



WHEN YOUR SCALE AND FRIDGE CONSPIRE TO MAKE YOU LOSE WEIGHT, TECH WILL HAVE GONE TOO FAR!

By Vivek Wadhwa

Your toaster will soon talk to your toothbrush and your bathroom scale. They will all have a direct line to your car and to the health sensors in your smartphone. I have no idea what they will think of us or what they will gossip about, but our devices will be soon be sharing information about us with each other and with the companies that make or support them.

It's called the Internet of Things, a fancy name for the sensors embedded in our commonly-used appliances and electronic devices, which will be connected to each other via WiFi, Bluetooth, or mobile-phone technology. They will have computers in them to analyze the data that they gather and will upload this via the Internet to central storage facilities managed by technology companies. Just as our TVs are getting smarter with the ability to stream Netflix shows, make Skype calls, and respond to our gestures, our devices will have increasingly-sophisticated computers embedded in them for more and more purposes.

The Nest Learning Thermostat already monitors its users' daily movements and optimizes the temperature in their homes. It reduces energy bills and makes their houses more comfortable. Technology companies say they will use the Internet of Things in the same way: to improve our energy usage, health, security, lifestyle, and habits.

Well, that is what they claim. In reality, companies such as Apple and Google want to learn all they can about us so that they can market more products and services to us—and sell our data to others. Google Search, Gmail, and Apple Maps monitor our lives for that purpose but are free and very helpful, and the new features on our devices will be inexpensive and useful. They will tell us when we need to order more milk, take our medicine, rethink having that extra slice of cheesecake, and take the dog for a walk. It's a Faustian bargain, but one that most of us will readily make.

The ability to collect such data will have a profound effect on the economy. McKinsey Global Institute, in

a new report, *The Internet of Things: Mapping the Value Beyond the Hype*, says that the economic impact of the Internet of Things could be \$3.9 to \$11.1 trillion per year by 2025 or 11 percent of the global economy. It will reach far beyond our homes and create value through productivity improvements, time savings, and improved asset utilization. It will monitor machines on the factory floor, the progress of ships at sea, and traffic patterns in cities in hopes of increasing economic value due to reductions in disease, accidents, and deaths. It will monitor the natural world, people, and animals.

As CLSA analyst Ed Maguire explains it, when manufacturers connect their products, they gain insights into the distribution chain, into usage patterns, and into how to create iterative products. Turning electronic products into software-controlled machines makes possible continuous improvements both to the machines and to the business models for using them. The constant improvement in features that we see in

our smartphones will become common on our other devices. Maguire says that companies will be able to “offer an experience or utility as a service that previously had to be purchased as a physical good.”

Everything will be connected including cars, street lighting, jet engines, medical scanners, and household appliances. Rather than throwing appliances away when a new model comes out, we will just download new features. That is how the Tesla electric cars already work; they get software updates every few weeks that provide new features. Tesla’s latest software upgrades are enabling the cars to begin to drive themselves.

However, the existence of all these sensors will create many new challenges. Businesses have not yet figured out how to use the data they already have. According to McKinsey, for example, oil rigs have as many as 30,000 sensors, but their owners examine only one percent of the data they collect. The data they do use mostly concern anomaly detection and control, not optimization and prediction, which would offer the greatest value.

Companies are also reluctant to change their business models, which they would need to do in order to offer better experiences and new methods of pricing. Sensor data will tell product manufacturers how much their products are used and will allow them to charge by usage. They will be able to bundle product upgrades and new services into usage charges. That will mean accepting payment retrospectively rather than in advance and will require them to build business operations that focus on data and software with new organizational structures, so they will be reluctant to change. Creative new start-ups will take advantage of technology advances and put incumbents out of business. Note how Uber is using the technologies in our smartphones to disrupt the taxi industry. That is a prelude of things to come.

My greatest concern in all this is the loss of privacy and confidentiality. Cameras are already recording our every move in city streets, in office buildings, and in shopping malls. Our newly-talkative devices will keep track of everything we do, and our cars will know everywhere we have been. Privacy will be dead, even within our homes.

My greatest concern in all this are the loss of privacy and confidentiality.
Our newly-talkative devices will keep track of everything we do, and our cars will know everywhere we have been.
Privacy will be dead, even within our homes.

Already, there are debates about whether Facebook and Instagram can and should be able to legally use our likes and the pictures we upload for marketing purposes. Google reads our e-mails and keeps track of what we watch on YouTube in order to deliver advertisements to us. Will we be happy for the manufacturers of our refrigerators to recommend new

flavors of ice cream, for our washing machines to suggest a brand of clothes to buy, or for our weighing machines to recommend new diet plans? They will have the data necessary for doing this just as the maker of your smart TV is learning what shows you watch. Will we be happy for criminals and governments to hack into our houses and learn even more about who we are and what we think?

I am not looking forward to having my bathroom scale tell my refrigerator not to order any more cheesecake, but know that it is an amazing—and scary—future that we are rapidly heading into. **N**

Vivek Wadhwa is an entrepreneur turned academic. He is a Visiting Scholar at UC-Berkeley, Director of Research for the Center for Entrepreneurship and Research Commercialization at Duke University, and Senior Research Associate for the Labor and Worklife Program at Harvard Law School.