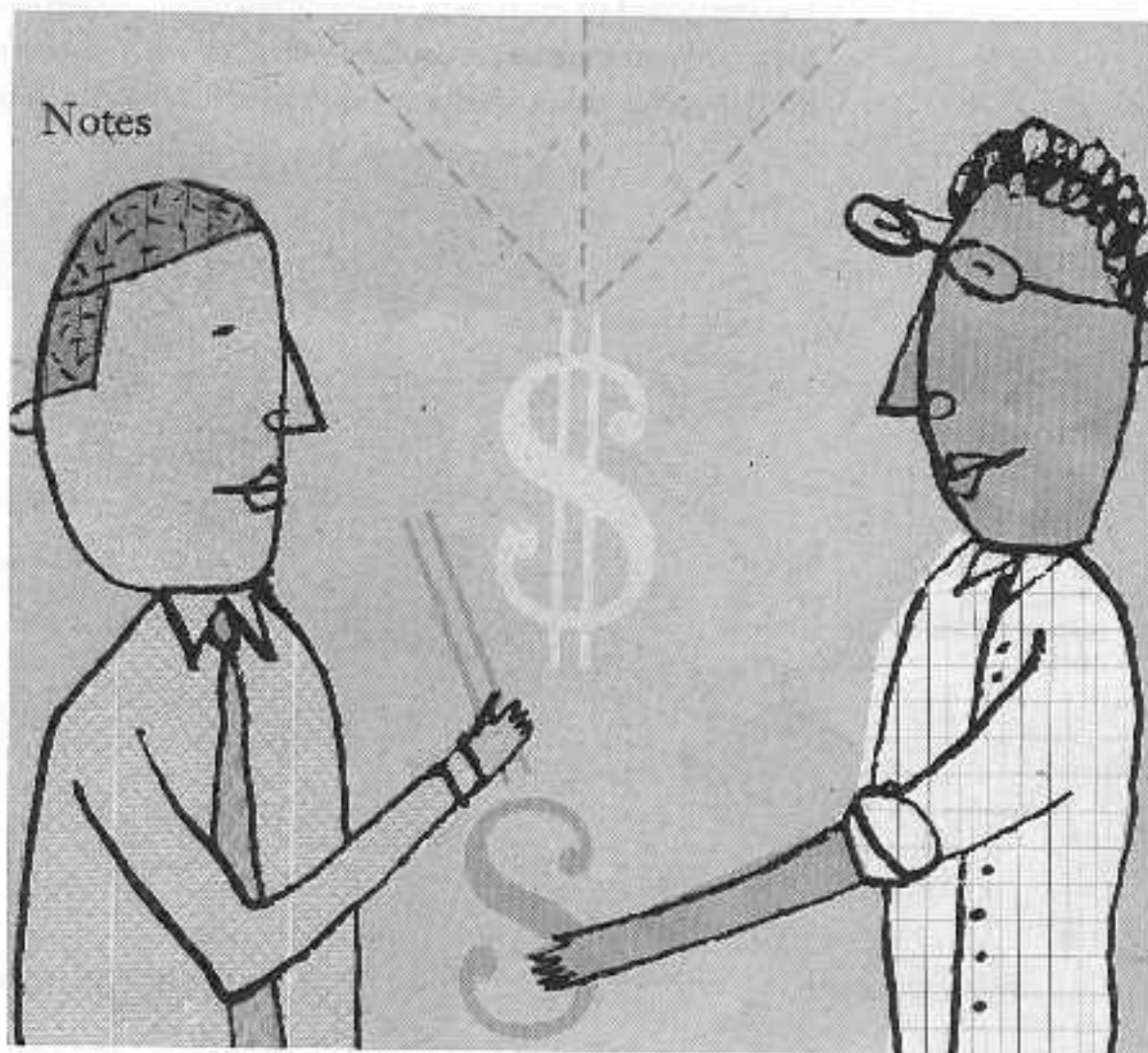
- a better understanding of the existing pricing process;
- a modified process to control and, hence, improve final transaction prices;
- ways to track improvement in final prices and to monitor compliance with the process and with pricing guidelines.

