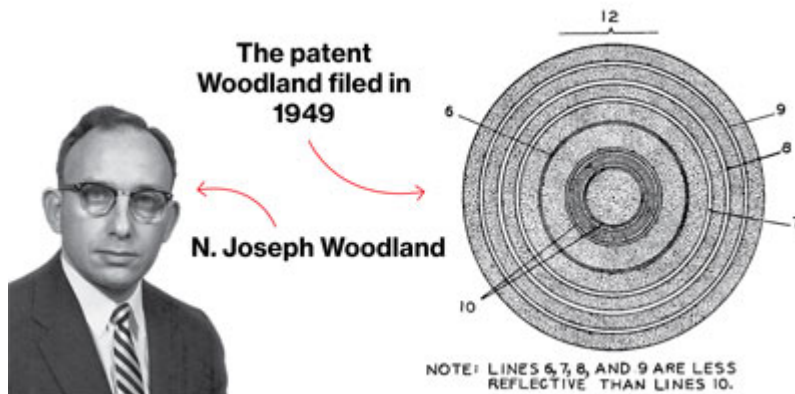


How the Bar Code Took Over the World

In 1948 a supermarket executive came to the Drexel Institute of Technology in Philadelphia with a request. He wanted a technology that could encode information about his products. Two graduate students, Bernard Silver and N. Joseph Woodland, took up the challenge. Woodland became obsessed and dropped out of school to concentrate on it. That winter he was sitting on Miami Beach, dragging his fingers in the sand, when he had an idea for a series of lines of different widths that functioned like elongated versions of the dots and dashes of Morse Code—in other words, a bar code.

Woodland died on Dec. 9, but his invention is so successful that it's almost invisible. Cereal boxes, soup cans, books, and magazines all have universal product codes. Anything you buy in a supermarket or department store does, too. Companies like Amazon.com (AMZN) use multiple bar codes to track packages. They're so common we barely even recognize them as technology.

Story: This Holiday Season, Shop by Voice From Your Smartphone



Family/AP Image

Photograph by The Woodland

The bar code started as one option among many. So what enabled it to take over the world? And how might today's emerging technologies achieve similar dominance? Like other successful standards, it had three ingredients, all essential—but, on their own, not sufficient.

1. Simplicity and reliability that overcomes habit. “First of all, they have to work,” says Henry Petroski, an engineer and historian at Duke University. “The bar code is very reliable, and a lot of work went into that.” Until the late 1970s, every clerk in every supermarket in America tapped numbers onto a register keypad. The process was rife with errors, yet it was the way retail functioned. Only a simple technology with obvious benefits could overcome that inertia.

2. A governing body to establish standards. If every supermarket and potato chip maker had chosen its own product-information technology, chaos would have ensued. Instead, a consortium of retailers and manufacturers got together and chose the UPC, IBM's (IBM) barcode system that Woodland, who had gone to work there, helped develop.

Story: Amazon's Holiday Run Helps Put UPS in Prime Position

3. An extravagant, surprising, and often expensive effort to seed the market. The classic example happened with credit cards: the Fresno Drop of 1958. Back then, only the wealthy had credit cards. As Joe Nocera recounts in his book *A Piece of the Action: How the Middle Class Joined the Money Class*, a manager at Bank of America (BAC) realized that the only way people would stop relying on cash and use cards was if everyone they knew did as well. He had cards sent to every home in Fresno—60,000 in all. The move worked. For UPCs, the seeding of the market followed the rise of Wal-Mart Stores (WMT), which used the codes to create its legendarily efficient distribution system.

There's a fourth ingredient that doesn't hurt: openness. Allowing everyone to build their own version of a technology can speed adoption. Bill Gurley, a partner at Benchmark, argues that Google (GOOG) was able to persuade Asian phonemakers to adopt its Android mobile operating system by creating an open-source version they could alter if they wanted to. "It gave them comfort that there was an out," he says.

In the decades after the Fresno Drop and Woodland's epiphany on the beach, many battles have brewed over competing technologies. One of the biggest today is over mobile payments. Consumers spend trillions of dollars around the world using credit cards. Google, Apple (AAPL), banks, credit-card companies, and others are scrambling to come up with ways to get a piece of that action.

Video: Exclusive Look Inside Amazon's Ultra-Fast Warehouse

One of the more interesting competitors is Square, a startup in San Francisco launched by Twitter co-founder Jack Dorsey. To gain wide adoption, technologies such as Square's face similar challenges to those that the UPC did.

So let's look at the ingredients. Simplicity? Check. Square has developed a small plastic device that plugs into an iPhone or iPad to allow customers to swipe their credit cards. It also has an app that enables purchases by smartphone. A splashy move to dominate the market? Check. Last month Starbucks (SBUX) began using Square's technology in 7,000 U.S. locations. Strong consortium or governing body? Not yet. There's still a tangle of competing alliances. So for now, Square has only two out of the three ingredients, and a long way to go to become as enduring as Woodland's big idea.

Source:bloomberg