

SPEED & RESPONSE: 1G
 PLAN CLICKS AT HEWLETT-PACKARD: 8G
 A FORMULA FOR SUCCESS: 9G
 DFT WINS PLAUDITS: 10G

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INSIDE
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Steve Groer/Rocky Mountain News

Outside his Institute of Technology, John Costanza poses with his staff. The school runs training and technology programs for manufacturing managers. Costanza's methods are used in 42 countries.

SUCCESS

'Speed and response' plan of Colorado consultant helps U.S. manufacturers excel

By Richard Williamson

Rocky Mountain News Staff Writer

John Costanza has reached the point in his career at which he can drive a more expensive car.

The model he prefers costs \$70,000, belches a blue flame and roars like a Boeing 747. It's about 23 feet long, goes from zero to 100 mph in less than a second, and the 2,500-horsepower engine has to be rebuilt every quarter mile or so.

Strap him into a Federal Mogul dragster and Costanza is a happy man.

"No phones, no beeper, no faxes," he says. "It relaxes me."

It's a short thrill ride, though, usually about a 6-second, teeth-rattling, blurry-eyed blast past the quarter-mile mark at National Hot Rod Association venues where Costanza's racing team competes.

Another driver on the team, Bill McCornack, says Costanza has gone from a virtual unknown in racing to one of the best-recognized names on the circuit in just one year.

The fact that Costanza actually got behind the wheel of his own dragster helped, McCornack says.

"It does take courage, and that's John," McCornack says. "Hats off to him; he's not afraid."

With each trip down the strip costing thousands of dollars,

Costanza is obviously not shy about his success as one of the nation's most influential management and manufacturing consultants.

Along with their entertainment value, the race cars carry Costanza's message about the importance of "speed and response" in the marketplace.

"We're creating a manufacturing revolution," he says.

Since launching his company in the basement of his home 13 years ago, Costanza has built a work force of more than 200 employees, with new headquarters near Centennial Airport and branch offices in San Jose, Calif., and Nice, France.

The John Costanza Institute of Technology claims to have saved customers more than \$4.7 billion in the past decade. Costanza's methods are used in 42 countries, and his how-to book *Quantum Leap* has been translated into five languages.

The privately held company has never had less than 40 percent growth in any year, Costanza says, and a burgeoning line of software promises to send sales soaring higher.

With clients such as General Electric, General Motors, Microsoft and Kodak, the company's sales force doesn't have to do a lot of cold calling anymore.

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either.

Michael Hammer, an MIT professor and author of *Reengineering the Corporation*, saw Costanza's methods firsthand at American Standard, where he, too, worked as a consultant.

"His work is enormously important," Hammer says of Costanza. "But I don't think it's been as widely implemented as it should be. We're going to see a lot more in the coming years."

UP FROM THE BOTTOM

Costanza might not have come up with his formula — called Demand Flow Technology — or written his book if American manufacturing had not hit bottom in the early 1980s.

Staggered by a major recession, American industry was losing its confidence amid an onslaught of cheap, high-quality products from overseas.

Almost overnight, Japan cornered the market on American inventions like the microwave oven. Televisions, stereos and other household products sold in the United States were virtually all made in Japan. And the Big Three automakers were losing ground to brands such as Toyota, Honda and Nissan.

With some business leaders worried that the United States was headed toward a sham services economy, President Reagan created the President's Council on Productivity to see what needed to be done to save the nation's eroding industrial base.

Reagan named David Packard, co-founder of the Silicon Valley computer giant Hewlett-Packard, as chairman.



Steve Groer/Rocky Mountain News

Gerard Leone teaches four-day classes at the Institute of Technology. On its fourth day, this class has set up an assembly line using CEO John Costanza's system of Demand Flow Technology.

Packard brought aboard Costanza, an engineer known for getting things accomplished.

Costanza and other commission members traveled thousands of miles, touring Asian factories that were using processes many American companies had never heard of.

"Just-in-time" inventory management, a *kanban* system of signaling for replenishment of parts and a rigorous process of continual improvement were commonplace in Japanese plants.

Costanza says he was impressed, but not awed.

"The Japanese decision-making system is incredibly slow," he says. "But once they decide, they execute extremely fast. The Japanese understand process quality."

