Internet of Things

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Part I

New digital technologies
The Essential

Emerging technologies every organization should consider right now

8

All attentions are on the eight that are having the biggest business impact right now.
IoT is on top of CEOs priorities

This technology is considered to be the most disruptive for industries and business models, and is the one having the higher investment.

Source: Global Digital IQ, PwC
IoT assumes different forms

Implementation of new technologies, by digital maturity level

Q: To what extend have you implemented, piloted, or planned to implement the following technologies within your company?

Source: Global Digital Operations Study 2018, PwC
Part II

The Internet of Things
What is IoT and its benefits

The Internet of Things (IoT) is a network of physical objects — devices, vehicles, appliances — embedded with sensors, software, and network connectivity, so they can collect, exchange, and act on data, often without human intervention.

Key benefits

- Real time analytics
  - lower costs
  - better informed decisions

- H2M & M2M Communications
  - more efficiency and productivity

- New offer of products & services
  - new revenue streams

- Best customer service
  - prompt and accurate answers to individual needs

Source: Next in Tech, PwC
Key forces accelerating the IoT globally

- Decreasing costs of sensors and hardware
- Convergence of IT, OT & AI
- Advent of Big Data, Cloud and Edge Computing
- Increasing device proliferation
- Decreasing cost of megabit/sec.
- Increase in VC spend and investment
IoT application changes across sectors

Experience-Led

Consumer IoT
- Health & Body
- Home & Hospitality
- Retail & Wholesale

‘Grey area’
- Buildings & Offices
- Smart cities & Public sector
- Consumer goods manufacturing

Business-Outcome-Led

Industrial IoT
- Industrial manufacturing
- Natural resources
- Logistics & Transportation
- Utilities

Software & Communications are the enablers for all industries’ IoT use cases
The IoT can make possible a multitude of potential enhancements

Companies know that what promises to create the most value for industries taking advantage of the IoT is the human and machine intelligence built into the technology.

Source: Next in Tech, PwC
IIoT will change industries and markets

The industrial Internet of Things (IIoT) refers to its non-consumer use in manufacturing and other industrial sectors, such as oil and gas, mining, energy and utilities, and transportation.

The IIoT adds sensors to people, places, processes, and products across a value chain to capture and analyse information that can advance an organization’s goals.
Connected devices are increasing

By 2020 the forecasted number of connected devices will reach the 31 billion.

Source: IHS | Statista

Internet of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (billions)
Market size and spending in IoT are growing exponentially

Worldwide IoT spending share by region, 2016–2021
(billion USD)

IoT global market size, 2009–2019
(billion USD)

* forecast
Source: IDC | Statista | HKExnews
What’s driving investment by industry

Investment levels for IoT technology vary greatly by sector and business model depending on the needs of different industries.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Investment Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>81%</td>
</tr>
<tr>
<td>TMT</td>
<td>80%</td>
</tr>
<tr>
<td>Public Sector</td>
<td>78%</td>
</tr>
<tr>
<td>Power &amp; utilities</td>
<td>76%</td>
</tr>
<tr>
<td>Hospitality &amp; Leisure</td>
<td>76%</td>
</tr>
<tr>
<td>Retail &amp; Consumer</td>
<td>74%</td>
</tr>
<tr>
<td>Energy &amp; Mining</td>
<td>73%</td>
</tr>
<tr>
<td>Industrial products</td>
<td>72%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>67%</td>
</tr>
<tr>
<td>Financial</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: The essential eight technologies. Board byte: the internet of things, PwC
As IoT moves forward there are game-changing security hazards

To realize the full potential advantages of the IoT, companies must overcome some challenges. Security, collection, storage and use of data flows of information acquired through the use of these devices are some of the hot topics.

- Secure devices and networks against data theft and service interruption
- Improve analytics modelling to accommodate exponential data increases
- Establish standards for data sharing and interconnectivity
- Integrate with legacy systems and platforms
- Implement organizational change

Industries with more implementation of IoT security strategies

Source: Next in Tech | Uncovering the potential of the Internet of Things, PwC
Part III

Real cases of IoT application
Rio Tinto Australia runs driverless trucks reducing operating costs, and can operate 24/7, 365 days a year...controlling the trucks from an operations center in Perth, 1,200 km away.
GE Aviation analyzed 340TB of data from 3.4 million flights on 25 airlines to improve asset performance and minimize disruptions. The results speak for themselves.

- Performance Boosted **287x**
- Costs Lowered **7x**
- Lead to Innovation Fast-Tracking **7 days**
Part IV

Business approach to IoT
Common challenges while dealing with IoT

Companies are facing several challenges in order to understand what they need to know to implement and get the most out of IoT.

