the ubiquity shift | smart systems disruption

2013 2014 2015

Harbor Research
www.harborresearch.com
The Advent of Smart Systems, Services & The Internet of Things....

These forces are informing a new trend we call “Smart Systems.” In its simplest form, Smart Systems is a concept in which inputs—from machines, people, video streams, maps, newsfeeds, sensors, and more—is digitized and placed onto networks. These inputs are integrated into systems that connect people, devices, business processes, and content to enable collective awareness.

- **Connectivity of Things & People**: Virtually all electronic and electro-mechanical products are being designed to automatically transmit information about status, performance and usage and can interact with people and other devices in real-time.

- **Pervasive Network Integration**: Broader reach and range of dependable wireless networks will drive significant new applications value from improved reliability, quality and data rates.

- **Value-Added Services**: Availability of new managed services based on data aggregation, management and analytics capabilities.

- **New Application Values**: Ability to sense and respond in real time will drive more adaptive capabilities. Significant growth for asset management, location tracking services, security, and supply chain integration based on interactions among devices, mobile workers and systems management.
Smart Connected Services Enable Manufacturers To Access A Much Larger Percentage of Their Customers’ Life Cycle Spending...

This phenomenon is not just about the dichotomy between people communicating with people or machines communicating with machines: it also includes people communicating with machines (e.g. a networked ATM), and machines communicating with people (e.g. automated stock ticker alerts on your PDA). The Internet’s most profound potential lies in its ability to connect smart sensors, devices, and ordinary products into a global “digital nervous system” that will allow people and businesses to achieve undreamed-of awareness, efficiency and optimization.

Beyond efficient support of products and equipment, the convergence of collaborative systems and machine communications will enable nearly new modes of interaction and implies a total paradigm-shift. The depth of this shift has begun to suggest itself, but it is by no means accomplished.

Visionary product manufacturers and service companies are already leveraging embedded computing and networking technologies to deliver smart, remotely monitorable goods that will support entirely new modes of customer-device interaction and service delivery.

![Diagram showing the Life Cycle Cost To Support Equipment Can Range from 5X To As Much As 15X The Purchase Cost of the Device]
As networks have invaded the “physical” world, traditionally unique components and interfaces between and among electronic as well as mechanical elements are becoming more and more standardized.

The implications of these trends are enormous. No product development organization or its suppliers of componentry and sub-systems will be able to ignore these forces -- product and service design will increasingly be influenced by common components and sub-systems. Vertically defined, stand-alone products and application markets will increasingly become a part of a larger “horizontal” set of standards for hardware, software and communications.

As it becomes easier and easier to design and develop smart systems, competitive differentiation will shift away from unique, vertically focused product features towards how the product is actually used and how the product fosters interactions between and among users in a networked context.

The opportunities this opens up to forward thinking product and service organizations are nearly infinite. Businesses can begin to explore many new possibilities for system solutions unthinkable just a few years ago.
How Well Prepared Are Manufacturers For The Advent of Smart Systems and Services?

In Most Companies, People, Functions & Processes Are Too Disconnected To Create New Smart Systems Opportunities....

Large organizations have many rules and policies that often seem completely disconnected. We have created language, business processes and systems that seem to be a triumph of technique over value and performance. Consequently, most businesses today are organized around functional disciplines that only interact on an “as needed” basis.

Most knowledge comes from human experience and expertise. Today, however, knowledge and expertise largely resides in functional silos and systems dispersed across organizations. Acting singularly, functional organizations are constrained by the resources under their control. Legacy processes and habits inhibit any natural ability to communicate and work together to solve big problems or create new solutions. In many companies, lean practices have been applied so aggressively that people are simply consumed by “running the business.” It restricts their ability to harness the collective intelligence available throughout a company and its networks to ensure timely decisions and creative solutions.

In this environment growth is dependent on interacting in new and creative ways. Linking functions by breaking down the barriers to communication is the first step, but it can’t stop there. The key is building collaborative networks.
In Fact, We Believe New Business Creation In Most Industrial Manufacturers Is Broken ..........

Venture Development For The Internet of Things Requires A Different Approach .......
An Approach That Can Span From Very Early Stage To Growth Maturity .....
Why Should Manufacturers Care?
Because Opportunities Of Vast Scale and Scope Are Available To Product OEMs and Value Adders...

If you examine the cumulative opportunity that grows from the smart buildings arena, as just one example, and consider the leverage available through relationships to capture information, aggregate intelligence, provide facility and energy optimization, this opportunity alone in just one or two product sectors could amount to as much as hundreds of billions of value add.

Smart System Application Opportunities In Buildings, Facilities and Energy Management

If the opportunity scale across the broad range of building related devices equals approximately 6X the value of base products in smart services value, then the overall market opportunity in the smart connected buildings arena equates to almost a trillion dollars in value added services
More Importantly, There Are Fewer and Fewer Acquisition Targets Left For Manufacturers...

