

THE T O L L  
OF A N E W  
M A C H I N E

First it was ATMs. Then gas pumps. Now we check ourselves in at airports and even punch up our own fast-food orders. Doesn't anybody work here anymore?  
By Charles Fishman



THE INTERSECTION OF INTERSTATE 4 and Florida's Highway 27 is a well-known spot, the point where the clutter of Orlando's theme parks exhausts itself and the old Florida of citrus groves and sandy ridges picks up.

There is a McDonald's at this intersection, and in a booth on a recent Friday, Don Vaughn is having lunch with his daughter-in-law and granddaughter. They've driven 12 miles to this McDonald's, drawn by the power of a dawning technology.

"It's fantastic," says Vaughn, a local. "I love it. It's the new age."

"We tell [the machine] the way we want it," says Chrystal, Vaughn's daughter-in-law, "and we know it's done right." Done right, in Chrystal's case, means no onions.

The liberating new-age technology in use right there inside the McDonald's—a pair of kiosks bolted to the floor near the front counter—allows customers to use a touch screen to order their Big Macs and Happy Meals exactly the way they want them. Vaughn, Chrystal, and Heather drove to this particular McDonald's—as they do regularly—just to order their food on the touch screens themselves.

In the tumult of lunchtime at a busy McDonald's, and in the tumult of the U.S. economy, the slim, silver machines would be easy to overlook, though each is as tall as a person and sports a colorful screen. There are just 85 of them, installed in 48 franchised restaurants, all without the help of McDonald's itself.

The company quietly putting self-ordering computers in McDonald's is Kinetics Inc., whose self-service technology has already swept through the airline industry, with results that

have amazed executives and customers alike. Every day, hundreds of thousands of airline customers check themselves in, cheerfully doing work that used to be done by thousands of airline ticket agents. Kinetics' self-service vision could have the same impact on the fast-food business as it has had on airlines—and fast food and airlines are just the start. Besides checking ourselves in for flights at the airport, we may soon be checking out rental cars at our destinations without talking to anyone, and then checking into hotels at a lobby kiosk that, first, displays a diagram of all the rooms available and then, after we choose one, pops out a room key.

If you look at the dozens of Kinetics self-service machines lined up at Delta's terminal in Atlanta, or Northwest's in Minneapolis, or Continental's in Houston, you'll begin to understand the role they're already having in a powerful economic trend: the ability of U.S. businesses to do more and more with the same, or fewer, workers. Labor productivity grew at an astounding annual rate of 9.5% during the third quarter of last year, the largest quarterly leap since 1983. That's an unsustainable pace (and it dropped to a more typical 2.6% in the fourth quarter), but it is part of a steady trend that has productivity increasing in the past two years at more than twice the historical pace. Crudely put, the numbers mean the work that required 100 people in 2000 requires just 89 people today.

Kinetics and its kiosks are capitalizing on this productivity trend and driving it. The company, which makes about two-thirds of the nation's airport self-check-in machines, is an all-but-

Three kiosks, no waiting: At Continental Airlines terminals, like this one in Newark, New Jersey, machines have cut the mean check-in time to 66 seconds.



unknown Lake Mary, Florida, outfit. Although Kinetics does everything itself—from designing and manufacturing its own machines, to servicing them in the field—it is tiny. Last year, tens of millions of airline customers checked themselves in on machines that were designed, produced, and supported by just 67 employees.

But the impact of Kinetics and its kiosks isn't as obvious or as scary as the sensationalist headline those numbers might suggest—"67-Person Company Puts Thousands of Airline Employees Out of Work!" True, airlines have been shedding jobs in the past few years, but that's largely due to industry woes that have nothing to do with automation. And it's unlikely that these machines will mean the end of ticket agents, rental-car clerks, or the front-desk staff at hotels. Instead, those jobs will change—and eventually, there may be more of them, not fewer, because

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of self-service. That seems counterintuitive, but employment has actually grown in other service businesses that have been automated. At the dawn of the self-service banking age in 1985, for example, the United States had 60,000 automated teller machines and 485,000 bank tellers. In 2002, the United States had 352,000 ATMs—and 527,000 bank tellers. ATMs notwithstanding, banks do a lot more than they used to and have a lot more branches than they used to.