Once he got the picture, Costanza grew impatient touring factories.

"I could see myself sitting in an airport the rest of my life," he says. "It was finally getting to the point where I thought, 'This is really stupid.' Why don't you just sit down and say, 'Gosh, what's the ultimate

way to manufacture?' Why don't you just sit down and do it like an engineer? With design."

When he returned to Hewlett-Packard, Costanza began working on the problem. What he wanted was a formula, not a theory.

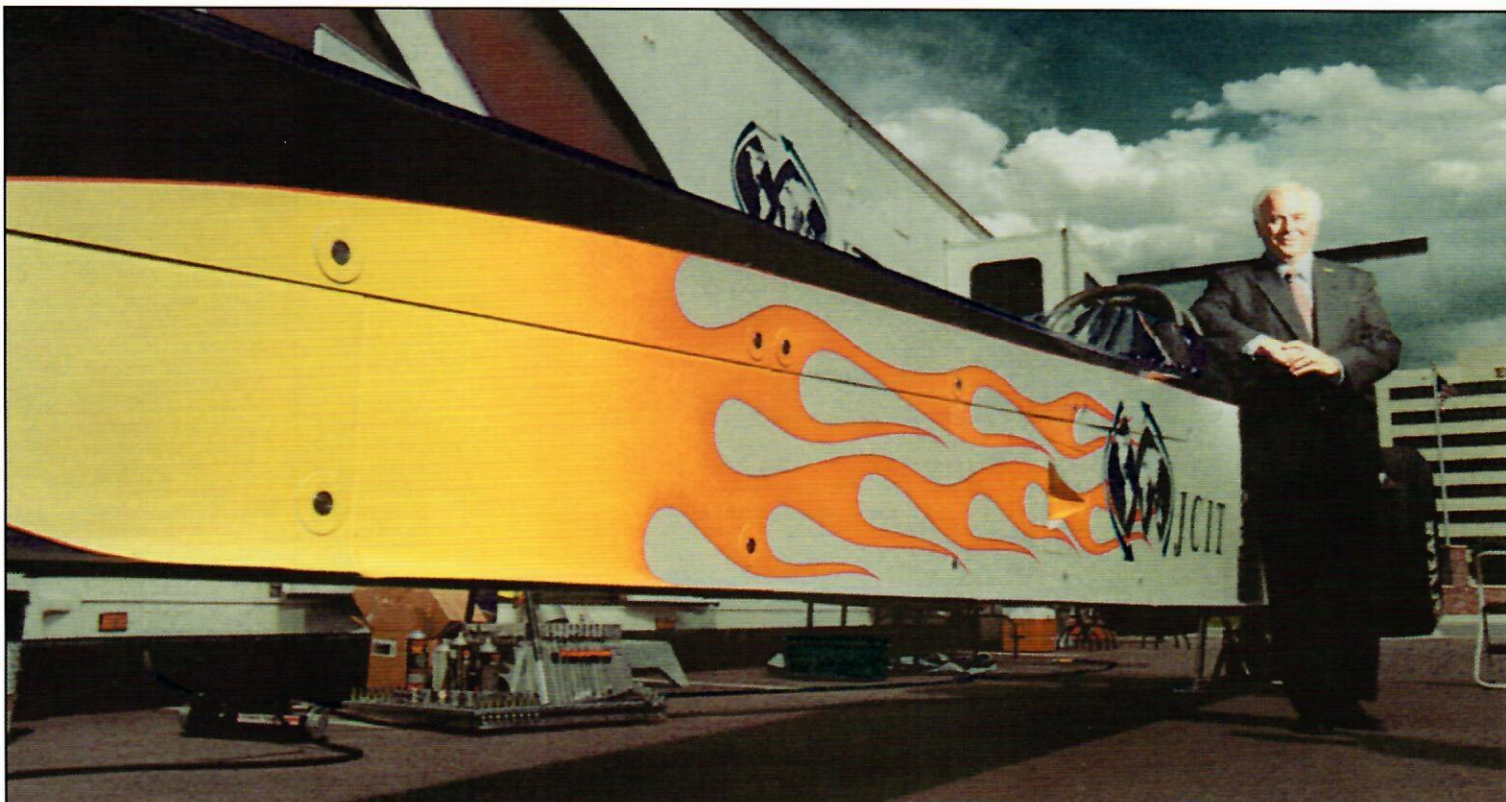
A factory, he knew, could be programmed much like a computer, using sets of algorithms for various tasks that could flow into one synchronized stream. No matter how complicated the processes, every manufacturing system could be mapped out and coordinated, with customer orders determining the rate of production.

