

LEAN THINKING

BANISH WASTE AND CREATE WEALTH
IN YOUR CORPORATION

Revised and Updated

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CHAPTER I

Value

A House or a Hassle-Free Experience?

Doyle Wilson of Austin, Texas, had been building homes for fifteen years before he got serious about quality. "In October of 1991 I just got disgusted. Such a large part of my business was waiting and rework, with expensive warranty claims and friction with customers, that I knew there must be a better way. Then I stumbled across the quality movement."

He read Carl Sewell's book on car dealing, *Customers for Life*,¹ and decided to test his claims by buying a car at Sewell's Dallas dealership. ("I thought that if even a car dealer could make a customer feel good, it should be easy for a homebuilder!") His purchase was such a positive experience that he asked Sewell for advice on quality in home building and was told to read the works of W. Edwards Deming.

Doyle Wilson is the archetypical Texan and never does things halfway. By February of 1992 he had launched a wall-to-wall Total Quality Management campaign at Doyle Wilson Homebuilder. Over the next three years he personally taught his workforce the principles of TQM, began to collect and analyze enormous amounts of data on every aspect of his business, got rid of individual sales commissions ("which destroy quality consciousness"), eliminated the traditional "builder bonus" for his construction superintendents (who were qualifying for the "on-time completion" bonus by making side deals with customers on a "to-be-done-later" list), reduced his contractor corps by two thirds, and required the remaining contractors to attend (and pay for) his monthly quality seminars.

Customer surveys showed a steady rise in satisfaction with the homebuilding experience and sales grew steadily even in a flat market as Wilson took sales from his competitors. In 1995, Doyle Wilson Homebuilder won the National Housing Quality Award (often called the Baldrige Award for quality of the construction industry), and Wilson set a goal of winning the Baldrige Award itself by 1998. Yet he was not satisfied.

"I knew I was making progress in competing with other builders for the new-home buyer, but a simple fact, once it lodged in my mind, wouldn't go away: 78 percent of the homes bought in central Texas each year are 'used' or older homes. I've been making progress in increasing my share of the 22 percent seeking a new home, but what about the 78 percent who bought older homes? Obviously, these buyers are the real market opportunity."

So instead of surveying people who were buying new homes, Wilson began to talk with people who were buying older homes. What he discovered was obvious in retrospect but has required a complete rethinking of his business. Specifically, he found that many buyers of older homes hated the "hassle factor" in negotiating for new construction, the long lead times to get the job done and move in, the inevitable "to-be-done" list after moving in, and the "phony choices" available from builders who promise custom homes but then load on as "standard equipment" many features of little interest to buyers.

Wilson soon realized that that was exactly what he had been asking his customers to go through. By contrast, older-home customers could clearly see what they were getting, buy only what they wanted, and, often, move in immediately. "No wonder I was losing 78 percent of my potential customers!"

To create a hassle-free experience to go with the house itself (these together constituting Wilson's "product"), it was necessary to rethink every step in the process. He has recently opened a one-stop sales center where the customer can see and decide on every option available in a house (for example, the forty different varieties of brick, the three thousand varieties of wallpaper, the four styles of built-in home office), customize a basic design with the help of an Auto-Cad computer system, select features beyond the standard level (for example, extra-thick carpet pads, additional outdoor lighting, and heavier-duty wiring), determine the exact price, work out the mortgage, arrange for insurance, and arrange for the title search. For customers truly in a hurry this can be done during one walk-through of the sales center.

To shrink the lead time from contract signing to moving in from six months to a target of thirty days, he has reorganized his contract-writing and job-release process and is developing a system of pull scheduling for contractors who are assigned new jobs as downstream jobs are completed. He is also introducing standardized work statements, parts lists, and tool kits for every job. Eventually these steps will eliminate the "to-do" list because the new system does not allow the next task to start until the previous task is certified as complete with perfect quality.²

Finally, Wilson has created a wide range of basic house designs with a minimum construction standard and asks the customer to specify all materi-

als and systems upgrades (using the computer design system) to a selected base design so the customer only pays for exactly what she or he feels is really needed.

Doing all of this will not be easy, as we'll see when we return to this example in Chapter 3 on flow, but Doyle Wilson has already made the key leap. Instead of concentrating on conventional markets and what he and his contractors were accustomed to making in a conventional way, he has looked hard at *value* as defined by his customers and set off down a new path.