Instead, the story of Kinetics offers a glimpse of the continued power of computers, automation, and the Internet to transform our lives as both workers and consumers—a power that, far from having plateaued, is only just getting started. Information technology hasn't touched lots of things that are just waiting to be automated, computerized, or kiosked. That they will be automated seems inevitable. But the results aren't so clear. Will all these smart machines create more jobs and free workers to tackle more rewarding, more complex tasks? Or will we gradually see the disappearance of a whole category of frontline workers? Will kiosks leave customers feeling well cared for and more closely linked to the businesses that use them, or frustrated and trapped in a real-world version of voice-mail hell? The answers have a lot more to do with how a company uses such machines than with the technology itself.

Kinetics, which delivered its first machines to Alaska Airlines in 1996, has transformed a kludgy, aggravating part of the air-travel experience that has long resisted improvement. In December, 70.3% of Northwest Airlines' passengers checked themselves in for their flights, the majority using Kinetics' kiosks, the rest online, a function made possible by Kinetics' software. That's up from 50% in May and 20% in 2001.

Entering an arena dominated by muscular global players such as NCR, Diebold, Siemens, and IBM, Kinetics has consistently beaten the giants in head-to-head competition for business. Kinetics' technology is running not just the self-check-in machines of Alaska, Continental, Delta, and Northwest, but also AirTran, Hawaiian, and Frontier. In March, Kinetics won the business of United Airlines, which had been using IBM. United plans to begin installing Kinet-

ics' machines immediately. The company's software makes possible the newer Internet check-in process for many airlines; it runs the ticket-issuing system for Orbitz; and, along with its hardware, is spreading to gates at many airports to speed boarding.

Unlike many information-age companies, there is nothing virtual about Kinetics. The company takes pride in doing everything: Employees write the software, design the hardware, and staff a storefront factory in Lake Mary. A field group of 12 technicians keeps the airport kiosks running at what Continental says is 99.5% reliability. And CEO, president, and founder David Melnik says privately held Kinetics is profitable and has been so almost since its first contract. "Companies multiples of our size don't have the impact on culture and business that we do," he says. "That's a pretty radical thing. I think it's pretty cool."

At Continental Airlines, 66% of U.S. passengers check themselves in at Kinetics kiosks. "We never thought it would go above 25%," says Scott O'Leary, Continental's senior manager in charge of airport self-service for passengers. As for the lines that used to bedevil even business travelers, says O'Leary, "We are essentially queueless." And once customers are standing at a kiosk, he says, "the mean check-in time is 66 seconds. For customers with no bags, it's 30 seconds." At big airports, your plane is more likely to stand in line to take off than you are to check in.

SELF-SERVICE HAS BEGUN TO POP up in so many places—photo-processing kiosks in drugstores, self-testing kiosks to renew driver's licenses, automated toll payment—that the technology has quickly gone from novel to unremarkable. But self-service often feels like the opposite of service, or it feels as if the customer has been made an involuntary, unpaid worker. Whatever the efficiency of pumping your own gas, doing so doesn't make the experience of filling your tank any better; depending on the weather, doing it yourself is often downright unpleasant.

But here's something every airline passenger knows: Kinetics' machines actually improve the task they automate. They don't just make the experience quicker, they make it better. Jeffrey Lammers, who used to design nuclear weapons and until February was Kinetics' head of hardware engineering, says, "You won't find anyone who flies a lot who won't just hug these machines."

The self-service kiosk shows you a seat map of the plane you're boarding—you see where your seat is, you see what seats are still open, and you're free to pick one you like better. And only you know that after your first choice—aisle, far forward, but not bulkhead—and your second choice—window, far forward, but not bulkhead—your third choice is any row where there's an empty middle seat. Except not farther back than row 20, because you don't want to wait 15 minutes to get off the plane. And then there's your fourth, fifth, and sixth choice. No ticket agent has the patience to walk through this with any passenger, let alone every passenger. The kiosk handles it in seconds. And it can be programmed



to operate in 12 languages. “It’s the end of the ‘veil of secrecy’ at check-in,” says Continental’s O’Leary. “It’s a quick, informative check-in, instead of standing in line for customer service.” When this kind of automation is done right, Kinetics’ CEO Melnik says, “People don’t perceive it as technology, they perceive it as an enabler in their life.”