WHERE THE BUYERS ARE

At the time, most U.S. manufacturers were using a system called "scheduling" to make products. Scheduling is a repetitive process that divides all the tasks of production into separate compartments, each operating independently to create the necessary components for final assembly. Scheduling is heavily dependent on forecasting, anticipating well in advance what kinds of products and how many products customers will want. It requires a great deal of setup, intensive paperwork and tracking of inventory.

Instead of checking for quality throughout the assembly process, a scheduled plant tests the finished product. If it fails, the entire product has to be reworked or scrapped. In some cases, all the parts and labor that went into the finished product are wasted, and the cause of the problem may still exist.

In a scheduled plant, decision-making is "upstream" from the assembly process.



Rodolfo Gonzalez/Rocky Mountain News

John Costanza stands next to his top fuel dragster. He has a racing team and has become well-known at National Hot Rod Association venues, including Bandimere Speedway.

A FORMULA FOR SUCCESS



Ellen Jaskol/Rocky Mountain News

John and Linda Costanza on their property a few miles east of their home in Parker, where they will soon build a house. They started the John Costanza Institute of Technology in their basement in 1984.

With Demand Flow, or "pull" manufacturing, decisions are made at the other end, where the buyers are.

Take jeans, for example. A scheduled manufacturer will study the market and predict how many pairs of black jeans in what sizes will sell in a year. Then, it will make that many, place them in inventory and deliver them to stores as the orders come in.

A Demand Flow system, on the other hand, keeps the material on hand to make as many black jeans as needed. But few are made for finished inventory. The rate of production and the sizes are determined by customer orders.

Costanza says Demand Flow is similar to the system Subway uses to make sandwiches. Each sandwich is made according to customer specifications, using raw materials on hand.

"They don't make a whole bunch of sandwiches first thing in the morning and then leave them sitting around, waiting for people to come buy them," he says.

"So, I started taking it to a think-tank level and said, 'Let's do an engineering-mathematical model,'" Costanza says. "I'd say most people said, 'Well, he's nuts.' A few of them said, 'That's intriguing,' so we gave it a shot and kind of got into it."

"We tried it, and it worked, and it became pretty exciting," Costanza says of DFT's early days at Hewlett-Packard. "And we tried it in another division. It worked. And it was like, 'Wow, this is pretty slick stuff.'"

But Costanza says he realized he would have to leave Hewlett-Packard to fully

"His work is enormously important. But I don't think it's been as widely implemented as it should be. We're going to see a lot more in the coming years."

Michael Hammer,

an MIT professor and author of *Reengineering the Corporation*, regarding John Costanza

develop DFT. The computer giant had so many of its own projects going at once that his vision could easily get lost in the competitive mix.

FAMILY AFFAIR

With \$10,000 in capital, Costanza and his wife, Linda, turned the unfinished basement of their home into an office and workshop in 1984.

They created a demonstration assembly line and acquired parts that could be used in a mock manufacturing operation for Costanza's classes.

Other family members and even the couple's 4-year-old daughter, Melissa, helped out, Linda Costanza recalls.

"We literally would have moms and dads, aunts and uncles, nieces, everyone in to help," Linda Costanza says. "That's the only way we pulled it off."

Linda says she met Costanza, the son of a Pueblo postman and graduate of the University of Colorado, on a blind date when he was working for Johnson & Johnson and she was working for a Denver bank.

"A girlfriend set me up on a blind date — not with him," Linda Costanza says.

"When we got there, I didn't like my date at all. I said, 'I want the cute Italian.' And we literally kind of switched."

Her husband's decision to leave Hewlett-Packard was a calculated risk, she says.

"Actually, we came into some money," she recalls. "And it was at this time when he said, 'I've got to do something, Linda. If I don't do it now, we may never have another chance like this.' So, he quit his job."

