Mobile computing, digital and Internet of things in supply chains
Industry overview

In today’s challenging business environment:

- Supply chains have become more distributed and complex.
- Additional vulnerabilities have emerged which are difficult to measure and manage.
- Fierce competition and fast-changing customer requirements have forced companies to adopt a more dynamic, effective and flexible supply chain system.

Role of supply chain analytics

Supply chain analytics facilitates the design and operation of more efficient and resilient supply chains via analytical solutions addressing risk diagnosis, logistics assessment, demand planning and inventory management.

Mobile technologies can help support this goal by integrating the supply chain with other business functions, facilitating collaboration with suppliers for greater resilience, enabling companies to adjust quickly to changes, and measuring and managing supply chain data.
Introduction

Mobile computing
Mobile communication tools deliver shipment visibility, worker performance, and asset-tracking data directly to managers, no matter where they are.

Cloud computing
Cloud computing has the capacity to change the way companies operate supply chain management (SCM) activities. By harnessing the cloud, companies can reap operational benefits and maximise potential savings.

Internet of things
Internet of things (IoT) sensors are fast becoming a complete ecosystem where software, cloud computing and analytics tools are turning raw data into meaningful information.

Mobile computing
Mobile devices such as radio-frequency identification (RFID), barcode scanners, mobile computers and supply chain applications can help track shipment status visibility, inventory, line of sight into equipment and worker performance, and also manage supply chains from anywhere.

Mobile computing technologies

Mobile devices (smartphones/tablets)
Consumer grade devices, especially smartphones, are being increasingly used by supply chain managers to access information in their supply chain systems or host business systems. Along with tracking information, these devices also scan documents and capture signatures.

The reduced prices of smartphones and increased functionalities, previously reserved for ruggedised devices, has helped increase the adoption of smartphones in SCM.

Barcode scanners
From the supply chain point of view, scanning the barcodes of the products using mobile Internet-connected devices helps record transportation information (real time) across each stage from the retailer to the customer (delivery tracking). With the help of this information, the customer can be informed about the status of his or her order.

In retail, inventory decisions are being made based on data provided by the large number of handheld barcode readers that can read goods at hand and update the inventory in real time through wireless connections.

Ruggedised devices
Ruggedised phones are built to withstand tough physical conditions such as elevated drops on concrete and extreme temperatures. These capabilities make them more versatile than traditional smartphones.

With their increasing capabilities, lower price points and greater user acceptance, these devices are ideal for distribution environments. Ruggedised devices last for 5 to 7 years in harsh environments.
How the industry is adopting mobile computing

Manufacturing
- Through the entire value chain from sales to shipment
- Predictive maintenance
- Managing supply chain
- Communication
- Organisation and resource management
- Reporting and quality assurance
- Plant and production line management

Logistics
- Route segmentation
- Hazard point analysis
- Driver segmentation
- Inventory management
- Telematics-based insurance
- Indoors geolocation
- Fuel cost reduction

Health
- Product innovation
- Collecting/distributing data through wearable technology
- Predictive maintenance
- Data-driven diagnostics
- Prescription adherence
- Sales and business development

Retail
- Inventory management
- Shrinkage reduction
- In-store customer interaction
- Campaign planning
- Customer insight
- mCommerce

Utilities
- Smart metering
- Customer service

Cloud
Cloud computing can transform the digital supply chain network.

Solutions based on the cloud, delivered through the software as a service (SaaS) model, can be adopted for all components of the supply chain as it provides benefits like low upfront investment, secure access, faster deployment, simplified integration, continuous upgrades and effortless scalability.

Cloud computing can be utilised efficiently in supply chain activities such as planning and forecasting, logistics management, sourcing and procurement, and service and spare parts management.

Cloud-based computing and tailored apps that harness data can be used to deliver greater bandwidth and scalability at the operations level. These apps can also be used for external data, such as weather information, to increase efficiency and accuracy.
**IoT and big data**

**IoT generates massive volumes of data for analysis**

Cisco estimates that *50 billion objects will be connected to the Internet by 2020*, producing a massive volume and variety of data at unprecedented velocity.*

The Brontobyte (10²⁷ bytes of information) is expected to be the measurement unit to describe the type of sensor data that will be generated from IoT devices.

