

10 Unexpected Ways the Internet Of Things Will Open Up a Future of Opportunity

A common and popular vision of the Internet of Things—which I loosely define as the connection of billions of physical objects to the Internet through the use of low-cost sensors—is the example of an alarm clock smart enough to read your daily schedule, review the latest traffic and weather reports and then communicate this information to your coffee maker in such a way that you’ll be able to maximize your sleep while still getting to work on time with a piping hot cup of java in your hands. This vision of the future is entirely possible but it sells short the true potential of the Internet of Things (IoT).

A more comprehensive vision is one where a world of inexpensive sensors—embedded in your eating utensils, pajamas, mattress and home lighting system, etc.—work in concert to monitor and measure everything from your diet to your sleep behavior, and then use this information to modify your future actions in beneficial ways. For example, the system could tell you to reduce the amount of caffeine you consume after 6pm as well as train your bedroom lights to gradually increase their brightness the precise moment you come out of REM sleep.

The two scenarios might not seem that different but I’d argue that they are and the difference hints at the broader potential of the IoT. In the first example, sensors are collecting current information to modify present behavior. In the latter scenario, a myriad of sensors still collect information from present activities and actions but they now combine it with detailed records from your past behaviors to help shape a healthier, happier and more productive future. In other words, you’ll still get to work on time but in the future you’ll do it in a way that not only leaves you feeling refreshed for the day but healthier for the long term.

Here then are nine additional and unexpected ways the Internet of the Things may modify the future:

#1: A New Literacy for the 21st Century

For the better part of the past three decades, educators have rightly placed an increased emphasis on computer literacy. Due to the IoT, however, the tide will turn away from making humans “computer literate” and instead toward making technology more “human literate.” One of the acronyms sure to become more prominent in the future is “IfTTT”. It stands for If This Then That and it hints at how technology—with the help of sensors—will start getting out of our way and begin doing what we want. For example, if you leave your house then your lights will turn off, the air conditioner will be lowered, your pet’s food bowl filled, and the security system activated. The individuals, companies and corporations that facilitate this smarter future will be the ones to thrive and prosper. Put another way, if you

embrace how the IoT will create more triggers (the “ifs”) then you’ll appreciate how IfTTT can create more that’s—in the form of desired actions.

#2: A Plethora of New Business Models

The convergence of the Internet and social networking platforms have created a number of new businesses and business models in the “shared economy” space—think Airbnb, ZipCar and Uber—but the IoT will place this revolution into hyper-drive. Sensors on automobiles, lawnmowers, and in spare bedrooms will make it even easier for would-be consumers to know whether near-by products are available for rent. And soon—thanks to sensor-based indoor positioning systems such as iBeacon—it will become even easier for these micro-entrepreneurs to accept micropayments. Longer term, in a world where even your clothing is embedded with sensors, expect entrepreneurial fitness coaches to use the information to keep athletes and exercise enthusiasts physically engaged and motivated throughout the day. Also, insurance and healthcare companies may soon request the right to monitor your daily movements in exchange for the promise of lower insurance rates or health premiums—provided your activity level meets their thresholds for the discounted rates.

#3: A “Smarter” Transportation Debate

In legislative halls around the world countless elected officials, lobbyists and concerned citizens are debating whether governments should devote more public resources to the construction and maintenance of roads and bridges to facilitate an auto-centric vision of the future, or whether public resources should instead be allocated on buses and mass transit systems. This debate will continue to rage, but the IoT will enable a different—and smarter—discussion. In a world where automobiles are embedded with sensors and users have constant access to smartphones that can either easily locate people willing to share open seats in their cars (for the right price) or make their car available for rent for short periods of time, the number of people owning automobiles and overall usage may drop precipitously and negate the need for either more roads, buses or mass transit. In fact, in the not-too-distant future, many communities may find themselves “over-infrastructure” and begin to convert excess parking lots into green spaces.

#4: You Will Care More About the Little Things

Even if you know you should brush your teeth twice a day for two-minutes you probably don’t closely track this activity. When your toothbrush is smart enough to do this for you, the result may be different and you may adhere more closely to the proper regimen. Something similar could happen when your smart thermostat informs you that you keep the temperature in your apartment three degrees higher than your neighbors—and this behavior is costing you an extra \$58 a month during the winter. And when your fork and spoon become smarter? Well, let’s just say smaller and healthier portions may be in your future.

#5: Goodbye “Senior Moments,” Hello Increased Independence

As ever more sensors are embedded in mundane products such as carpets, shoes and jewelry, one of the more practical implications is that seniors will be able to live independently in their homes and apartments for longer periods of time. Instead of fearing that no one will come to their aid if they fall, they will grow increasingly confident that their environment will be smart enough to know when a problem has arisen and contact the appropriate people for assistance. The IoT may even detect signs of a future problem. (A “smart” shoe may, for example, detect a change in the wearer’s gait and understand this is a strong indication of a worsening hip condition and a potential fall). Moreover, as prescription medications, house keys, and ovens are connected to the IoT the number of “senior moments”—e.g. forgetting to take one’s daily medication, losing keys or not remember to turn off the stove—will dissipate.