Next, to collect data, carry out analysis, and ensure everyone's buy-in for any subsequent implementation, the project manager enlisted people from the pricing, finance, marketing, IT, and sales divisions to be part of the Six Sigma team. The various team members were selected for their functional and analytical expertise. The finance person, for example, was chosen because she was familiar with the many pricing-related reports Acme was currently generating and also with many of the company's data sources.

In addition, to endow the project with institutional backing and to ensure that team members had good access to data, the project manager asked people in positions of influence at Acme to serve on a steering committee for the project. The chair of the committee was the project sponsor. Other members included the director of sales, the vice president of IT, the vice president of finance, and the vice president of marketing. They agreed that the project manager would meet with the team and the steering committee as needed to keep them apprised of the project's progress.

The first duty of the team was to confirm the proposed problem definition and project charter and to set a financial

The Six Sigma approach has considerably reduced the inherent friction between pricing and sales.



goal for the project. That was no easy task, as it was the first time Acme had embarked on such a project. Nonetheless, the team set a goal of increasing revenues by \$500,000 in the first year following implementation. This additional revenue was to come entirely from more efficient price management—in other words, from actions that did not incur any losses in market share or sales volumes. This was a far more ambitious number than Acme had ever set for comparable manufacturing or service Six Sigma projects, which had typically delivered average annual cost savings of less than \$100,000.

Measurement. In the second step of a Six Sigma project, the team gathers data and prepares it for analysis. At Acme, the project manager began by mapping the price agreement process, with team members helping to fill in process details. To generate and verify

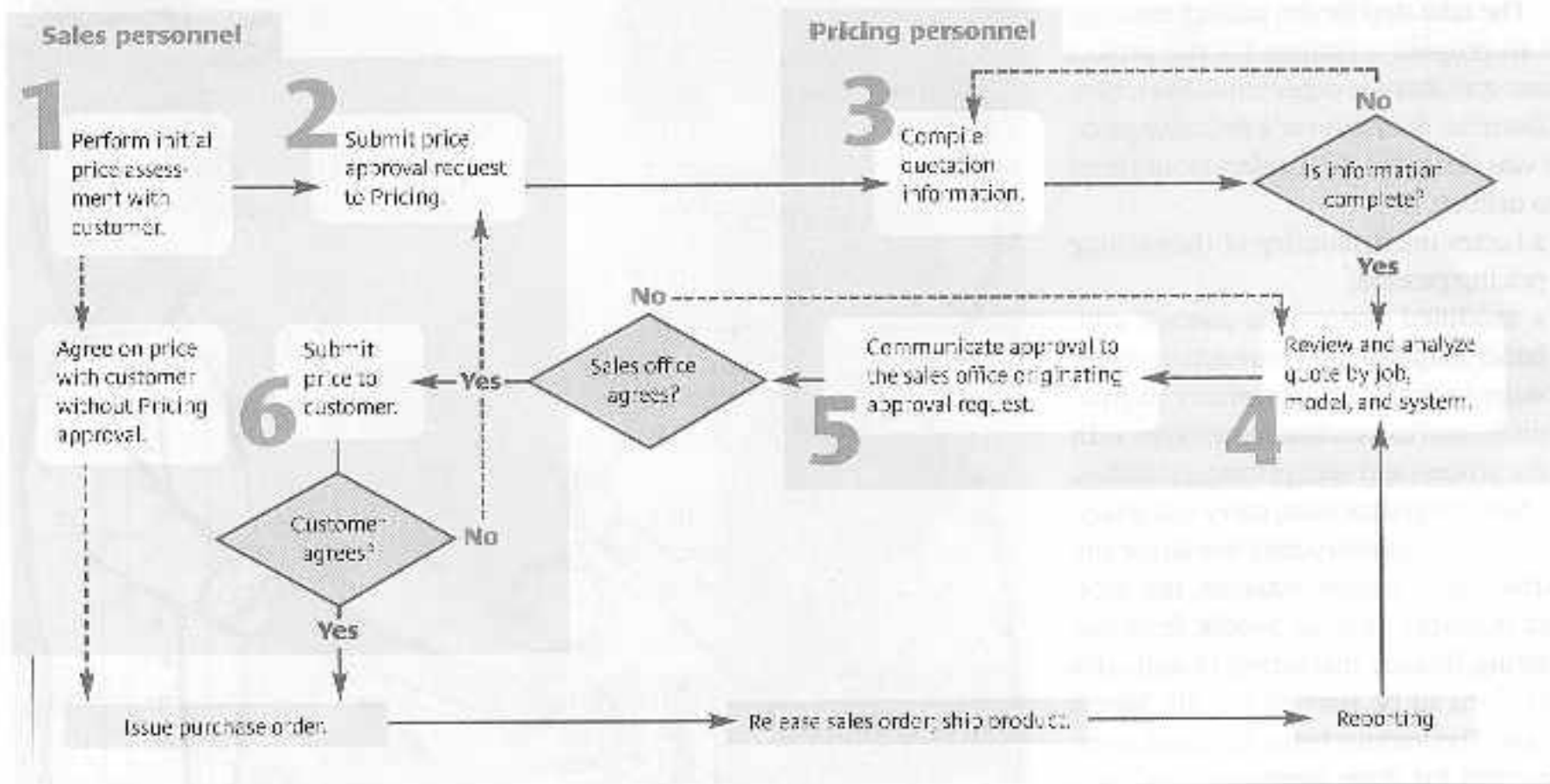
the information he needed, the project manager formally interviewed eight colleagues from five functional divisions: IT, sales, pricing, finance, and marketing. He also sought informal feedback from other people in these functions. As a result of this exercise, the team was able to draw a high-level diagram of the entire process showing the flow of information from one step to the next (see the exhibit "What Are We Doing?").

