

RFID and Productivity Growth:

# Behind the Economic Statistics



Companies using radio frequency identification to automatically track and manage assets are lowering costs, increasing revenue, and improving customer satisfaction and employee morale.

BY BARB FREDA

How productive is your organization? Can you produce more goods and generate more sales with fewer costs, resources and labor—in less time, with fewer errors?

That has been the goal of many businesses since the Industrial Revolution. More recently, technology innovations were expected to deliver big productivity gains. But according to a U.S. Bureau of Labor Statistics report released in June, productivity growth, which measures output (revenue and inventory) per unit of input (labor and capital), is basically flat across the economy. The Conference



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Board, a global business membership and research association, reported in May that it sees modest global economic growth for the remainder of 2016 with little upside for 2017.

Yet, for several years, RFID Journal has been reporting that companies in health care, manufacturing, retail and other sectors that have adopted RFID have been achieving outstanding gains in productivity. Why the discrepancy?

It seems broad economic statistics show just part of the story. First, economists say, there is the “lag” effect—it takes time for new technologies to be harnessed, and RFID is still considered an emerging technology. Erik Brynjolfsson, director of the MIT Initiative on the Digital Economy and co-author with Andrew McAfee of *The Second Machine Age: Work, Progress, and Prosperity in the Time of Brilliant Technologies* (2014), coined the term “productivity paradox” to explain the lag between the introduction of new technology and the implementation that makes productive use of the technical changes.

Robert Gordon, professor of economics at Northwestern University and author of *The Rise and Fall of American Growth* (2016), says there is plenty of innovation and technical change, but it is having very little impact on the economy at large. “Most of the economy operates much the way it did years ago,” he says. “My emphasis is on how gradual the change is, how our economy is like an ocean liner taking a long time to turn.” Gordon acknowledges that a technology such as RFID will improve productivity, because it improves inventory management without hand counts.

Second, economists aren’t looking at individual technologies such as RFID when they discuss broad gains and losses in productivity, says Ygal Bendavid, a professor in the department of management and technology at the Université du Québec à Montréal. “RFID is a data-capture technology. Economists look at composite indicators too large to discriminate the RFID role,” he says. “They are missing the big changes at this level.”

Sanjay Sarma, VP for open learning at MIT and co-founder of the Auto-ID Center, says it is a matter of scale—with so much innovation,

productivity growth is difficult to measure. The noise of other variables must be stripped away, he says. When you do that, and look at just one technology such as RFID, it is much easier to see the benefits and real growth.

Economists who are pessimistic regarding the impact of technology on productivity “don’t understand retail that much,” says Bill Hardgrave, dean of Auburn University’s Harbert College of Business and founder of the RFID Lab. “RFID presents opportunities to squeeze efficiencies out of the way we do retail, with less handling of product, a reduction of logistics and better ways to handle counting.”

To understand how RFID delivers productivity gains today, Hardgrave suggests using the basic accounting approach, in which you consider direct and indirect benefits. “The beauty of the basic accounting approach,” he says, “is that everything eventually manifests itself in either a variable cost, a fixed cost or revenue.”

## Direct Benefits

Direct benefits from RFID include lower variable costs to businesses (labor reduction, lower picking costs, and lower transportation and supply-chain costs) and increased revenue, Hardgrave says. In retail, RFID can improve inventory accuracy and reduce out-of-stocks, but those are not the direct benefits. In terms of productivity gains, they enable increased sales, fewer cycle counts and faster inventory counts, he says. The time made available by those efficiencies leads to time for employees to sell more or produce more, he adds.

In manufacturing, improving operations can result in lower variable costs, such as more efficient labor use and holding less inventory, Hardgrave says. “Improved output from manufacturing means higher output per employee,” he says, “which means less variable cost per unit, which means higher margins.”

Here is a sampling of the companies RFID Journal has profiled that have achieved direct productivity benefits from employing RFID.

American Woodmark, which manufactures and distributes kitchen cabinets and vanities, deployed an RFID solution to track cabinet

doors and drawer fronts. The company reports that the initiative reduced the labor for cycle counting by 66 percent, while supporting additional counts when errors are discovered. More importantly, count accuracy has improved from roughly 80 percent to 100 percent. “The system has helped us become far more competitive, cost-efficient and profitable,” says David Johnson, American Woodmark’s materials technology and product manager.

Delta Air Lines is employing RFID to improve the visibility of oxygen generators installed within its aircraft, and thereby reduce the amount of waste associated with discarded generators, as well as the time required to check the devices’ expiration dates. It used to take approximately eight man-hours to check expiration dates on oxygen generators aboard a 757. With its RFIDAeroCheck solution, it now takes 45 seconds to complete the check on a twin-aisle aircraft.

Bell Helicopter, a civil and military aircraft manufacturer, has brought its on-time delivery of parts used during the production of helicopters to 99.81 percent since installing an RFID solution to track the internal movements of parts and containers in 2011. Bell Helicopter estimates it recouped its investment within a year, according to Aaron Druyvesteyn, the firm’s manager of logistics. The financial return comes from reducing the number of labor hours employees spend searching for missing parts, as well as performing associated stock adjustments. In addition, the high traceability of parts has dramatically reduced the potential for disruptions to the production schedule.