"To pull off what he wanted to do, he needed the support work. So, there's two unemployed people with the mortgage, car payments, a child."

"I think by the time we even took any money out of the company, we didn't even have \$1,000 left, and we had a mortgage coming up."

Costanza had eight employees in his first office. After a couple of years, he had a new, larger office and 11 employees. In the early days, the family sometimes traveled around the country in a non-air conditioned moving van containing all the materials for

his classes.

In three years, the couple never took a day off.

LEAP OF FAITH

Of all the companies that have adopted Demand Flow, probably none was more important to Costanza than American Standard, a name seen on toilets and plumbing products throughout the world and the parent of Trane Air Conditioning. For American Standard chairman Emmanuel Kampouris, adopting DFT to a huge leap of faith in the relatively obscure system.

"When we started working with American Standard, we had a \$500 million (sales) target that we had to hit or they were going to take the company and tear it apart," Costanza says. "You had to get money out to service the debt or you started selling off the arms and the legs."

After fending off a hostile takeover by Black & Decker in 1988, the company was laden with \$3.2 billion in debt by 1990. To avoid bankruptcy, Kampouris was looking for a way to turn some of the company's \$700 million tied up in working capital and inventory into cash.

That was exactly what Costanza promised he could do.

"If Demand Flow Technology works, we'll save us," Kampouris told his management team in February 1990. "If it doesn't, we will go bankrupt."

American Standard not only didn't go

A FORMULA FOR SUCCESS



Steve Groer/Rocky Mountain News

The author of *Quantum Leap*, John Costanza autographs copies of the how-to book for students at a reception. The book has been translated into five languages.

FORMULA from 9G

bankrupt, but also rebounded with a vengeance.

"We now provide some of the best response times in our industry," said Dave Gleditsch, a former Costanza employee who now manages Demand Flow Technology for American Standard.

With 19,300 employees and 31 plants in nine countries, American Standard has reduced working capital since 1988 from 16 cents per dollar of revenue to 5 cents, Gleditsch says. "We do have a goal of working the company with zero working capital."

Kampouris was so happy with his success using DFT that he called it "the foundation of our success" on his 1995 annual report.

TRANSLATING GENERALITIES

Selling Demand Flow Technology is sometimes a harder task in business schools and union halls.

"There are some headaches that go with it," says Linda Lewis, vice president of Local 340 of the International Union of Electrical Workers in Cuba, N.Y. When Lewis' employer Acme Electric Corp. was in danger of going under, the union signed off on the use of DFT.

"We lost a lot of our job classifications because of it," she says.

Under DFT, workers are required to "flex" or move to different jobs if the need arises. But Lewis says some employees got stuck in jobs they didn't like.

"We have an older work force," she says. "What we're hearing is, 'If I'd have wanted that job, I'd have bid it.'"

Still, Lewis says DFT kept the plant from closing.

Steve Lawrence, a management professor at the University



SCHEDULED MANUFACTURING

- **Dependent** on long-term forecasting of buying trends.
- **Requires intensive** inventory management.
- **Requires expensive** build-up of finished inventory.
- **Has difficulty** adapting to changing market or individual orders.
- **Uses long set-up** operations and build-up of subassemblies before final assembly.
- **Once up and running**, final assembly line is fast but repetitive, producing a series of identical products.
- **Workers do one** job, and the assembly line always runs at the same pace.
- **Quality control** at the end of assembly often creates waste or expensive rework.



FLOW MANUFACTURING

- **Rate of production** is determined by orders.
- **Responds quickly** to market, delivering products in days instead of weeks.
- **Creates little finished inventory**, but maintains good supply of raw material.
- **All subassembly lines** are synchronized to feed into final assembly process.
- **Workers must "flex"** to two other positions, one up, one down.
- **Different versions of product** can be built on the same assembly line.
- **Quality controls** come throughout the assembly process.
- **Reduces working capital** toward a goal of zero.

Rocky Mountain News

of Colorado, says Costanza is not alone in promoting a "pull" system for manufacturing. Hewlett-Packard and companies like Toyota also deserve a major share of the credit for transforming modern manufacturing, he says.