The map was supported by documentation detailing the inputs (called X's, in Six Sigma parlance) and outputs (Y's) associated with each step, showing all the people and IT systems involved, and specifying whether the decision-making inputs could be controlled by Pricing or Sales. The eventual output variable for the entire process is the final transaction price, but intermediate steps have their own intermediate

What Are We Doing?

When Acme's Six Sigma team mapped the company's existing pricing process, it became easy to see not only how the process was supposed to work but how it actually worked. The formal process comprised six main steps, which should have been taken in sequence (as depicted with solid lines). But oftentimes, sales reps sidestepped it all

by negotiating final prices with the customer directly. Other times, the process got bogged down as pricing analysts rooted around for information they should have already obtained from the sales staff in Step 2 or negotiations went back and forth between the sales rep and the pricing analyst (essentially getting stuck before Step 6).



outputs. For example, after an initial discussion with a customer, the output could be an agreed upon price that conforms to guidelines, or it might be a proposed price that would have to be referred to Pricing for approval. The inputs are the characteristics of the deal, such as the product type, order size, or time of year.

The map revealed a pricing process with six main steps, which seemed straightforward in principle. But it was clear that in practice the sequence did not work smoothly, that it was replete with exceptions and shortcuts, and that the quality of inputs available to Sales or Pricing personnel in any step could be quite poor.

1. Perform initial price assessment with customer (Sales). The inputs for this are the list price, the blanket discount guidelines for Sales in the particular market,

and the customer's product and pricing requirements. The output is a tentative price (that is, a discount off the list price). Approval is needed from Pricing if the discount is deeper than the maximum authorized for the particular market.

2. Submit price approval request to Pricing (Sales). For the Pricing personnel receiving such a request, the inputs are the price the sales rep has requested and the guidelines for pricing analysts. In practice, sometimes this step, and most of the subsequent ones, were circumvented when a sales rep offered a final discounted price to the customer without prior Pricing approval.

3. Compile quotation information (Pricing). The input is the information about the customer and the order provided by the sales rep to support his or her request. The output is the complete de-

tails of the transaction in question. This step should be trivial but often, in practice, the sales rep did not or could not provide enough information about the quotation, and the Pricing analyst or manager would have to chase around to get the missing information.

4. Review and analyze quote (Pricing). Inputs are the completed quotation information generated in the previous steps (including the tentative price the sales rep has requested); reports summarizing the history of similar transactions in the particular market; and, when available, reports of similar transactions with the same customer. In theory, such reports would guide Pricing's efforts to accept or modify the price requested and to produce the output—the tentative approved price. In reality, with information scattered in different computer systems, the guidelines available

to the pricing analyst could be quite poor. Or the sales rep might request a very quick turnaround, leaving little time for a pricing analyst to carry out this step effectively.