Decathlon, the French sporting goods retailer, is RFID-tracking most products throughout its supply chain—from factories to warehouses to stores. Today, RFID is improving efficiencies in all Decathlon facilities—1,030 stores and 43 warehouses. The retailer, which began a global rollout in 2013, saw an 11 percent increase in sales from July 2014 to July 2015, and the company attributes part of that growth to the RFID deployment. In addition to increasing product availability on store shelves, the RFID solution decreased product shrinkage by 9 percent in 2014.

Hospitals worldwide that have adopted RFID real-time location solutions to track equipment have been able to reduce the number of assets they buy or rent. The Medical University of South Carolina, for example, is using RFID to track and maintain 6,000 vital assets, including bladder scanners. The system ensures that the devices are available, clean and easy to locate whenever nurses or doctors need them. The solution also resulted in significant cost savings. Once the RFID system was in place, the hospital needed to purchase only 38 bladder scanners rather than the 100 originally requested—a savings of more than \$750,000.

Northwestern Memorial Hospital adopted an RFID solution to track and manage medical supplies. The facility has improved cost efficiencies by reducing product loss due to unused or expired items, and by ensuring patients are billed for the products used during their stay. “We caught \$4 million in charge costs over two years,” says Brian Stepien, who was director of supply-chain distribution and logistics at Northwestern Memorial HealthCare, parent company of the 900-bed teaching hospital in Chicago, during the RFID deployment. “That’s a really nice ROI, Stepien adds.

Bantrel, a Canadian subsidiary of U.S. construction giant Bechtel, deployed an RFID material-tracking solution to locate 70,000 parts during the construction of a multibillion-dollar tar-sands project in northern Canada. Bantrel estimates that the average time spent locating parts in the field decreased by two-thirds, from 15 minutes on average per part down to just five minutes. That’s time workers used more productively in other ways.

Cisco Systems developed an RFID solution to manage fixed assets in 70 U.S. data centers and R&D labs. The networking firm has slashed its cycle count time for conducting inventories from several weeks to just a few hours, reducing inventory labor and cost, says Maryanne Flynn, Cisco’s director of operations. The system has also reduced the audit cycle count for a typical-size lab from more than one week to less than two hours—a 95 percent improvement in the time it takes to comply with and supply reports for mandatory audits.



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## Indirect Benefits

Indirect productivity gains include customer satisfaction and employee morale, Hardgrave says. These benefits may be hard to measure, but they impact an organization’s reputation. In retail, for example, a customer frustrated by an out-of-stock situation just one time may never come back, he says. Once the sale is lost, the merchant may never see that customer again.

“Customer service is a great driver for RFID,” says Timothy Zimmerman, research VP at Gartner. “Those merchants who give customers satisfaction in finding an item and giving good service are the ones who complete the sale.”

Boosting employee morale helps companies maintain a productive workplace and reduce turnover rates. The costs of hiring a new employee include loss of work after someone leaves and before a new person is hired, advertising costs for the open position, training costs, and productivity loss while a new employee gets up to speed.

Decathlon’s main goal in adopting RFID was to improve customer satisfaction. The RFID solution has increased product availability on store shelves, which has had a direct impact on the customer experience and sales, says Jean-Marc Lieby, the retailer’s RFID project coordinator. “The first source of dissatisfaction of a customer is failing to find a product on the shelf,” he adds.

Macy’s rolled out its RFID inventory-management solution to all 850 Bloomingdale’s and Macy’s stores. RFID enables Macy’s to address changing shopping habits and become a successful omnichannel retailer. It’s meeting consumer demands for an anytime, anywhere shopping experience, whether in a store, on a mobile device, on a home computer or by phone. And that, in turn, let’s Macy’s better compete with online and brick-and-mortar retailers.

To improve customer service, Kuehne + Nagel, a global transportation and logistics firm, developed an RFID solution to monitor the temperature of sensitive pharmaceutical and health-care products in transit on a near-real-time basis. “There is an ever-increasing desire to know where a shipment is when it is

in transit and the physical conditions at any given moment,” says Jon Chapman, Kuehne + Nagel’s global pharmaceutical product manager. “There is a growing expectation that this information is available at the touch of a smartphone or tablet screen.”

Sunnybrook Health Sciences Centre, in Toronto, deployed an RFID solution that tracks surgery patients to reduce bottlenecks and keep family members and friends informed of the patient’s status. The solution also helped to foster more collegial relationships among peers in different surgical-related units, says Ellie Lee, business manager of Sunnybrook’s OR Information Management Services department. Hospital staff members working in surgical areas awaiting the transfer of surgical patients have better insight into what is happening elsewhere.

