

It's About All The Smart Devices Dummy

We believe smart systems will drive a multi-year wave of growth based on the convergence of innovations in software architectures; back-room infrastructure; wireless and broadband communications; and smaller, powerful, and numerous client devices connected to personal, local and wide-area networks. These technologies will work together in unprecedented ways to solve smarter and more complex business problems than previous generations of computing. But let's get one very very important point straight from the outset ... its about all the smart devices not just mobile telephony and smart phones ... its also about all the sensors, instruments, and smart machines coming on to networks!

Since the beginning of computing there has essentially been three waves of technology and architecture: mainframe computing, personal computing, and network computing. This next generation of "Smart Systems" technology will add significant new capabilities to computing and network systems. These new capabilities will revolve around real-time situational awareness and automated analysis. As a result, technology moves beyond just proposing "batched" solutions to understanding what is happening in the "real world" in real-time, analyzing that new information for risks and possibilities, presenting alternatives, and taking actions. Smart Systems are:

A new generation of systems architecture (hardware, software, network technologies and managed services) that provide real-time awareness based on inputs from machines, people, video streams, maps, news-feeds, sensors, and more that integrate people, processes, and knowledge to enable collective awareness and better decision making.

The three previous waves of technology each have had significant impacts on productivity and efficiencies; mainframes standardized transactions; personal computing placed processing power into the hands of professionals; and, networked systems enabled business process automation. What is important about this next wave of Smart Systems is the compound impact of these cycles of innovation. While there is standalone value in each of the innovations in software and IT systems, network infrastructure, and smart devices, it is the combination of all these innovations that will allow computing technologies to inform smarter systems.

Where will the investment flow in smart systems over the next five plus years? It will likely be into a mix of traditional IT and network systems technologies coupled with new investments in core smart system technologies. We expect the rate of investment in smart systems to be measurably higher than in maturing infrastructure and occur in three key areas:

Smart System Platform Technology: Next generation foundation technologies for unified communications, embedded processors and network enablement tools, virtualization systems technologies, and software infrastructure will be the foundation elements of Smart Systems.

Smart Device Innovation: Innovations in new mobile terminals, information appliances and the integration of a broad range of sensing capabilities into intelligent devices will continue to provide an ever broader variety of features that support the integration of digital information and sensory inputs from the physi-

cal world, thus broadening the range of possible applications available and also improving and simplifying the user experience and interactions.

Business Process Integration: New software products will continue to automate business processes (asset management, energy management, medical records, procurement, etc.), but more importantly, drive integration across business processes and systems.

Value-Added Application Services: Vertically focused solutions that increasingly integrate all the people and assets a company has or serves -- systems that allow for real-time energy management; health systems delivery and intelligent transportation systems management to name a few.

We do strongly believe that the Pervasive Internet and Smart Systems market opportunity is reaching a new level of maturity; there is now substantially greater recognition of the technological capabilities and the potential benefits of connecting devices to the Internet than there was even 2 years ago. This represents a whole new generation of technology innovation and, if history repeats itself, we expect to see a significant wave of growth in Smart Systems. Here are some related points:

- Mobile IT, telephony and media devices will grow to approximately 1.4 billion units (shipments) in 2010 -- networked non-IT device and machine volume will represent about 10% of that unit volume in 2010;
- ICT investment topped 2.4 trillion dollars in 2009, we believe that Smart Systems investment has already reached approximately 5% of the ICT market;
- Our analysis indicates the rate of investment in smart systems will be measurably higher than in maturing IT and network infrastructure technologies; we are forecasting Smart Systems growth at 3X the compounded rate of traditional ICT technologies;
- Investment in Smart Systems, particularly as the market and supply side players recognize

its distinct requirements and characteristics, will likely increase in scale to as much as 10% of all of ICT investment within five years; and

- As the market for Smart Systems continues to move to a period of sustained growth, the portion of mobile IT, terminal/appliance and telephony device volume that is impacted by integration machines, instruments, sensors, etc. will also rise significantly.
- Overall shipments of connectivity technology for non-IT/telephony smart devices (this includes Wireline, WWAN, WLAN, and WPAN devices) are expected to increase from nearly 200 million in 2010 to approximately 1.1 billion in 2015 (representing a compound annual growth rate of 44%). If you add smart phones/terminals, related telephony, the myriad of new mobile web devices (netbooks, tablets, readers, etc.) the scale of connected smart "things" grows from as many as 2.5 billion in 2010 to somewhere in the range of 9-10 billion in 2015.

The most substantial revenue opportunities can be found in the smart [managed] services realm. As technology stabilizes, attention will rapidly shift to connected service opportunities as the primary driver of growth and value. The Pervasive Internet and associated smart systems markets are expected to show particular strength as the economy recovers. The Smart Systems opportunity is not just about people communicating with people or machines communicating with machines: it also includes people communicating with machines, and machines communicating with people. The Internet's most profound potential lies in the integration of smart machines and people—its ability to connect billions upon billions of smart sensors, devices, and ordinary products into a unified "digital nervous system" that will smoothly interact with individuals.

Scaling The Smart Systems Opportunity

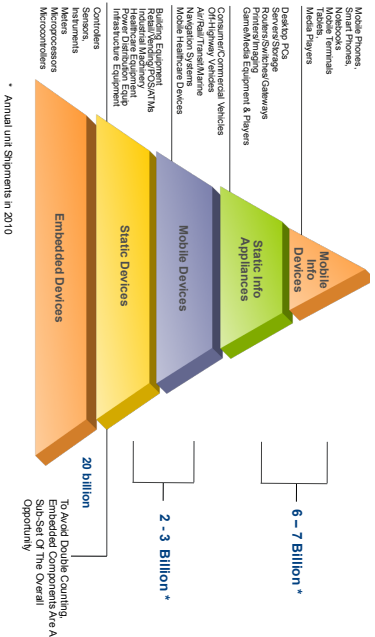


Investment In Smart Systems & The Internet of Things Will Outpace Traditional ICT

Scope of Smart Devices Driving Smart Systems

These forces are informing a new trend we call "Smart Business." In its simplest form, Smart Business 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.

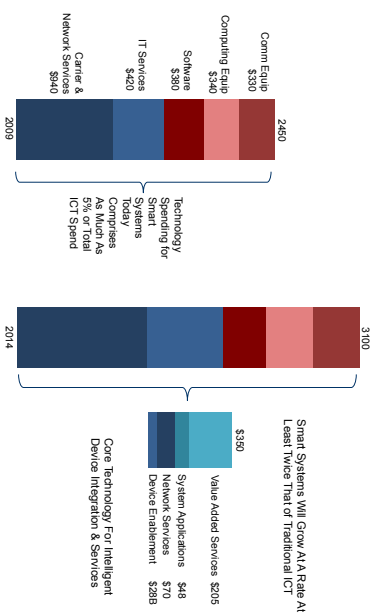
Intelligent Smart Device Hierarchy (Potential Unit Shipments 2015)



Investment Profile For Smart Systems

Harbor believes Smart Systems will drive a multi-year wave of growth based on the convergence of innovations in software architectures; back-room infrastructure; wireless and broadband communications; and, smaller, and numerous client devices connected to personal, local and wide area networks

Global ICT & Smart Systems Spending (US\$, Billions, 2009-2014)



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