"But he's right," Lawrence says of Costanza's mathematical approach. "There are a lot of people who wave their hands and speak in broad generalities about these concepts. But translating those generalities into systems is awfully difficult."

The demand for Demand Flow Technology has kept Costanza extremely busy. He still travels all over the world to explain his methods.

But every Wednesday, Costanza

makes it a point to be back at the Englewood headquarters to meet with people taking his class.

And racing events involve the whole family as well as the families of employees. Melissa Costanza, now 16, is even learning to drive the dragsters.

Costanza says he's proud of what he has accomplished. But if he had it to do all over again, he's not sure he would.

"People ask me about being an entrepreneur," Costanza says. "I say, if you've got a good job, hold onto it. If this is something you've really got to do, then go do it. But if you're going to do it because you're going to get rich, you're crazy. It ain't going to happen. It's very tough."

Demand Flow Technology wins plaudits

Trane Air Conditioning plant official credits consultant's ideas with aiding growth, success

By Richard Williamson

Rocky Mountain News Staff Writer

When a company starts losing money, the first thing the boss usually cuts is the payroll.

That's a big mistake, says John Costanza, a nationally recognized management and manufacturing consultant.

Instead of attacking the highest portion of their costs, material and overhead, companies slash direct labor, often the smallest cost factor, he says.

"People are notorious for beating the heck out of direct labor," Costanza says. "Then, you've got a bigger problem, because you're less responsive to customers' demands."

At the Trane Air Conditioning plant in Pueblo, Costanza's Demand Flow Technology has pulled working capital out of the pipeline as production has doubled in four years.

"We tell people, if you don't get back 10 to 12 times your investment in DFT, something's wrong," said Dave Glennon, John Costanza Institute of Technology's customer service representative for Colorado.

The Trane plant that opened in 1993 with 50 workers now has 930 employees and 405,000 square feet of floor space, said Jack Rink, Trane operations manager.

"We thought if we did everything right and really grew our business, we'd have about 250 employees by now," Rink said.

Part of Trane's success is due to increased worldwide demand and the fact that its industrial air conditioners are very low in terms of ozone depletion.

"But there's no doubt that we would not have grown as fast as we have without Demand Flow Technology," Rink said.

Costanza said that if he had his way, there would be only one job classification at a company: "Flexible employee."

But that position doesn't always go very far, said Linda Lewis, vice president of Local 340 of the International Union of Electrical Workers in Cuba, N.Y.

Lewis said the union agreed to use DFT to save the Acme Electric plant near Buffalo, N.Y., when hard times hit. Now that the plant has survived, some union members are complaining about "flex-

ing" to other jobs, she said. The number of job classifications has been slashed from 75 to nine.

"I used to go in and do the same job every day," she said. "But now because everyone's the same I do jobs all over the place. And some of these are jobs I don't like."

"Overall, I think the system is good because it lets you get the product out the door faster," Lewis said. "And from an ergonomics standpoint, it's better because you're not doing the same repetitive motions all day long."

Though the plant is building power units faster than ever, the workers actually have more time to spend on each part of the production process, she said.

Costanza said unions don't have to be an impediment to DFT.

"The average union employee is not the problem," he said. "People care more about long-term employment. If you're more competitive, you've got long-term employment."

At one of the classes at the John Costanza Institute of Technology in Englewood, instructor Gerard Leone sends students off with their marching orders:

"Don't let excuses get in the way. Work in teams. Educate everyone in the plant."

But at DFT-certified Intermec near Seattle, instilling teamwork hit some roadblocks, said Cindy Hart, manufacturing unit manager.

"The team path is really an issue for our corporate culture," Hart said. "We have a lot of Asians who may not have been able to live with each other in their home culture. I think Cedar Rapids, Iowa, would have an easier time."

Hart, an industrial engineer, said she has seen dramatic results after the company began training employees.

"We reduced our direct labor costs by 20 percent," she said. "And fortunately with growth we didn't have to lay off anybody. We improved our floor space usage by 25 percent. Our quality rates have improved 1 percent. And inventory reduction has freed up cash."

"DFT jolted us out of our acceptance of how we had always done things," she said.

Now that Intermec is fully immersed in DFT thinking, Hart is often asked to show people from other industries how it works.

"Our competitors?" she said. "I don't want them getting near it."