Ruby Memorial Hospital, largest of the West Virginia University hospitals, installed RFID-enabled cabinets to automatically track tagged tissue and medical devices. Error rates tracking products that were implanted in patients during procedures dropped from 3 percent to lower than 1 percent, says Kimberly Chevront, Ruby Memorial’s perioperative quality assurance coordinator. Waste fell from 10 percent to 8.9 percent over 24 months, with an increase in patient flow. In addition, nurses were freed from the time-consuming job of monitoring these items. “We want the nurses to be able to function as nurses and not wandering around trying to find product,” Chevront says. “The level of nursing satisfaction here is great, and you can’t put a price on that.”

At Lufthansa Technik, which overseas logistics and services for German airline Lufthansa, RFID has revolutionized the way in which employees work, as well as their attitude toward managing inventory items, says Kathrin Stromann, RFID project manager. The system, which has approximately a 97 percent accuracy rate, helped the company trim the amount of time it spends monitoring supplies by 80 percent. “In the past, nobody wanted to do the job,” she says. “Touching dirty, smelly and sticky containers was annoying.”

# RFID End-User Case-Study DVDs

RFID Journal has created a series of DVDs containing presentations by end users, recorded at various live and online events.

## UPDATED WITH NEW CASE STUDIES

RFID Journal holds several face-to-face conferences every year, as well as a number of online virtual events and webinars. These events feature end users speaking objectively about the business reasons that they deployed an RFID system, the technical hurdles they overcame in doing so and the benefits they now achieve as a result, as well as presentations by academics, vendors and other experts. Many of the sessions were recorded, and we have compiled these recordings into seven DVDs that are available for purchase for only \$99 or free with a one-year premium membership to RFID Journal.

Hear presentations from RFID Journal events, including:

- RFID in Health Care
- RFID in Energy
- RFID in Aerospace
- RFID in Manufacturing
- RFID in Retail and Apparel
- RFID in Supply Chain and Logistics



TO LEARN MORE, VISIT [www.rfidjournal.com/dvds](http://www.rfidjournal.com/dvds)



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Now, workers are reporting that they enjoy the task, she adds. “It has created a high-tech approach and a far more pleasant and desirable way to handle these items.”

## A Sea Change

Clearly, RFID enables companies in myriad industries to track and manage assets automatically, accurately and cost-effectively—and delivers big productivity gains. But it is the smart use of data that will power bigger and sustainable productivity growth. Businesses must understand the data they collect and have a plan to use that data to improve operations. “That data allows me to make a more intelligent decision for business productivity,” Gartner’s Zimmerman says.

Hardgrave is “bullish on data.” But, he admits, the amount of data RFID generates can be overwhelming. Companies don’t always know what questions to ask or what questions the data can answer. “If a company is not embracing the data and trying to understand the data, it is at a disadvantage,” he says. “They need to know how to process the data and how to make decisions about the data. They have to harness the data in ways others are not. Going forward, data will be the way a company creates or maintains a competitive advantage, and if they don’t do that, they are going to be in trouble.”

Companies must learn how to use all the data they collect to identify trends, Sarma says, adding that trends don’t just leap off the computer screen. Once trends are identified, he says, companies need to understand what they mean. Then, he says, organizations can implement or adjust systems or operations to take advantage of the trends, with expected increases in sales and/or productivity.

Sarma notes that now is the time for companies to take stock of the data at hand and make decisions about how to move forward and remain competitive. “They will hire employees who are innovative, people who can give insights and look for patterns,” he says. “The implication is that for society as a whole, as automation and technology increase, we are moving to an innovation economy. If you don’t

innovate, productivity growth passes you by.”

Productivity growth also will be impacted by use—both an increase in the number of companies adopting RFID and an increase in the way firms that have deployed the technology put it to work. “Some analysts’ numbers suggest that only about five percent of retail inventory utilizes RFID, and I think that is probably accurate,” Hardgrave says. “We have a long way to go. We are just seeing the tip of the iceberg here.”

Lower costs are opening the door for more companies to adopt RFID. “When tags were 60 to 80 cents each, the business case to use passive UHF technology was more difficult,” Zimmerman says. “But now, less expensive tags are available, and in some cases it is cheaper for a source manufacturer who may be providing products to multiple clients to put tags on every item, rather than separate it out and run two lines. Now, the tags [in these cases] are available at zero cost to retailers or others in the supply chain.” When supply-chain partners receive tagged assets, he says, it encourages them to use the technology to optimize processes.

“RFID is a technology such that the more you use it, the more efficiencies you gain,” Hardgrave says. “For the retailer, in particular, much of the cost of RFID is in infrastructure. Once in place, the infrastructure ROI improves with every tagged item. If you install a dock door RFID reader, for example, it costs the same to read 100 tags as it does 100,000 million tags.” Higher volumes result in quicker payback, he says, and increased sales, which come with the new RFID efficiencies, will be sustained moving forward with no additional resources. Also sustainable are the lower inventory held and reduced shipping costs (since fewer items are being shipped).

“Early innovators in RFID who began with inventory management are now seeing some really novel ways to create efficiencies and improve customer experiences,” Hardgrave says. “We will see even more.”

It may take several more years for RFID to impact economic statistics, but there is certainly opportunity for businesses in any industry to achieve productivity gains today. ■