Global expansion; re-engineering; lean practices; mergers and acquisitions - all reasonable strategies for growth and value creation. But in a marketplace of rapidly consolidating businesses what worked in the past is less likely to work now or in the future. For many companies, these strategies have already reached the point of diminishing returns.
What Progress Has Really Been Made In Driving Organic Smart Services Opportunities?

In many ways, most of the larger diversified industrials have not gotten any further than “first base” in realizing connected smart systems and services values....

Many lines of business have moved to smart remote services programs that, to date, are largely focused only on services delivery efficiencies.

Based on Harbor Research analysis, many/most of these systems only utilize about 5% of the data value collected ..........

While many players are talking a Big Data game, few are realizing any significant new value from machine data and analytics.
Machine To Machine Systems and Smart Services Technologies Are Still Evolving

To date, remote services opportunity has been comprised of “simple” monitoring applications & related tracking/location services…. future development will be focused on collaboration between devices, people and systems.

**Simple Applications**
Applications tend to be remote support-driven applications that involve monitoring/upgrades of installed base of machines in the field – such as motors, instruments, machines, etc.
- Tracking
- Product Support
- Product Upgrades
- Diagnostics / Monitoring

**Compound Applications**
Applications that involve multiple collaborating [peer-peer] devices or significant interactions between and among devices, systems and people.
- Multi-Party Equipment Support
- Real-Time Demand Response
- Maintenance Support & Collaboration

**Complex Applications**
Applications that drive interactions between and among devices, device sub-systems and people and can also allow extending/ expanding values from third party collaboration and large scale [big] data integration/analytics.
- Multi-Vendor Brokered Services
- Integrated Real Time Pricing for Electricity
- Multi-vendor Maintenance Collaboration

**Connections**
- Integrated Automation, Condition Monitoring & Asset Management Systems
- Managed Security Services

**Simple**
- Equipment Monitoring
- Maintenance Dispatch
- Alerts & Alarms

**Compound**
- Crowd-Sourced Content for Machine Troubleshooting
- Brokerage / Auction for Spare Parts or Sub-Contractors

**Complex**
- Multi-Vendor Brokered Services
- Integrated Real Time Pricing for Electricity
- Multi-vendor Maintenance Collaboration

**Sensor Data Fusion / Integration**
So What Will It Take To Really Win Big In The Future Smart Services Arena?

To drive success, players will need a whole new frame of reference to work with.

The solutions we are describing here will have far less managerial hierarchy, command and control decision making or proprietary ownership of ideas than companies have been accustomed to.

These networks will be self-organized by people who are motivated to explore and develop ideas they care deeply about.

Collaborative innovation will extend beyond ideas about new products and services to the very manner in which business is conducted.

To discover, design and develop innovative systems, organizations must consider all the elements involved and the context they fit into.
What Is The Internet Of Things and ... ... Why Is It So Important?

In the not too distant future, hundreds of millions, then billions, of individuals and businesses, with billions, then trillions of smart, communicating devices, will stretch the boundaries of today’s business and social systems and create the potential to change the way we work, learn, entertain and innovate.

Global expansion; re-engineering; lean practices; mergers and acquisitions. For most companies these strategies for growth and value creation have reached the point of diminishing returns. As networks continue to integrate the physical and virtual worlds - the Internet of Things - what worked in the past to drive growth is less likely to work now or in the future...

Where Are The Opportunities and … … How Do We Get There?

The assumption that the role of new business design and development is only about making existing products or services more attractive no longer works.

We believe smart systems design needs to transcend discreet product or service innovation. Business developers need to creatively imagine fully developed systems and whole marketplaces.

To discover, design and develop innovative smart systems, organizations will need new and uniquely facilitated processes.…

Where Are The Opportunities and … … How Do We Get There?

Smart systems and services will increasingly have less managerial hierarchy, command and control decision making or proprietary ownership of ideas.

Diverse collaborative networks will be self-organized by people who are motivated to explore and develop ideas they care deeply about. Business innovation will extend beyond ideas about new products and services to the very manner in which business is conducted.

Building new ventures for the Internet of Things requires new and very different modes of design and development – organizations will need to push the boundaries of collaboration to include many new and unfamiliar participants – “strange bedfellows…..”

Discover
Understanding Emerging Smart System Opportunities

Anticipating Experiences, Interactions and Relationships

Design
Determining Value Creation Role

Develop
Building The Platform

The Internet of Things Will Force Manufacturers To Create New Ways To Create Growth... ......“R&D For New Business Design”
Value Created .......... Is Informed By Community Interactions ....

The relationships and interactions we help foster serve as a context for deep insight and more value creation. Every relationship building event, every workshop and platform project, regardless of its focus, is enhanced by the range and depth of these relationships.

Harbor seeks out clients whose strategic and business development mode shows a desire to drive disruption and manage change effectively, both in their organization and through their relationships in the marketplace. These are the forward looking competitors who can benefit most directly from the breadth of knowledge and process skills embodied in Harbor.