#6: 85 Will Become the New 65 as Boomers Stave Off Aging

In 2012, the Food and Drug Administration approved the first “smart pill”—a tiny digestible device capable of monitoring and reporting on activity taking place inside the human body. In 2013, Qualcomm and Intel both announced major health care initiatives to take advantage of their computer chip processor technology for the purpose of detecting diseases earlier; and, in 2014, Google unveiled a smart contact lens capable of monitoring a diabetic’s glucose levels. All three developments point toward a future where people can monitor their health in such a way as to proactively prevent problems from ever occurring and, thus, stay healthier for longer periods of time. One company, in fact, is already exploring how the IoT could use sensors deployed in the body of a patient with a weak heart to send a “heart attack ringtone” to the user’s smartphone to warn him or her of an impending heart attack.

#7: Seeing Water and Carbon Everywhere

California and portions of Brazil are in the throes of severe droughts, and water restrictions and rationing are becoming commonplace. The droughts could be a harbinger of what may soon occur around the world as populations, economic development and climate change converge to place increased stress on the world’s already limited freshwater supply. One of the benefits of the IoT is that farmers, manufacturers, citizens and lawmakers alike will be able to more accurately monitor and measure things such as water usage and carbon dioxide output. Consider, for example, that it has been estimated that 1,800 gallons of water are necessary to produce a single pound of beef. With exports of meat from the U.S to China growing rapidly this implies the U.S. is “shipping” massive amounts of water to China—albeit disguised in the form of meat. As a result of the IoT’s ability to more precisely calculate this water usage—which many experts think the figure is much higher than 1800 gallons—policy makers may begin rethinking the wisdom of subsidizing meat exports. Alternatively, the true cost of water may more effectively be incorporated into the price of beef. On the home front, citizens may soon connect sensors on their sprinklers with sensors embedded in the soil in order to tell them the most opportune time to water their lawn.

They may even have those sensors access the latest local weather information to determine whether it is even necessary to water because they'll know if rain is coming soon. (Similar insights and actions will likely occur when sensors can detect the precise amount of carbon dioxide that power plants, agri-businesses, commercial buildings and automobile owners are contributing to the atmosphere.)

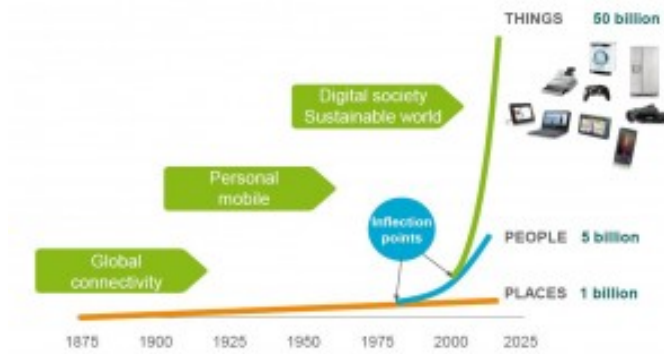
#8: Better Wine

For decades, selecting fine wines has been the purview of individuals such as Robert Parker, sommeliers and wine enthusiasts. Contrary to what these individuals may like you to believe their ability to determine which wines will be great tasting isn't that good. What has been demonstrated to be an effective indicator of future fine wines is accurate information about the rainfall and temperatures in which the harvested grapes were grown. In a world where sensors will soon be on nearly every vine, average consumers will not only know where to find the best tasting wines, they'll no longer have to guess whether that \$15 glass of chardonnay is really twice the value of the \$8 glass at their local bistro.

#9: Shorter Lines and No More Crying Over Spoiled Milk

Advances in Radio Frequency Identification (RFID) technology, near-field communication (NFC) technology, and other emerging platforms such as iBeacon are currently being used by innovative early adopters in the retail industry to allow consumers to pay for items directly from their smartphone. As these technologies improve and more retailers and consumers get comfortable with the technology, the well-known ritual of whipping out a credit card, sliding it through a payment terminal and signing a physical piece of paper will become as rare as finding a full service gas station. The short-term benefit: Shorter and faster moving lines at retail establishments. Mid-term, as the price of sensors and RFID chips continues to drop, and the devices are placed inside packaging, you can expect to stop wandering aimlessly through the grocery store in search of that obscure spice that a new recipe calls for because you'll be able to get in-store directions directly to the item. And longer term, when the sensor in your milk carton is smart enough to detect if the milk is running low or about to spoil it will simply place an order to an entrepreneurial new mobile milk delivery service and a new carton of milk, along with the rest of the items your automated grocery list, will be delivered before you even knew you needed it.

Such visions may seem far off, unlikely to occur or, perhaps, even undesirable. A good way to think about where the IoT is headed is to contemplate where GPS technology was at the turn of the century. In 2000, President Clinton signed an executive order allowing GPS data to be used for commercial purposes. At the time, the accuracy level wasn't very good and everyday uses—such as navigation systems capable of telling you turn right in 50 yards—seemed like science fiction. Today, such uses are commonplace and deeply valued by many users. Another way to consider the future of the IoT is to contemplate where artificial intelligence—in the form of technologies such as Apple's Siri or Google Now—were in 2012. Just two years after their introduction the technology has already become the equivalent of



an affordable personal assistant for many people, and it's getting smarter every day. (Expect by the end of the year for artificial intelligence to be able to book flight, hotel and rental car reservations for you). In this same way, we are now just in the early days of the Internet of Things and as it matures its new capabilities will be astonishing. Don't just expect to told

where to turn or when to book your flight, expect to have these actions taken for you before you even think or know to take them yourself.