The Internet of Everything

Business Value of the Next Major Wave of IT Innovation

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The Internet of Everything - The business value of the third major wave of IT innovation

The Third Wave of IT Innovation

Over the past 65 years, two major waves of Information Technology (IT) innovation fueled a significant rise in productivity. Internet of Everything (IoE) is the third wave of IT innovation that is about to fuel the next rebound in productivity increase.

The first major wave signified the dawn of IT from 1950 through 1970s when automation and integration of business processes increased labor productivity by 3.2% annually. New data captured from activities such as order processing and manufacturing resource planning contributed to dramatic increase in the productivity during this period.

The Internet revolution brought about the second major wave of IT revolution during 1990s through 2000s. The rise of the Internet enabled consumers to participate in the IT revolution. Furthermore, Internet allowed integration and automation of processes across the global supply chain, beyond the boundaries of an organization. This led to the development of powerful platforms, rapid acceleration of economy and an annual productivity increase of 2.3 % in the 1990s and 2.7% in the early 2000s.

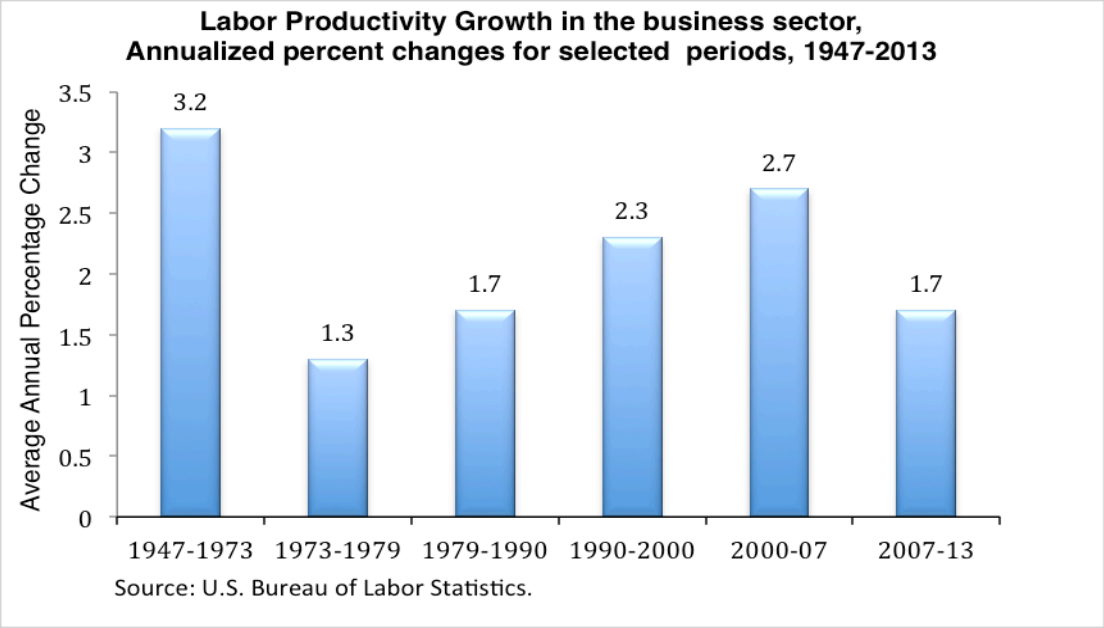

Figure 1: Labor Productivity Growth from 1947 to 2013

Since the early 2010s, smarter, connected products are being deployed across

the global value chain from agriculture to manufacturing to energy to transportation to public infrastructure to homes and consumers. These internet connected products can communicate and coordinate with each other to create smart systems and system of systems such as smart home, smart factories, smart grids, smart cities, and smart farms. Such ubiquitous connectivity across processes, human beings, products and systems and the resulting economic opportunities signifies the era of the Internet of Everything (IoE). IoE is the third major wave of IT innovation that will power the next era of surge in productivity and industrial innovation.

What is IoE?