5. *Communicate approval to sales office (Pricing).* The input is the tentative approved price from the analysis in the previous step and any additional information regarding the order and customer. The output is the approved price. This should be the penultimate step before the sales rep approaches the customer but, in practice, this could instead be the beginning of a prolonged negotiation between Sales and Pricing. Other people may weigh in at this point as well, and the final approved price could end up quite a bit lower because of pressure from a manager or from a more senior sales or marketing executive.

6. *Submit price to customer (Sales).* The input is the approved price. The output is the tentative price for invoicing that the sales rep submits to the customer. At this point, the sales rep should simply be offering the customer the approved price. But this entire project was based on the observation that the price the sales rep actually offered the customer, as indicated by the invoice from the subsequent transaction (if there was one), could be quite a bit lower than the approved price.

Before moving on to the next stage of the project, the team assessed the quality of the input data that supported the pricing process. It would be difficult to improve the process if the current steps systematically produced faulty data. Moreover, the team needed to have faith in the numbers on which it was going to base its findings and recommendations. By examining representative samples of data in detail, the team was able to confirm that the actual sales transaction data were by and large stable and reliable, even though different reports presented the information in different formats.

Analysis. Once a process has been mapped and documented, and the quality of the hard data supporting it has been verified, the Six Sigma team can begin the analysis. The team members

usually start by meeting to identify the ways in which people fail to act as needed or fail to assert effective control at each stage.

To aid in this analysis, the Acme team used a common Six Sigma tool called the Cause and Effect (C&E) Matrix to guide discussion. With the help of the Master Black Belt, the project manager held a workshop using the tool to identify problems and put them in order of priority. The rows on the C&E matrix list all the steps in the current process, and the columns list all of the requirements a particular process customer has for the entire process. Each requirement is then weighted according to how important it is to that customer. (See the exhibit "Which Steps Matter?") For Acme's team, the customers were senior executives who wanted better controls in the pricing process and, eventually, better price performance.

The team did not actually assign number scores. Instead, members used the structure of the matrix to focus on

possible causes for lack of control at each step. The process diagram was projected as a slide, and team members used a whiteboard to discuss each step in turn. The main findings from this exercise suggested that the defects arose largely from problems in steps 1, 4, and 6, and from failures in reporting.

• *Step 1.* The team found that the ability of the sales reps to help customers select the right products, and the right features for those products, was critical to managing customers' price expectations. Unfortunately, salespeople's failures in assessing customer requirements could not be easily detected and controlled.

• *Step 4.* The key constraint here was time; sales reps sometimes wanted discount approval within hours of forwarding a request, which made it difficult for pricing analysts to work out whether or not the discount was reasonable. Giving Pricing more time for analysis would make it easier to reduce the incidence of defective prices.

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• *Step 6.* Sales reps sometimes offered final prices to customers without prior approval, leaving Pricing with little choice but to OK the price after the fact. The team agreed that such situations should be tracked.

• *Reporting.* Information about transactions was not gathered or presented in a consistent manner. The unit's various functions generated more than a hundred different transaction reports that summarized sales data by product line, market, and other ways at weekly, monthly, or quarterly intervals. Discrepancies and redundancies in those reports led to variability in the decisions analysts came to in deciding prices. This meant that managers could neither track pricing defects easily nor obtain the data they needed for Step 4 in time

to do adequate due diligence on price quotes.

After completing the C&E workshop, the project manager did a standard statistical analysis of transaction-level data for all of the individual transactions that occurred in the two years before the project started. As the exhibit "What Are We Really Charging?" reveals, he confirmed that actual transaction prices were distributed along normal bell-shaped curves around the average transaction prices. But he also discovered distinct bell curves for different transaction sizes: average discounts increased the higher the list price of the transaction. That indicated that many customers were willing to pay higher prices for smaller transactions, suggesting that pricing guidelines could

and should be differentiated for different-sized transactions.