- **Lack of overall IoT and data strategy**
- **Interoperability.** What platforms and standards?
  - open source vs. proprietary
- **Organisational issues**
  - lack of skills, innovation, governance, operating model
- **Security hazards**
- **Scaling**
  - moving out of pilot phase
- **Understanding role in IoT ecosystem**
  - build one, have a partner or buy a strategy?
- **How to monetize and sell IoT**
A company’s IoT strategy and vision serves as the foundation upon which to build a capability roadmap and an operational support model.

**IoT Strategy**

**Business Outcomes**

“What is the business problem /use case I am trying to solve?”

**Capabilities**

“What parts of the IoT ecosystem should I build, partner or buy?”

**Operations and Support**

“How do I operationalize and support IoT?”
IoT opportunities are anchored by four key business objectives

- **Innovation**
  - **IoT powered business models**
    - Transforming business through innovative business, organization & product/service models that doesn’t exist today.
  - **New revenue streams**
  - **Increased revenue per user (ARPU)**
  - **Higher margin services business**
  - **Disruptive product + service offerings**
  - **New business models**

- **Engagement**
  - **IoT enabled customer experiences**
    - Enabling interactions between clients and customers in a more engaging, seamless way
  - **Higher customer satisfaction scores**
  - **Reduced customer churn**
  - **Greater customer insights**

- **Productivity**
  - **IoT digital efficiencies**
    - Digitizing our clients’ operating model and processes to improve productivity.
  - **Lower Opex**
  - **Improved worker productivity**
  - **Lower defect rates**
  - **Higher uptime**

- **Trust**
  - **IoT secure environment**
    - Ensuring secure information in a digital age to inspire trust in our clients by their customers
  - **Reduced risk**
  - **Greater brand value**
  - **Stronger customer satisfaction**
IIoT value chain and detail on IIoT ecosystem structure

- Solutions
  - Analytics & BI
  - Service Assurance
  - Device Management
  - Billing
  - Security

- Professional Services
  - Strategy
  - Management Consulting
  - Technology
  - Managed Services

- Platform
  - Infrastructure
  - Data
  - Software

- Connectivity
  - Wire/Cellular
  - WiFi/Radio
  - Satellite
  - Proprietary/Fog

- Internet “Things”
  - Industrial Manufacturing
  - Natural Resources
  - Logistics & Transportation
  - Utilities

- Components
  - Sensors/Actuators
  - Processors/Computing
  - Connectivity Components
  - Operating System

- Ecosystem integrator (emerging)

- Hypothesis for PwC Focus
- High Value, but not PwC focus
- Lower Value / Commoditised part of value chain
IoT operational reference architecture

Interaction layer
- Reporting
- Mobile apps
- Business apps
- API management

Platform layer
- Rules Engine
- Complex event processing
- Configuration management
- Firmware management
- Billing
- Data Analytics
- Fault management
- Inventory management
- Orchestration & Provisioning
- Service catalogues
- Data Cache
- Performance management
- Predictive Analytics
- Process automation
- Security management

Data messaging & interaction layer
- Data Lake
- Integration service
- ESB/Broker
- BPM

Connection layer
- IoT Gateway 1
- IoT Gateway...
- IoT Gateway...
- IoT Gateway...
- IoT Gateway N
- Zigbee
- RF
- RFID
- Wi-fi
- LAN
- HTTPS
- MQTT

Security
- Policy management
- Compliance & Standardisation
- Single Sign-on
- Cyber security
- Monitoring
- AAA

IoT Data Source layer

Internet of Things
PwC
Getting started in the IoT adoption

I. Pilot
  • Build local, prioritized inventory of IoT opportunities
  • Understand information and analytic needs
  • Frame the IoT capability conceptual design across dimensions
  • Conduct 1-2 IoT pilots to prove value and develop foundation
  • Secure business endorsement to proceed

II. Deliver and scale
  • Deep dive and deliver value from initial 1-2 IoT pilots
  • Expand organisational coverage across functions/geographies
  • Update prioritised inventory of IoT opportunities
  • Deploy future state blueprint and roadmap of capability delivery
  • Deploy foundational components across process, organisation and technological components
  • Begin working next wave of IoT opportunities
  • Secure business endorsement to scale

III. Enterprise adoption
  • Deep dive and deliver value from next wave IoT pilots
  • Expand organisational coverage further across functions/geographies
  • Cultivate prioritised inventory of IoT opportunities
  • Deploy enterprise standard components across process, organisation and technological components
  • Begin working additional IoT opportunities
  • Maintain business endorsement to operate

Investment required
Blueprint for digital success

Six steps to build out IoT capabilities

- Map out your IoT strategy
- Create initial pilot projects
- Define the capabilities you need
- Become proficient in data analytics
- Transform into a digital enterprise
- Actively plan an ecosystem approach

Blueprint for digital success

Internet of Things

PwC
Thank you!

“Computers are incredibly fast, accurate and stupid; humans are incredibly slow, inaccurate and brilliant; together they are powerful beyond imagination”

Albert Einstein