Deloitte predicts that in 2015 one billion wireless Internet of Things (IoT) devices will be shipped, up 60 percent from 2014, and leading to an installed base of 2.8 billion devices. The IoT-specific hardware (which could be a more expensive cellular modem, or a much cheaper Wi-Fi chip) is likely to be worth $10 billion, and the associated services enabled by the devices worth about $70 billion. Services include all of the data plans that may be necessary to connect a device over a network, the professional services (consulting, implementation, or analyzing the data) and then things like an insurance policy discount for a telematics device in a car or a wearable device for health purposes.

IoT hardware and connectivity revenues are growing at about 10-20 percent annually, while the apps, analytics and services are growing even more rapidly at 40-50 percent. While the press may focus on consumers controlling their thermostats, lights and appliances (from washing machines to tea kettles), Deloitte predicts that 60 percent of all wireless IoT devices will be bought, paid for and used by enterprises and industries. And over 90 percent of the services revenue generated will be enterprise, not consumer.

The Internet of Things is also referred to as the Machine-to-Machine (M2M) market, and is often used interchangeably (see: A brief history of Internet of Things terminology).

A brief history of Internet of Things terminology

Many devices and sensors have been able to communicate with each other, normally through wires and using technologies such as SCADA (supervisory control and data acquisition). Occasionally they have been connected through wireless radio signals over certain broadcast frequencies. As cellular phone systems were rolled out in the 1980s at different frequencies, they generally transmitted voice conversations but not data for machines. As 3G was deployed from 2001, it became relatively easy to have a machine or sensor communicate over the now-data-friendly cellular network. Industry analysts needed to distinguish between the two types of traffic, so everything involving voice calls was put in one category, and every data-only device into another, called Machine-to-Machine or M2M. Over time, M2M became a broad category encompassing all telematics over cellular networks on trucks, smart utility meters, eReaders, tablets and PC modems, but not smartphones.

Even today, many M2M industry forecasts include eReaders, tablets and PC modems; but this seems inappropriate. Although there is the occasional automatic update or download, most of the traffic via these devices is human-initiated and human-observed; and they often use cellular for only some of the time, and Wi-Fi (or other short range wireless technologies such as Bluetooth, or ZigBee) for the majority of traffic. Finally, with the advent of Voice-over-IP technology, putting these three devices into a different category from smartphones is not helpful, nor is lumping them together with telematics, machines, or sensors. Following a 2014 Deloitte report on the IoT ecosystem, we are going to “focus more on ‘machines’ and less on ‘people’”, The Internet of Humans is an important topic, but a different one.

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Modern wireless technology, whether cellular or Wi-Fi, allows a consumer with a smartphone to perform multiple useful tasks remotely: from controlling appliances to home security, climate control and lighting. But Deloitte is forecasting that the total consumer demand in 2015 for this kind of solution will be 90 percent smaller than the enterprise market. Why?

In the consumer context, M2M usually solves only part of the problem. Turning a washing machine on remotely, being notified when the cycle is finished offers some level of convenience compared to pushing a button on a machine in the basement. But the clothes still need to be sorted, carried to the laundry room, pre-treated, placed in the machine and soap added. In other words, the portion of the task that M2M improves is trivial.\(^\text{11}\)

The cost saving from using an appliance during off-peak hours is real but minimal. Starting a clothes dryer in the evening rather than noon takes advantage of lower electricity rates where offered. But even if a dryer is used daily, this only saves about $50 per year.\(^\text{12}\)

Sometimes the cost is prohibitive: one connected home lighting kit, consisting of a controller and two bulbs, costs $150, with each additional bulb costing $60.\(^\text{13}\)

A connected living room lit up by six IoT bulbs would cost nearly $400; six halogen bulbs and a dimmer switch cost about $50.\(^\text{14}\)

Full IoT is sometimes overkill. For example opening a garage door or starting a car remotely is a binary on/off task. A simple radio remote control, costing about $40,\(^\text{15}\) accomplishes the same job at a fraction of the price.\(^\text{16}\)

Or the task that an M2M device may perform is ‘low touch:’ the majority of homeowners seldom change their climate settings, and their on/off patterns are predictable, as most of us have predictable routines. The conventional programmable thermostat is adequate for most homes, and is already installed, understood, and paid for. In addition, the ecosystem for connecting and controlling devices is highly fragmented, which limits opportunities for higher-value cross-application uses.

Finally, the powerful customization and data analysis that is possible through IoT is not of interest to most consumers: they are not looking for numbers, they are looking for insights. Even then, behavior is a limiting factor: humans are resistant to modifying their behavior to fit with systems; they prefer that systems adapt to meet their needs with minimal change in human behavior. As an example, an electrical utility installed smart meters in millions of homes, expecting that (among other benefits) consumers could look at an online dashboard of their monthly usage, and modify their behavior to save money and benefit the environment. Three years after the meters were deployed, about six percent of households had viewed the dashboard at all, and fewer than two percent had done so more than once.\(^\text{17}\)

So if consumers do not need them, should we bother installing M2M smart meters at all?

