PTC® PRODUCT & SERVICE ADVANTAGE®

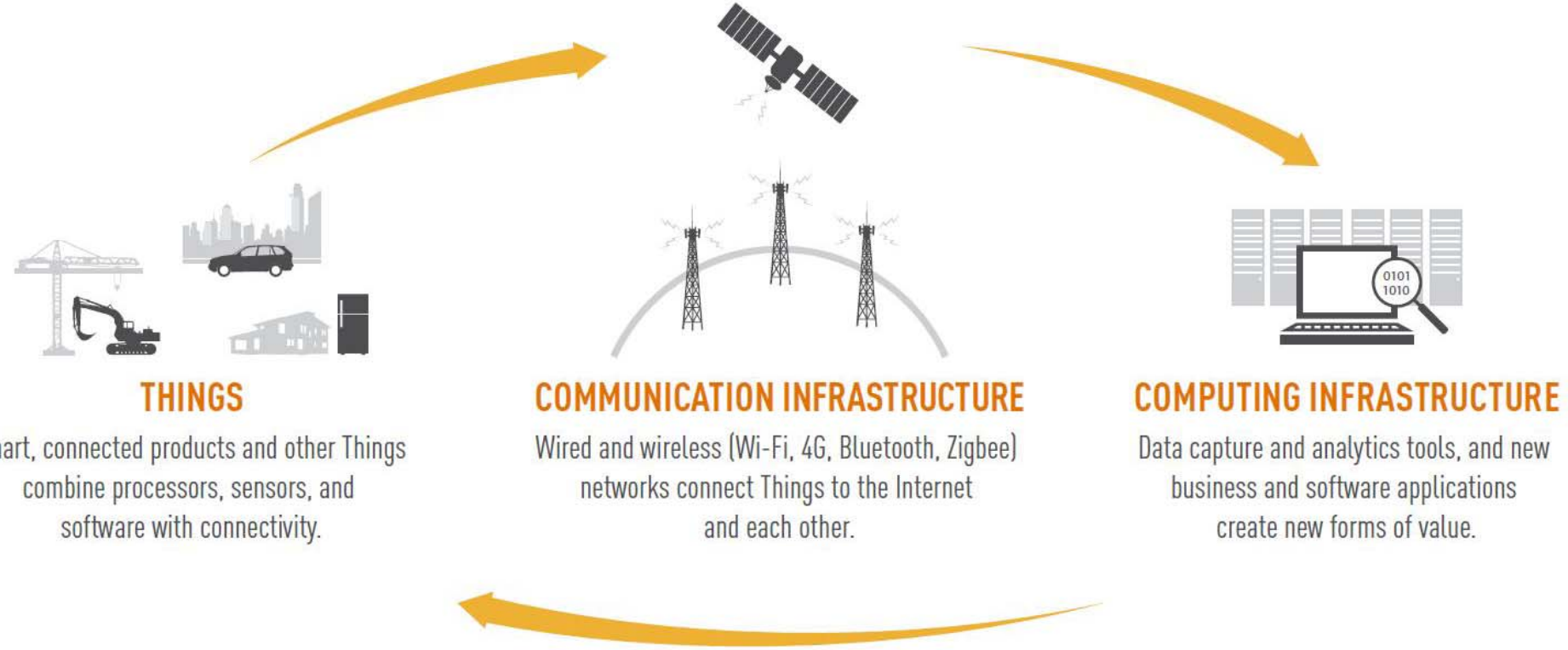
Smart, Connected Products in the Internet of Things