Big data tools will be used to collect, store, analyse and distribute these large data sets in order to generate valuable insights, create new products and services, optimise scenarios, etc.

IoT improves inventory management by bringing real-time visibility of the inventory and giving a clear view of how much is left, thus reducing both out-of-stock and overstock issues.

Fleet management companies use IoT by equipping the load carried by the company with sensors which collect all kinds of information—namely destination, navigation and transport conditions—to help manage maintenance schedules and daily vehicle usage, and automate asset tracking.

IoT also helps monitor driver performance and ensure that drivers take the most effective and shortest possible route. This results in reduced costs, improved efficiency, increased service, removal of defective goods, lower transportation costs due to a lower reshipping rate and lower risk along every step of the supply chain.


**Evolution of endpoint sensing**

*In the future, creative uses of sensors—whether used individually or combined to create sensor pairs—can contribute unique information to impact business operations.*

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Application</th>
<th>Business impact</th>
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<tbody>
<tr>
<td>Electromagnetic and pressure sensors</td>
<td>Will identify equipment that is out of tolerance or detect wear and tear on moving parts</td>
<td>Information will alert plant managers to replace or repair equipment before disruptions are caused to the manufacturing line</td>
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<td>Visible light</td>
<td>Used at sea; sensors will guide container ships to help them avoid hazardous sea lanes</td>
<td>Reduce the cost of ship repairs due to collisions</td>
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<td>Uses image sensors that detect light data from buoys or lighthouses</td>
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<tr>
<td>Motion and radio frequency</td>
<td>Sensors will recognise the presence of employees or customers in an area and activate environmental controls as needed</td>
<td>Decrease store or facility energy costs</td>
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<tr>
<td>Radar, thermal and wireless signal sensors</td>
<td>Fleet vehicles will be equipped with sensors that will accurately sense the direction and speed of pedestrians in situations where visibility is poor</td>
<td>Decrease legal and other costs associated with the effects of an accident</td>
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Why PwC?

Strong supply chain sector expertise
Our consultants have a proven track record of working with leading service providers in India, thereby gaining strong domain knowledge in this space.

Scalable, flexible and cost-effective offerings
Our solutions can be customised as per a service provider’s specific needs across areas.

Cutting-edge technology
We have expertise in implementing mobile computing, digital and IoT in the supply chain by aligning them to the client’s technology landscape.
PwC can help you deal with all of these and other challenges through the use of analytics, allowing you to have access to information quickly and accurately and in formats that will enable you to make meaningful business decisions in real time.

Out Data and Analytics offerings

Data and Analytics offerings

- Business intelligence and data management strategy, vendor evaluation
- Business intelligence on enterprise resource planning
- Enterprise-wide data warehouse implementation
- Financial planning, budgeting and consolidation
- Analytics strategy
- Analytics maturity assessment and benchmarking
- Analytics model implementation
- Analytics competency centre set-up
- Regulatory technology
- Financial crime
- Claims loss analytics
- Liquidity risk
- Tax analytics
- Fraud analytics
- CM dashboard
- Revenue assurance
- Quality of service analysis
- Pricing analytics
- Human capital analytics
- Cross-industry offerings
  - Big data strategy and implementation
  - Data management
  - Business intelligence and data management strategy
  - Vendor evaluation
  - Social media analytics
  - Master data management
  - Financial planning, budgeting and consolidation
  - Analytics competency centre set-up

Data and Analytics key industry-wise services

- Customer analytics
- Supply chain analytics
- Demand forecasting
- Store operations analytics
- Marketing ROI/trade promotion
- Sales and distribution analytics
- Sales force analytics
- Demand forecasting
- Physician targeting
- GPS-based smart logistics
- Promoters'/chairman’s dashboard
- Predictive asset maintenance
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