There has been a lot of discussion regarding Internet of Things vs. Internet of Everything. But every one agrees as a fact that there has been an exponential Increase in the number of things or every day objects that are now connected to the Internet. In 2003, there were approximately 500 million connected devices. By 2010, 12.5 billion devices were connected to the Internet. Fast forward to 2020, more than 28 billion devices, or 4 "things" for each human being on the planet, are predicted to be online.

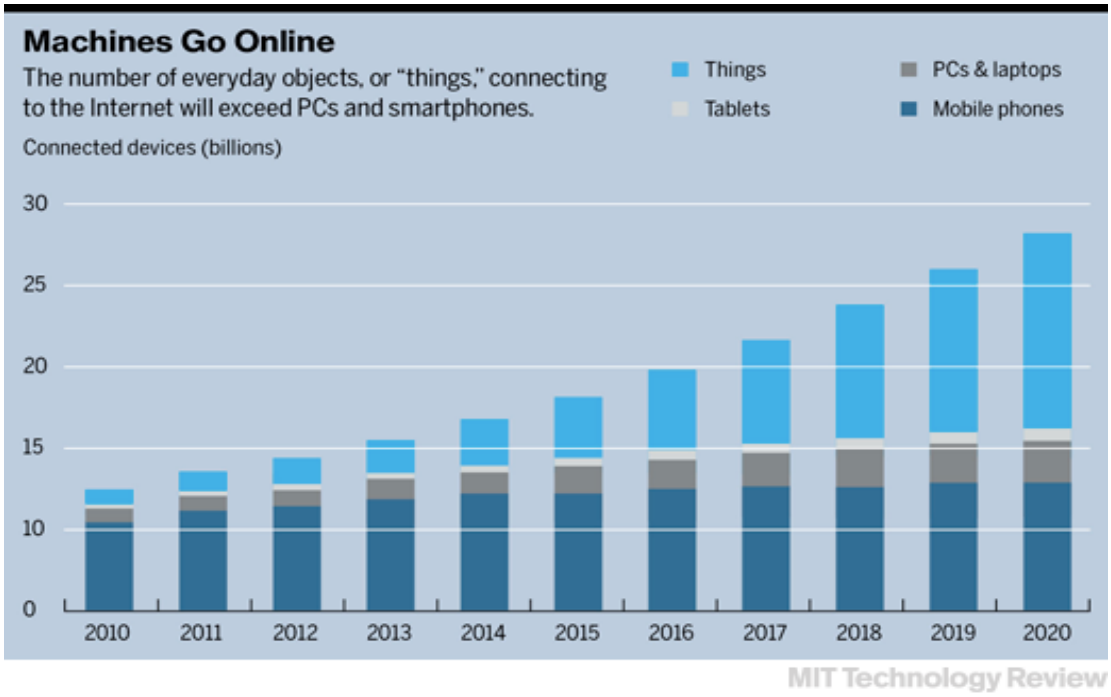

Figure 2: The rise of the connected machines

To keep it simple, Internet of Things (IoT) is the transformation by which common objects or "things" such as cars, watches, apparels, thermostats, and machines

are connected to the Internet due to the Moore's law and the pervasiveness of Internet connectivity. Every object is a component of the network and takes full advantage of the connectivity to increase its value proposition. For example, cars can send diagnostics information to the manufacturer and download software updates as needed while thermostats manage the temperature inside the house based on the local weather and the demand for power.

As more and more things join the network aka the Internet of Things, the value of the network increases as defined by the Metcalfe's law. When you connect human beings, processes, and data, which have traditionally managed the objects, with the Internet of things, the resulting transformation and new possibilities is called the Internet of Everything (IoE). The difference between IoT and IoE is similar to the difference between a smart thermostat and smart home or smart car vs. smart transportation system or smart machine vs. smart supply chain.

A Disruptive Innovation

IoE will have a pervasive impact across all the lines of business including yours. Whether you are in the agriculture, energy and utilities, healthcare or transportation, you should anticipate a rapid transformation of how business is done and value is delivered to customers. A few examples of transformations are:

Agriculture: Evolution of intelligent farm management systems by connecting smarter farm equipment systems with irrigation systems, animal management systems, weather information systems etc.