Start by Challenging Traditional Definitions of "Value"

Why is it so hard to start at the right place, to correctly define value? Partly because most producers want to make what they are already making and partly because many customers only know how to ask for some variant of what they are already getting. They simply start in the wrong place and end up at the wrong destination. Then, when providers or customers do decide to rethink value, they often fall back on simple formulas—lower cost, increased product variety through customization, instant delivery—rather than jointly analyzing value and challenging old definitions to see what's really needed.

Steve Maynard, vice president for engineering and product development at the Wiremold Company in West Hartford, Connecticut, was trying to deal with these very problems when he reorganized Wiremold's product development system in 1992. For many years previously, Wiremold had developed new products—consisting of wire guides for office and industrial users and surge protectors for PCs and other business electronics—through a conventional departmentalized process. It started with marketing, which commissioned surveys comparing Wiremold's products with the offerings of competitors. When an "opportunity" was identified, usually a gap in the market or a reported weakness in a competitor's offering, a design was developed by product engineering, then tested by the prototype group. If it worked according to specification, the design proceeded to the engineers designing the machines to make the products and eventually went into production.

This system produced designs which lacked imagination and which customers often ignored. (The designs also took too much time and effort to develop and cost too much to make, but these are a different type of problem we'll discuss in Chapter 3.) Simply speeding up this process through simultaneous engineering and then broadening product variety would just have brought more bad designs to market faster. Pure *muda*.

Steve Maynard's solution was to form a team for each product to stick

with that product during its entire production life. This team—consisting of a marketer, a product engineer, and a tooling/process engineer—proceeded to enter into a *dialogue* with leading customers (major contractors) in which all of the old products and solutions were ignored. Instead, the customer and the producer (Wiremold) focused on the value the customer really needed.

For example, traditional Wiremold wire guides (which channel wiring through hostile factory environments and provide complex arrays of outlets in high-use areas like laboratories and hospitals) had been designed almost entirely with regard to their ruggedness, safety, and cost per foot as delivered to the construction site. This approach nicely matched the mentality of Wiremold's product engineers, who dominated the development process and who found a narrow, "specification" focus very reassuring.

As the new dialogue began, it quickly developed that what customers also wanted was a product that "looked nice" and could be installed at the construction site very quickly. (Wiremold had never employed a stylist and knew relatively little about trends in the construction process.) Customers were willing to make substantial trades on cost per foot to get better appearance (which increased the bid price of construction jobs) and quicker installation (which reduced total cost).

Within two years, as all of Wiremold's product families were given the team treatment, sales for these very conventional products increased by more than 40 percent and gross margins soared. Starting over with a joint customer-producer dialogue on value paid a major dividend for Wiremold quite aside from savings in product development and production costs.

While Wiremold and Doyle Wilson Homebuilder and every other firm needs to be searching for fundamentally new capabilities that will permit them to create value in unimagined dimensions, most firms can substantially boost sales immediately if they find a mechanism for rethinking the value of their core products to their customers.

Define Value in Terms of the Whole Product

Another reason firms find it hard to get value right is that while value creation often flows through many firms, each one tends to define value in a different way to suit its own needs. When these differing definitions are added up, they often don't add up. Let's take another nightmarish (but completely typical) travel example.

One of us (Jones) recently took his family on an Easter holiday in Crete from his home in Herefordshire in the United Kingdom. What was wanted was a total, hassle-free package of transport to the airport, a flight to Crete, transport to the villa in Crete, and the villa itself. What was available instead

CHAPTER 3

Flow

The World of Batch-and-Queue

What happens when you go to your doctor? Usually, you make an appointment some days ahead, then arrive at the appointed time and sit in a waiting room. When the doctor sees you—usually behind schedule—she or he makes a judgment about what your problem is likely to be. You are then routed to the appropriate specialist, quite possibly on another day, certainly after sitting in another waiting room. Your specialist will need to order tests using large, dedicated laboratory equipment, requiring another wait and then another visit to review the results. Then, if the nature of the problem is clear, it's time for the appropriate treatment, perhaps involving a trip to the pharmacy (and another line), perhaps a trip back to the specialist for a complex procedure (complete with wait). If you are unlucky and require hospital treatment, you enter a whole new world of specialized functions, disconnected processes, and waiting.

If you take a moment to reflect on your experience, you discover that the amount of time actually spent on your treatment was a tiny fraction of the time you spent going through the “process.” Mostly you were sitting and waiting (“patient” is clearly the right word), or moving about to the next step in the diagnosis and treatment. You put up with this because you've been told that all this stopping and starting and being handed off to strangers is the price of “efficiency” in receiving the highest-quality care.

