The Internet of Things Is Here… So Now What?

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Agenda

What Is The Internet of Things?

How is IoT Impacting The Market Today?

How Do We Get From Smart Connected Things to Smart Systems?
The history of the term “Internet of Things”
What is all this stuff going on?

Smart Systems and the Internet of Things are driven by a combination of:

1. **SENSORS & ACTUATORS**
2. **CONNECTIVITY**
3. **PEOPLE & PROCESSES**
We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.
These inputs are digitized and placed onto networks that range from personal area networks like Bluetooth to large area networks like Cellular and Satellite.
These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.
The interactions between these entities are creating new types of smart applications and services.
IoT Technologies Are Still Evolving…It’s Early In The Game

Simple Applications:
Applications involving simple remote monitoring, location services and product support for maintenance or upgrades

Compound Applications:
Applications that involve multiple (peer-to-peer) devices and machines with significant interactions between systems and equipment in multi-vendor environment such as factories, hospitals and related environments characterized by diverse vendors, users and stakeholders

Complex Applications:
Applications driven by diverse interactions involving sensors, actuators, machines, people and systems that enable extending/expanding values from collaboration and analytics supported by data fusion between and among disparate and diverse sources
As networks have invaded the “physical” world, traditionally unique components and interfaces between and among electronic and electro-mechanical elements are becoming more and more standardized…
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IoT Will Have an Impact Across All Sectors and Markets

smart systems and services will drive a wave of innovation and value creation for years

By 2020 this opportunity will grow to more than

>$1 Trillion
Internet of Things Overview
September 2016

Market Layer

Some markets adopt new technologies faster than others, but no sector of the economy is immune to the expanding influence of the IoT. While there are similarities that apply across the board, each vertical has its own set of needs and challenges that shape the way networked technologies add value.

Overview

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IoT Touches Everything But People Only Understand it from Their Context
What does IoT Mean for Farmers and Consumers?

Use Case to Understand How IoT Impacts Agriculture

DIGITAL FARM TO TABLE

- Farm & Livestock ID & Sensors
- Food packaging sensors
- Retail Supply Chain Monitoring
- Health Services

Maria and her daughter are picking up groceries for the week. Using packaging with printed sensors, the two can make sure the ground beef they are purchasing has never reached unsafe temperature levels while on the shelf or being transported.

The packaging also contains a QR code which they can use to query the cow’s RFID tag and bring up its history:
- Where it was raised
- What it was fed
- Where it was slaughtered
- How it was transported
- The last time it was inspected

A week later the U.S. Department of Agriculture’s Food Safety Service determines ground beef from originating from a regional packing company and sold at a neighboring store is contaminated with E. coli 0157:H7. All packages from this distributor change their alert color and notification messages are sent to those shoppers that may have been impacted.
Use Case to Understand How IoT Impacts Maintenance

**REAL-TIME SERVICE NETWORKS**

- Appliance Monitoring
- Predictive Maintenance
- Service Technician / CRM
- Waste Management / Recycling

**R Hotel Denver, Industrial Washer #GHS40-2608**
- Location: ID: FC-RM #00243
- Manufacturer: Appliance Park
- Materials: FC / SUS
- Sensor: Vibration
- Connectivity: Wireless LAN

Connor, the Lead Maintenance Manager at the R Hotel in Denver, receives a sensor notification that the pump body O-ring #6 on washing machine #230243 is starting to fail in the housekeeping laundry room.

On his mobile, Connor prompts the machine to order a new part. This action triggers a bidding opportunity for local service technicians within the product’s authorized maintenance network.

The request lays out:
- Pricing parameters
- Timing requirements
- Machine history
- Part specs
- Predictive sensor measurements & alerts

Tom from IA Appliances bids on the service request and receives a notification a few moments later that his bid was accepted.

Within 1.5 hours, a service technician from IA Appliances is on site (Using a temporary facility access code for the wireless door lock) to replace the water pump. Connor sends a brief note on the service quality and IA Appliances releases a bid request for the part’s raw materials to local recycling centers.

**What does IoT Mean for Service Technicians?**
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**How Do We Get From Smart Connected Things to Smart Systems?**
Smart Systems Is The Integration Beyond Just Technology

The Internet of Things demands that we think about opportunities as...systems not products....
As these intersections blend the **physical** and the digital they are mediated by on-going **user experiences**, business processes, **technology architectures**, and newly created market forces.
From the design of silicon to the end-user experience, the technologies of the IoT are driven by data.

Sensors, software, and networked infrastructure collect, analyze, transmit and present data for the users and devices who need it most.
“User Experience” is the sum of our relationship with technology. It encompasses the practical—like which senses, gestures, and inputs we use to interact with our devices and surrounding environment—as well as the emotional: how the interaction makes us feel.
Integrating smart systems into business processes requires restructuring long-held assumptions about how products and services are brought to market. Collaboration between and among users, customers, developers and partners will be a minimum requirement for success.
Collaborative innovation will extend beyond ideas about new products and services to the very manner in which business is conducted.
success will increasingly go to those that effectively utilize their combined potential

Smart Systems and the Internet of Things will be built from complex interrelationships between the stack.

Integrating these layers together are myriad Interactions

A bi-directional link between digital user experiences and the physical world.
What Questions Do We Need to Ask to Develop IoT Businesses?

Smart Systems Framework

How can we better understand customer experience through the user’s eyes and through the creativity of multiple parallel participants?

How can we better understand the value of data and information coming from products, systems and people?

How can we put human sensibilities and behaviors at the center of the solution?

How can we deliberately organize to anticipate technologies that are disruptive or sustaining in nature that creates new opportunities?
Key Themes Harbor Sees In The Market Today

Designing New User and Customer Experiences

Organizing Creative Combinations of Smart Systems Technology

Rapid Experimentation & Business Model Innovation

Extending Skills Through Relationships, Ecosystems and “Strange Bedfellows”

Aligning The “Business Architecture” With The “Technology Architecture”

Designing New Go-To-Market Systems and Relationships
thank you