Energy and Utilities: Evolution of smart power grids that combine energy production management, demand response management and intelligent power grids.

Healthcare: Smart healthcare systems that combine connected, digital hospitals with remote patient monitoring systems to provide continuous service to patients both in and beyond hospitals.

Manufacturing: Intelligent factories where smart machines are connected to enterprise resource planning, supply chain management, quality control systems and apply manufacturing philosophies such as lean manufacturing, six sigma etc with active coordination from the factory and business personnel.

When the physical world such as machines is assimilated into the Internet world, the data and network could sometimes become more valuable than the company products itself. As a result, companies that continue to pursue a pure product

strategy will be disrupted by organizations that embrace IoE and successfully amalgamate their physical business with the Internet world through a platform strategy. Such a transformation requires collaboration and partnership to acquire skillsets in the areas of networking, software and data management that are not the core competencies of several traditional businesses. That is why industrial manufacturing companies like GE are collaborating with IT companies like Cisco, IBM to take advantage of this immense opportunity to transform their business.

Beware of the Hurdles

Apart from the challenges with respect to the new skillsets required, organizations must collaborate and overcome significant challenges to enable wide spread adoption of IoE.

IPv6 Deployment. Deployment of billions of new sensors will require unique IP addresses. All the IPv4 addresses have already been exhausted. Deployment of IPv6 is critical and will also provide better network management and security features.

Energy for Sensors. The sensors that capture data and connect with the Internet need reliable power sources. While this might not be an issue for sensors in an industrial setting, self-sustaining energy source is essential for all other sensors.

Network congestion. Network traffic from the billions of new sensors will be competing with traffic from videos and phone calls. Network bandwidth has to be increased to accommodate the new data traffic resulting in additional cost.

Standards and Governance Model: IoE is a new paradigm that requires development of standards and governance models in the areas of security, privacy, architecture and communications.

Business Transformation: Last, but not the least, traditional companies will be forced to become information business whose economics is alien to them. When the data more valuable than the machine itself, would organizations develop the guts and skills required to transform their business or would it lead to a massive disruption across industries where new players displace the existing leaders?

The Path to IoE

Organizations adopting IoE should take a careful and planned approach to achieve early success and replicate it across the business.

Prioritize: The first step is to brainstorm the use cases where IoE could disrupt your business. Prioritize the use cases based on ROI, time to value, skillset required. Establish partnerships with organizations that can provide the complementary skillsets.

Capture: Augment your traditional machinery and remote equipments with sensors and video capture equipment to capture intelligence from the machines. Redundant power supply and security is required to ensure safe and continuous data capture.

Connect: Replace proprietary communication protocols with IP based networks to connect the sensors to your network. Solutions such as the Cisco Industrial Smart solution help converge operational technology and information technology.

Analyze: Build a data infrastructure that can capture, store and analyze large volume, velocity, and variety of data. This is where big data technologies such as Hadoop, search, stream processing, and NoSQL databases add value and complement the existing IT infrastructure. They provide a cost effective platform to tackle the unforeseen magnitude of data that is often beyond the capabilities of traditional IT systems.

Optimize: Leverage the data to optimize your operations and increase efficiency. Introduce new platforms and value added solutions to your customers. Armed with the initial success, bring additional machines, processes and people into the fold of IoE and continue the cycle of IoE deployment.

Unleash the Value of your Platform

The key value of IoE is the opportunity to transform your business from a product to a platform company thereby enabling you to increase operational efficiency and offer new value added services to your customers. In addition to the change in the business model, your ecosystem consisting of customers, partners and employees have to adapt to the evolving IoE solution standards and frameworks. Success awaits those organizations that adopt a well thought out business strategy to embrace IoE and establish a repeatable process for wide scale adoption across the value chain.

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More Information

Guidanz Inc. is a data engineering and analytics solutions company that helps the world's largest public and private organizations solve critical business challenges. Guidanz provides data strategy, data engineering, and data management solutions that maximize the value of data to its clients.

Founded in 2010, Guidanz is based in Fremont, California. For further information about Guidanz, visit http://www.guidanz.com