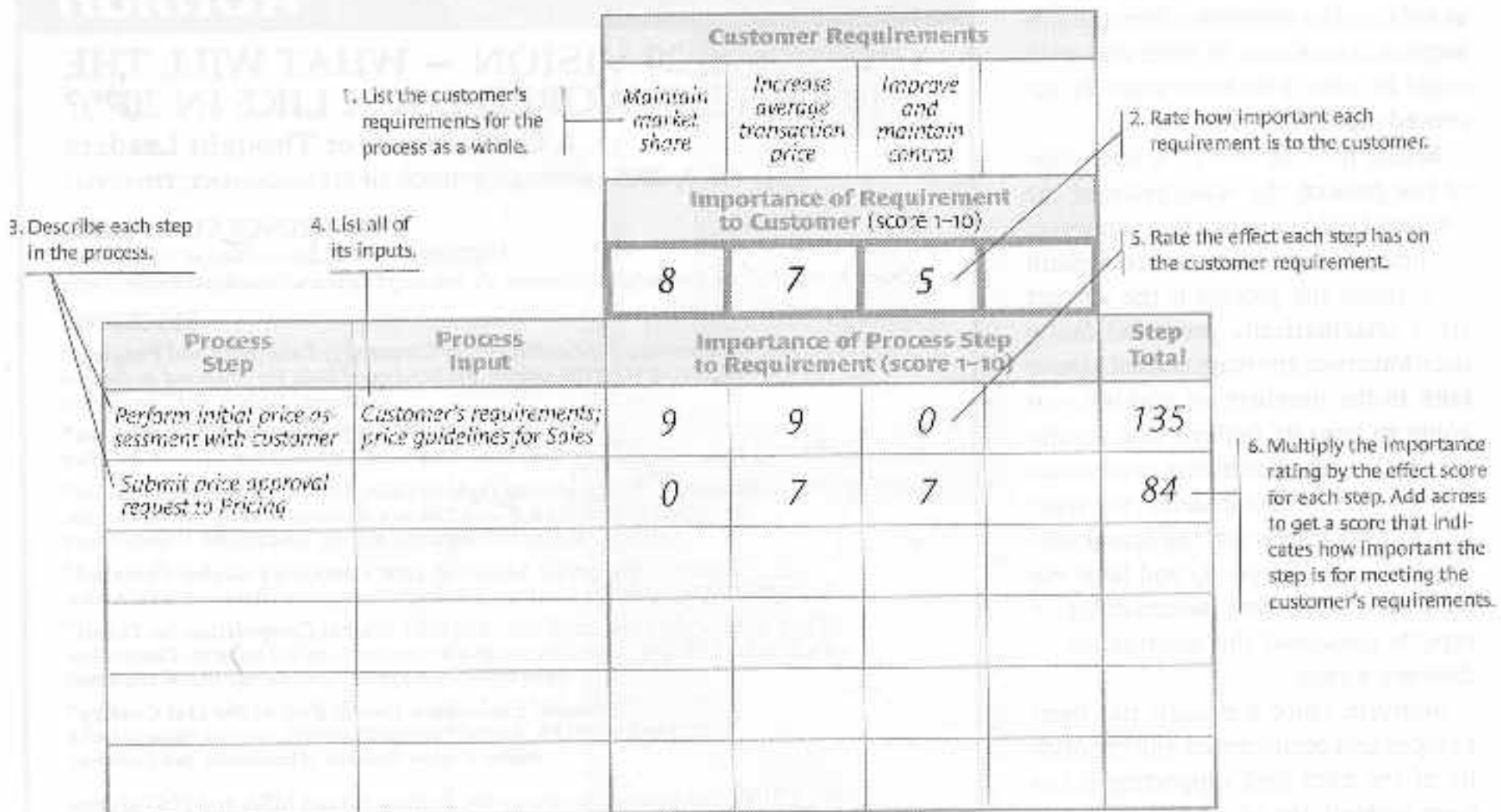
In addition, the analysis revealed that salespeople serving certain territories within the same market had a greater tendency than their colleagues in other territories to invoice at prices either significantly higher or lower than approved. The team concluded from this analysis that different pricing guidelines needed to be set not only for different transaction sizes but also for different territories within the same market and possibly even for different customer groups. Pricing guidelines had always been market specific but were not differentiated by transaction size, by territory, or, for the most part, by customer group.

Improvement. The results from the analysis created a lot of positive buzz

Which Steps Matter?