We've already looked briefly at another service, a trip involving an airline. And most of the time the experience is even worse than the Joneses' family trip to Crete because rather than taking a direct flight you must go through a hub for sortation. In the end, the time you spend actually moving along the most direct route is likely to be little more than half the total time required to get from door to door. Yet most travelers put up with this system without dreaming of anything better. After all, it's extremely safe,

and travelers are told that it's highly efficient because it fully utilizes expensive airplanes and airports.

Health care and travel are usually called "personal services," in contrast with "products" like VCRs, washing machines, Wiremold's wire guides, and Tesco's beverages. Actually, the major difference is that in the case of health care and travel, you the customer are being acted upon—you are necessarily part of the production process. With goods, by contrast, you wait at the end of the process, seemingly beyond harm's reach. However, there is no escaping the consequences of the way the job gets done even if you are not directly involved.

Let's take just one example for a common good, the single-family home. Henry Ford dreamed about mass-producing homes using standard but modularized designs with the modules built in factories to slash design and production costs while still providing variety. A number of entrepreneurs actually created modular designs and briefly set up production lines in the United States to make the modules for prefabricated houses immediately after World War II.¹ And Toyota has had modest success in Japan since the 1960s in offering a wide range of floor plans and exterior appearances using a few basic modules fabricated on a production line and assembled almost instantly at the construction site.

Yet, almost all of the world's new single-family homes are still built largely at the construction site by cutting and fastening a welter of materials to create the basic structure and then installing thousands of individual components, from plumbing fixtures to kitchen appliances to wall sockets.

If you go to your home builder and then to the construction site and take a seat to watch the action, you will mostly note inaction. For example, when Doyle Wilson started to measure what occurred in his office and at the work site as part of his TQM effort, he discovered that five-sixths of the typical construction schedule for a custom-built home was occupied with two activities: *waiting* for the next set of specialists (architects, cost estimators, bill-of-material drafters, landscape architects, roofers, sheetrockers, plumbers, electricians, landscapers) to work a particular job into their complex schedules, and *rework* to rip out and correct the work just done that was either incorrect from a technical standpoint or failed to meet the needs and expectations of the home buyer.

As the buyer at the end of the process, you pay for all the waiting and rework—grumbling, of course—but it is a custom product, after all, and you've heard many stories from your friends about even worse problems with their homes, so you tend to accept the predominant system and its problems as unavoidable and inherent to the nature of the activity.

In fact, all of these activities—the creation, ordering, and provision of any good or any service—can be made to flow. And when we start thinking

about ways to line up all of the essential steps needed to get a job done into a steady, continuous flow, with no wasted motions, no interruptions, no batches, and no queues, it changes everything: how we work together, the kinds of tools we devise to help with our work, the organizations we create to facilitate the flow, the kinds of careers we pursue, the nature of business firms (including nonprofit service providers) and their linkages to each other and society.

Applying flow to the full range of human activities will not be easy or automatic. For starters, it's hard for most managers to even see the flow of value and, therefore, to grasp the value of flow. Then, once managers begin to see, many practical problems must be overcome to fully introduce and sustain flow. However, we do insist that flow principles can be applied to any activity and that the consequences are always dramatic. Indeed, the amount of human effort, time, space, tools, and inventories needed to design and provide a given service or good can typically be *cut in half* very quickly, and steady progress can be maintained from this point onward to cut inputs in half again within a few years.

The Techniques of Flow

So, how do you make value flow? The first step, once value is defined and the entire value stream is identified, is to focus on the actual object—the specific design, the specific order, and the product itself (a “cure,” a trip, a house, a bicycle)—and never let it out of sight from beginning to completion. The second step, which makes the first step possible, is to ignore the traditional boundaries of jobs, careers, functions (often organized into departments), and firms to form a lean enterprise removing all impediments to the continuous flow of the specific product or product family. The third step is to rethink specific work practices and tools to eliminate backflows, scrap, and stoppages of all sorts so that the design, order, and production of the specific product can proceed continuously.

In fact, these three steps must be taken together. Most managers imagine that the requirements of efficiency dictate that designs, orders, and products go “through the system” and that good management consists of avoiding variances in the performance of the complex system handling a wide variety of products. The real need is to get rid of the system and start over, on a new basis. To make this approach clear and specific, let's take as a concrete example the design, ordering, and production of a bicycle.