Melnik, 39, is one of those smart, restless souls who stumble into entrepreneurship because it makes so much more sense than working for companies that are too big, too slow, and too hesitant. A college dropout whose real passion is marine biology (for a while, he performed as “Flipper Boy,” cavorting with dolphins at the Miami Seaquarium), he started the company that became Kinetics in 1988 after working as a sales agent for a Tampa travel agency. The experience of selling and delivering airline tickets to small businesses got him wondering why those tickets couldn’t be handled more like money in ATMs and less like a special product that had to be “produced” at a travel agency. “I got interested in this, and it hooked me,” he says.

Melnik worked with NCR on several projects, including plans to bring an early kiosk to the Trump Shuttle in New York’s LaGuardia Airport. He worked with Siemens on a project for Lufthansa. He also worked as a waiter, accepted startup funding from his mother-in-law, and lived for several years off the teacher’s salary of his wife, Cindy. He can write software, and he can “bend metal” to make kiosks.

It took nearly eight years of persistence for the technology, the airline mind-set, and the customers to catch up with Melnik’s vision. He sold Alaska Airlines on those first machines, called Orcas, using a cardboard mock-up.

How this kind of simple but powerful self-service technology ripples through businesses and the economy always looks easier to predict than it is. The first passenger elevator in the world, created by Elisha Otis, was installed in a New York department store in 1857; it wasn’t until 1950—nearly a century later—that the Otis Elevator Co. came up with the technology for self-service elevators. In 1955, 500,000 people in the United States were working as elevator operators, jobs that were almost all gone less than 10 years later.

But as it turns out, the impact of even the most pervasive self-service, on productivity and on customers, is easy to misinterpret. Kinetics’ machines improve the productivity of airline ticket agents—

Last year, 75 million airline passengers checked themselves in on machines that were designed, built, and supported by Kinetics’ 67 employees.



## So You Want to Hire a Robot: The Dos and Don’ts of Self-Service Automation

**T**here are many reasons Kinetics’ self-service check-in machines have swept through the nation’s airports in just the last three years. Americans are much more comfortable with computers than they were even five years ago. And the airlines desperately needed a more effective and efficient way of getting passengers through airports. But Kinetics also thinks about self-service in ways that have made its kiosks particularly appealing—to both passengers and airlines. Its principles of self-service design could be effective in all kinds of settings.

- **Automate to simplify, not to be cute.** From vending machines to ATMs, the key is to automate a task that already needs to be done, not to invent a task and then provide a computer to do it. In both airports and fast-food restaurants, kiosks provide a service that customers already need. And they do it with a complete lack of self-aggrandizing flourish. It’s not about the technology, it’s about the task.

- **Bite off less than you can chew.** The first versions of Kinetics’ machines in airports didn’t allow customers to upgrade to first class or go on standby for a different flight. Kinetics gave customers a chance to learn the system, and to develop confidence in a new technology, before adding layers of complexity. Now airport machines offer upgrades and alternate flights, and some airlines even use them to automatically rebook passengers when there are weather or equipment delays.

- **Use automation to improve the task at hand.** Airport kiosks change the experience of checking in by showing passengers a map of the airplane, where they are sitting, and where there are open seats. They make checking in not just faster, but better. McDonald’s customers who use a Kinetics kiosk to place their orders have absolute confidence that the “no onions” request has been made. In both cases, kiosks provide not just convenience but a sense of power and control.

- **Remember, automation doesn’t mean standardization.** With each of its airline clients, Kinetics sits down with a fresh sheet of paper. It tries to understand the priorities of each airline independently, in order to craft a self-service experience that matches the airline’s needs. For airlines that carry mostly business fliers, passengers are offered the first-class upgrade option quickly; for airlines carrying mostly tourists, the “How many bags are you checking?” screen may come sooner. Part of self-service is paying attention to how many different selves you might be serving.



waiting to take bags and issue boarding passes; but many airlines have that many check-in terminals in individual airports.

At Continental, O'Leary acknowledges that the airline is using Kinetics' technology to grow traffic without adding staff and costs. "It's absolutely true that before self-service, we were adding staff and [airport] real estate like you wouldn't believe," he says. "Once you have self-service deployed, you can absolutely contain those costs. But we still argue we are getting better productivity and service out of our existing agents."