The Cause and Effect Matrix is one of the basic tools of any Six Sigma project. It is a systematic way to judge the impact of each step on the process's customers (whether internal or external)

as a prelude to prioritizing underlying problems and identifying their causes. In this example, we've filled in two steps, and senior management is the customer.



among Acme's senior managers. It was time to recommend modifications to the existing process to decrease the number of unapproved prices without creating an onerous approval process. Response speed was critical for salespeople so they could continue to act quickly and close deals. But this was a challenge for pricing personnel. What they needed, the team concluded, was clear guidelines to help them decide when they should or should not approve any deeper-than-usual discounts that Sales had requested or promised to customers.

So the team proposed giving graduated discount approval authority to individuals in three levels of the organization's hierarchy: sales reps or managers, pricing analysts, and the pricing manager. Finally, at a fourth level, top executives could continue to approve discounts without any limit. So, for example, in one particular market for a transaction size between \$100,000 and \$150,000, a sales representative could offer any discount up to 30%, but to be able to offer an even lower price to a customer, he would have to contact a pricing analyst for approval. She would first check against the guideline price for that region, type of product, transaction size, and perhaps other criteria, and use this to negotiate with the sales rep any further discount, up to 35%. If the sales rep felt that the situation demanded an even lower price than the analyst could authorize, the request would be elevated to the pricing manager, who could approve a discount of up to 40%. If the salesperson was going for an even lower price, the request was passed up to a specified group at the top leadership level, which alone could approve a higher discount. Making both the guidelines and the escalation process clear made the process more efficient and faster.

In cases where sales representatives had already offered a customer a price and needed post hoc authorization, the new process required that the rep involve his boss, who would have to e-mail or call Pricing for approval. The price already offered would still be honored, but now reps could be held more

accountable for making unauthorized commitments.

The new distribution of pricing responsibilities required a process for developing—and, from time to time, reevaluating—all of the discount limits. To ensure that limits did not become outdated, the team created a spreadsheet tool that let Pricing work off recent transaction history.

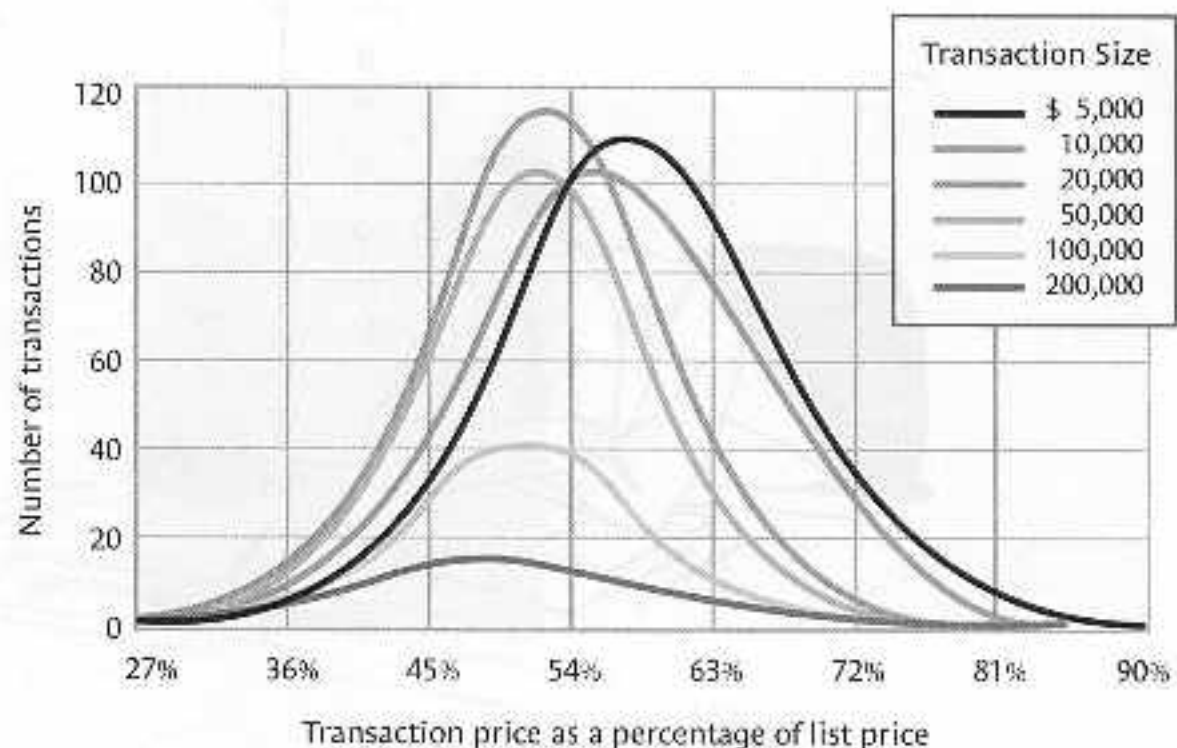
The team also created exception codes that enabled Acme to track the reasons for variations in prices. The codes made it clear who had been involved in the decision to deviate from guidelines. For instance, if someone from the leadership had approved a deep discount, the eventual transaction was tagged with a Leadership Approval code. If Acme needed to match a competitor's aggressive price, the pricing manager could approve a low price that