We should, because enterprises can benefit. For example, deploying smart meters in the UK has been estimated to generate annual savings of just over $40 per household, or $2 billion for households across the whole country.\(^\text{18}\) The electric utilities, the combined savings from the other benefits of IoT could be multiples of this amount. The savings from automated meter reading, short-circuit detection, and better real-time diagnosis/location of power outages comes to over a billion dollars annually, or about the same size as the aggregate consumer savings. But the most significant benefit comes from the analytics about consumer demand for power around peak power periods. This could save billions of dollars annually by obviating the need for between one and three new power plants, each of which could cost up to $37 billion.\(^\text{19}\) The total saving for the utilities could be five or even ten times as large as the savings for consumers.

As discussed earlier, the direct benefit to most consumers from remote control of their washing machines is likely to be marginal; but the value to the machine manufacturers is enormous, not just for the information about reliability and advance warning of when a failure is about to occur, but for real-time information on which features are actually being used and how. The insights revealed by this stream of data could be worth hundreds of dollars per machine over its life,\(^\text{20}\) recouping the cost of making IoT-enabled washing machine tens of times over.
In a real-world example, a manufacturer spent millions of dollars and several months building a low-energy automation feature that required customer opt-in. IoT data from users showed that less than one percent of customers actually used it; this prompted the company to change it to a self-learned energy management feature that deployed automatically, translating into customer cost-savings benefits.

Annual sales of cars with embedded telematics are expected to exceed 16 million units in 2015, but it is unclear how many consumers will actually use all those features. As one example, millions of cars have buttons to summon roadside assistance, but in an era of ubiquitous smartphones many drivers never use this service. But insurance companies have interest in the driving data, smartphones many drivers never use this service.

Sales of 22 million units including after-market are expected in 2015, and this is likely to save money from discounted insurance and reward safe driving.

Despite all the media excitement around consumer uses for the Internet of Things, most items are selling in their hundreds of thousands as connected devices, sensors or controllers; very few are selling in their millions. Meanwhile enterprises are buying and using tens or even hundreds of millions of IoT devices. Smart meters, smart grids, smart homes, smart cities and smart highways are just some examples. Factories, mHealth, shared transportation solutions (such as car and bike rentals) or resource industries can all benefit too.

Bottom Line

In 2014, the IoT analytics market is primarily descriptive ($800 million), a little bit of predictive ($180 million) and minimally prescriptive ($14 million). Over the next four years, while IoT analytics revenues of all three types is likely to grow by 500 percent, the prescriptive subset is likely to grow over 3,000 percent.

IoT vendors may want to extend cost-reduction and risk management deployments to explore revenue and innovation potential. Often, IoT is seen as a technology that is driven by the CIO. Since CIOs are not typically focused on revenue growth and innovation, providers who sell only to the CIO will usually revert to talking about lowering transaction and maintenance costs. Cost reduction is not bad, but it also is not enough and the potential for adoption and business value may be broadened by reaching out to CMOs, CFOs, major line managers, and even CEOs.

Growing IoT may mean focusing on product and/or customer lifecycle. The retail sector offers examples of how companies can benefit from using real-time data to move beyond transactions and understand their customers and products better. For example, a UK-based retailer used their loyalty club card to track customer visits, buying behavior, payment modes, and inventory. By paying close attention to customers (customer lifecycle) and product sales (product lifecycle), the retailer was able to adjust merchandise dynamically to suit local tastes, customize offers to customers, manage inventory volume based on demand/purchases, and plan inventory refresh as needed. The result? Sales, customer loyalty, and coupon redemption rates all increased.

We expect many firms to target early deployments to maximize impact. This seems counter-intuitive, since the power of IoT grows exponentially as the number of connected devices increases. But in the early days, enterprises may want to find the single biggest pain point or revenue opportunity, and roll out an inexpensive solution, such as a sensor network, which will simplify the ROI justification.

Connecting devices that were unconnected before creates opportunities, but also requires a fundamental shift in business model. A connected product is no longer just a product; it is a service. For example, a connected coffee machine is an insights tool for restocking and usage profiling to optimize coffee pods supply chain and increase customer lifetime value. However, connectivity also introduces new risks, and enterprises need to develop security that is both preventative and responsive in order to lower costs and increase operational efficiency.

Customers have concerns about privacy: what data is an enterprise collecting in M2M, and what are they doing with it? It will be important for companies to maximize transparency in order to enhance user trust: there will likely be a balance between perceived costs and benefits by customers, and the willingness to share information by consumers will vary by application.