Customers who use the kiosks at this Florida McDonald's typically spend 30% more per order. Maybe it's because the machines don't snicker when you upsize the fries.

O'Leary is sensitive to the perception—from both staff and passengers—that Kinetics' kiosks take jobs. But he argues that they're really just eliminating tedious, repetitive work and freeing agents to deliver real customer service to passengers who don't like the machines, or have more complicated issues. "My

but not by allowing the ticket agents to do more work, more quickly. They allow the ticket agents to preside over more work being done—in this case, by the customers. And it may be this sort of productivity improvement that helps make possible the "jobless recovery," in which companies manage to grow without hiring new employees or without recalling those who have been laid off.

Indeed, when you use a self-check-in machine, you can't help but wonder about the thousands of airline employees who have lost their jobs since September 11. Last year, Northwest flew 12% fewer passengers than in 2000. But it did so with 25% fewer employees. If Delta had been staffed in 2003 the way it was in 2000, it would have employed 2,500 more people. Since the end of 2000, Kinetics' three biggest customers—Delta, Northwest, and Continental—have shed some 37,000 employees, enough people to run all of Northwest today.

Of course, the airlines are a complicated case—their business was out of whack before the September 11 attacks, and the attacks hit the airline business harder than any other. But even where the impact of such machines looks obvious, labor tends to squirt around the economy in unpredictable, even counterintuitive, ways. Although Continental now has 780 kiosks in 130 airports, with the machines handling the vast majority of passengers, the airline has reduced the number of airport agents by only 4% since September 11.

Melnik likes to say that each Kinetics self-check-in machine, at an initial cost of between \$6,000 and \$10,000, takes the place of two-and-a-half ticket agents, because the machine is available (at least) from 6 a.m. to 9 p.m., seven days a week—or about the number of hours that many agents would work. But that both understates and overstates the machines' impact.

Kinetics has installed 3,800 self-check-in machines for airlines—but 9,500 ticket agents have not lost their jobs. At the same time, at airports in Atlanta and Houston, where there are banks of dozens of check-in machines, the kiosks handle surges of passengers easily and quickly. No airline can have 50 or 100 ticket agents



CEO David Melnik struggled for eight years to get Kinetics off the ground, working as a waiter, borrowing from his mother-in-law, and living on his wife's salary.

position has evolved," he says. "Watching anyone do clerical transactions over and over again just looks like wasted time. Having [a ticket agent] punch the same combination of 122 keys over and over and over again—that's just wasted effort in the 21st century. It's not the society I think of as productive."

HERE'S HOW PERSUASIVE THE self-service machines were to Gary and Kim Moulton, who own the McDonald's at the intersection of Interstate 4 and Highway 27 in central Florida, and five more McDonald's in that area. The day in early 2002 when the very first machine was delivered and hooked up, the Moultons ordered nine more. "I said, 'Tell us when you can install the rest of them,'" says Gary.

For the Moultons, the self-service ordering machines have been one surprise after another. "The first surprise was, the first day it

went in, customers said to us, 'It's not just fast, it's not just accurate—this is fun!' " says Kim. One college girl was so amazed by the machines, she ran up and hugged Gary. "She said, 'Thank you, this is the greatest,' " he recalls, still amazed at the reaction. (The Moultons' favorite customer response comes at their highway store, from tourists: "We don't have these up north.")

The Moultons expected the kiosks to handle 25%, maybe 30% of their volume; the average across all six stores after two years is 45%, and at a couple of them, more than 50% of customers order themselves. People routinely stand in line for the kiosks, even when the counter is clear, with people ready to take orders.

These machines are the work of Todd Liebman, who started a company called Quick Kiosk, which he sold to Kinetics last year. Liebman is now head of a Kinetics division targeting "quick serv-

ice" restaurants. Fast-food machines are both simpler and more complicated than the airline machines. They are simpler because they don't have to constantly and quickly access vital, secure databases such as passenger manifests. They are more complicated because even a McDonald's lunch menu offers many more choices than an airplane seat map. You can specify the elements of your burger—cheese, lettuce, ketchup, mayonnaise—in a range of choices from none to extra. Everything from breakfast to dessert has a picture.