was tagged with a Competitive Match code. If a sales rep had already promised a price to a customer before getting approval, the transaction would have to be tagged with a Sales Error code. What's more, Pricing would now have 24 hours to do due diligence before approving a price request, and Acme tracked which sales reps consistently asked for extra-fast turnarounds.

Control. In the final stage of a Six Sigma project, the team creates controls that enable the company to sustain and extend the improvements. Acme set up a monthly review at which executives—mainly the vice presidents of marketing, sales, and finance, along with their direct reports—look at the company's overall performance and at particular geographic markets and transaction sizes to see if the new process is indeed resulting in higher average transaction

What Are We Really Charging?

At Acme, analysis of two years' sales data showed that the higher the list price, the deeper the mean discount tended to be. For large transactions with list prices in the \$200,000 range, for instance, the mean price negotiated with the customer was 50% lower than list. For transactions in the \$5,000 range, the mean price Acme actually charged was 60% of the list price. This suggested that Acme could improve average prices by differentiating the pricing guidelines for transactions of different sizes—precluding deep discounts, for instance, on small transactions.



prices, fewer exceptions, and no loss in market share. If prices are under control but the company is losing market share, it might be a sign that Acme needs to review its pricing guidelines or the way sales reps are managing their territories. If the review group notices that a particular sales rep is frequently making Sales Error transactions, the rep's boss will take a closer look at how that person is negotiating. And if the review group sees that transactions of a particular size regularly require the pricing manager's approval, the group would instigate a reexamination of the pricing guidelines for that transaction size.

The Payoff

The initial goal of generating half a million dollars in incremental revenues in the first year was handily exceeded in only three months. More important, following a subsequent across-the-board list price increase, the average transaction price for the pilot product line went up by slightly more than the list prices; in other words, the increase was fully reflected in the top line. But other product lines realized less than half the increase. That list price increase, together

with the tighter controls the Six Sigma team developed and implemented, resulted in the \$5.8 million in incremental sales in just the first six months following implementation going straight to the bottom line.

From an organizational perspective, the Six Sigma approach has considerably reduced the friction inherent in the Pricing-Sales relationship. The exercise of systematically collecting and analyzing price transaction data gave pricing analysts hard evidence to counter the more intuitive claims that the sales staff had typically advanced in negotiating discounts. A frequent refrain, for instance, was: "My customers want just as high a percentage discount for a \$3,000 transaction as they would get for a \$300,000 one." Now that Pricing knows for certain that Acme's customers tend to accept lower discounts on smaller transactions and that some customers are willing to pay higher prices than others, analysts can more easily push back when negotiating price approvals with sales staff. They can respond confidently and authoritatively when sales reps ask questions like "Why is my authorized price higher than those in another market?" or "How

come we don't authorize the same price for all customers?"

Salespeople, for their part, are less likely to feel that the negotiation with Pricing is driven by political motives or by a purely personal desire to assert control, and they can, of course, use the same data to press their own points. It became clear, for example, that some sales offices that had previously been under scrutiny for aggressive pricing practices had in fact been acting perfectly reasonably given their local market conditions.

In light of the project's success and its low cost, Acme is rolling out Six Sigma pricing across the entire organization. Other companies operating in competitive environments can also benefit from Acme's experience as they look for ways to exercise price control without alienating customers. They can transform the tenor of the relationship between their pricing and sales staffs from adversity to relative harmony by giving them a process for making joint decisions that are aligned with company objectives and based on solid data and analysis. U

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