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The machines have actually increased the Moultons' labor costs—in two ways. Volume overall is up so much that they have had to add kitchen staff to make more food. And the Moultons have added "kiosk representatives" to greet customers and help them with the machines. "We've basically had to add two people per store," says Gary. "One in the kitchen, one for the kiosks, and we haven't been able to take anyone off the front counters." But if labor costs have gone up, the Moultons' cost of labor as a percentage of sales has dropped. "We've outpaced the labor costs with the increase in sales," says Gary.

That's the double-reverse flip of the productivity improvement: The kiosks make everyone at the Moultons' restaurants so much more efficient—customers, kitchen staff, counter staff (who still take all cash payments and deliver everyone's food)—that the Moultons have used the machines to increase their payroll. During the breakfast and lunch rushes, the kiosks give the Moultons all kinds of headroom to keep customers flowing and lines down.

In fact, unlike the airport, where you've already picked your airline before you face check-in lines, the kiosks in a McDonald's can quickly increase business. One of the key factors in picking a fast-food lunch spot is the wait. The front counter is a choke point. "I had a customer come up to me in one of our city stores recently," says Gary. "She said, 'I love these kiosks, but it sure is hurting your business, because there are no lines at lunch anymore!'"

The final surprise is that customers who use the kiosks spend more money. Because the Moultons' volumes are so high, and have remained that way for so long, they know this is not some quirk of self-selection. On average, customers who use the machines

spend \$1 more per check. "With the size of our typical order, that's a 30% increase," says Gary. "That's huge."

The Moultons have a couple of ideas to explain why kiosk checks are bigger. The color kiosk screens are a great sales tool—you can put the new McDonald's premium salads right in the center: 20% of customers who initially don't order a drink and are offered one (with a picture) buy it. Then there's the embarrassment factor. A substantial customer might be reluctant to upsize the fries, or order two Big Macs, or an extra apple pie, from a counter person. The kiosk can't snicker, even to itself.

In some ways, the job issues are less stark at fast-food restaurants than at airline ticket counters. "You are always going to need a substantial number of people to run a McDonald's," says Liebman. "You aren't going to automate the cooking of the food,

you aren't going to automate the delivery of the food, not any time soon." The McDonald's kiosks take payment by credit card; for cash, in terms of speed, it's still much quicker to have a customer step to the counter and hand over money to a person than feed bills and coins into a machine. And although it's easy to lament the steady erosion of personal contact in commerce, McDonald's is rarely the source of richly satisfying service encounters.

Kinetics CEO Melnik has been working on travel kiosks for more than 10 years and sees the kiosk business as a graveyard of silly ideas. "We are an industry built on failures," he says. "People are enamored with kiosks. There are kiosks all over the place that no one uses: kiosks at the mall for shopping, kiosks for community information, kiosks for job listings."

Kinetics has been successful, Melnik says, because it isn't trying to trick-up an ordinary experience with a "multimedia experience." "We focus on transactions that already exist," he says, and he wants machines that make those transactions steadily simpler. "I think that 10 years from now, serving yourself will be the default, versus now, where it's the exception," he says.

And when you raise your eyes from the airline business—where Kinetics has had a dramatic impact while selling 1,341 machines in 2003, manufacturing an average of just 5 a day—the market size, and the potential for transformation, is stunning. Kinetics is already talking to rental-car, cruise-ship, movie-theater, and hotel companies. The fast-food business alone could keep Kinetics busy for years. The top five fast-food chains by revenue—McDonald's, Burger King, Wendy's, Taco Bell, and Subway—have 48,000 restaurants in the United States.

It's easy to envision the typical fast-food restaurant installing a couple of kiosks inside. But for impact, the real key is the drive-through lane, where a Kinetics touch-screen kiosk, mounted on a pole and weatherproofed, could solve a problem that has confounded engineers for 40 years: our inability to be heard through the drive-through speaker when we shout, "No mustard!"

*Charles Fishman (cfish@mindspring.com), a FAST COMPANY senior writer, takes his airline seats aisle, far forward and his burgers with no mayo.*

**Here's the double-reverse flip of productivity improvement:  
The kiosks have increased sales at McDonald's so much that the  
owners have had to add two more employees in each store.**