조용원
PTC 코리아 지사장

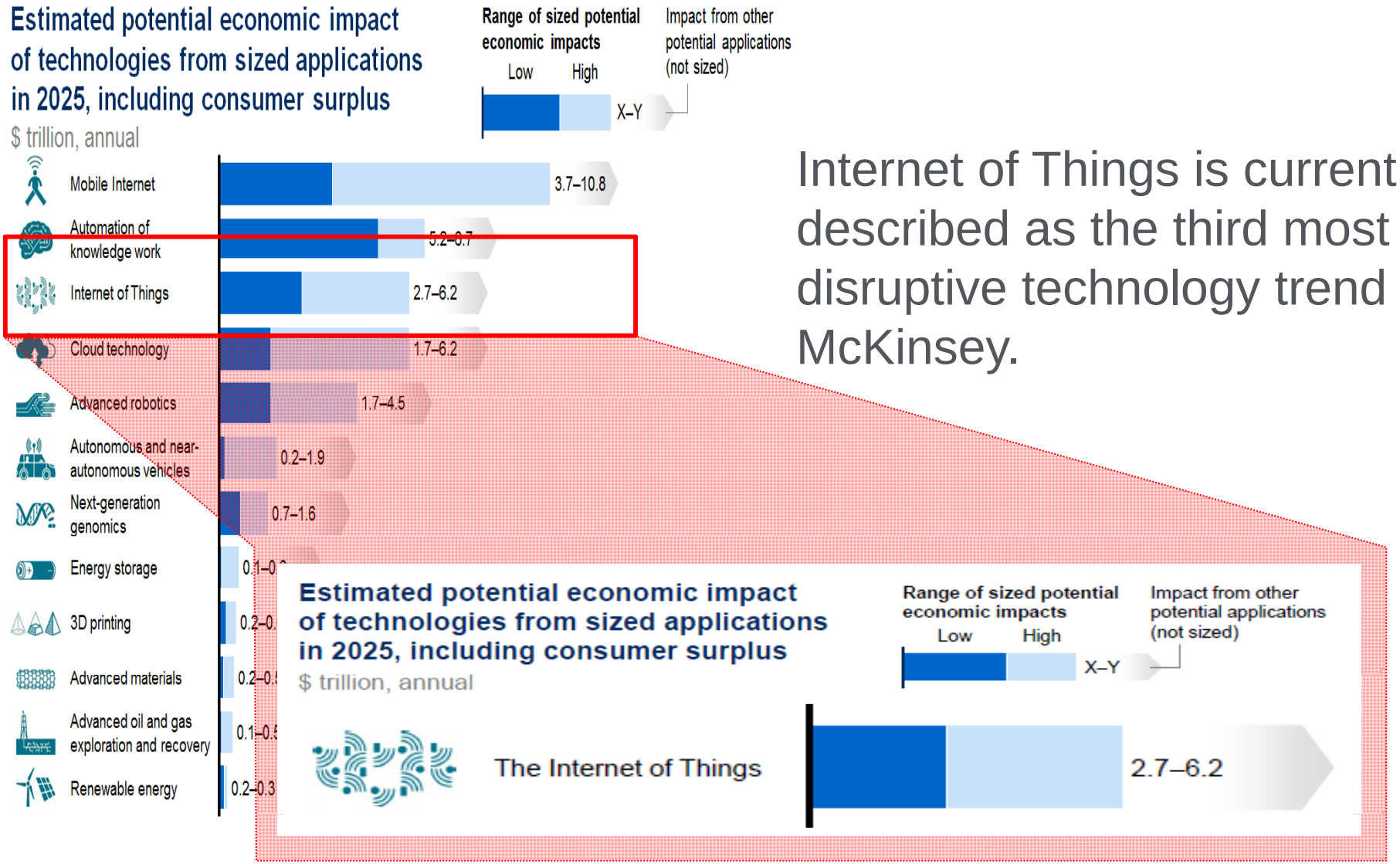
2014년 6월 25일

The Internet of Things

Smart, connected products and other Things connected through an Internet-like infrastructure to a computing infrastructure, creating new forms of value



McKinsey's View of Disruptive Technologies



Internet of Things is currently described as the third most disruptive technology trend by McKinsey.

Applications Drive Value in the Internet of Things

PTC

CISCO

*"Huge Explosion of devices… candidly, doesn't do you any good **without the applications** to make them practical."*

– John Chambers, CEO

McKinsey Global Institute

$6.2T

Estimated potential economic impact of The Internet of Things in 2025, range from $2.7 – 6.2 trillion annually

– McKinsey Global Institute

Gartner

#1

Manufacturing industry will be the #1 industry sector by share of global economic value-add.

– Forecast: The IoT, Worldwide, 2013

What Are Smart Products?

PTC

Smart Product

Enhanced UI
Ability to Interact

Software
Ability to Think

Sensors
Ability to Sense

Electronics and Controls
Ability to Process

Physical Product

Electrical

Mechanical

Smart Product Examples

Products that can process, sense, think, and interact, but are not connected

Smart Refrigerator

- Refrigerators equipped with built-in touch screens that can help keep track of food inventory and expiration dates
- Easily customize temperature of freezer, refrigerator, and water based on user preferences

Bosch Direct Drive System for Windshield Wipers

- Sensors embedded in blades detect the amount of water on the windshield and adjust speed based on how wet or dry the windshield is
- Blockage recognition system detects obstructions such as snow accumulation and adjusts area swept

Keurig Vue Brewing System

- Each Keurig coffee pack contains an RFID tag that communicates the default optimum setting for each type of beverage to the brewing machine
- Allows for user to further customize each individual cup based on user preferences in strength, temperature, and size

What Are Smart, Connected Products?

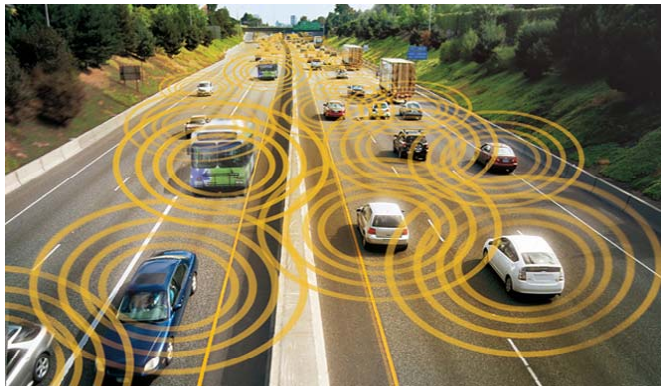
PTC

Smart, Connected Product
Connected through a wire or wireless

Mesh Connectivity
Many to Many

Hub and Spoke Connectivity
One to Many

Point-to-Point Connectivity
One to One



Smart Product

Enhanced UI
Ability to Interact

Software
Ability to Think

Sensors
Ability to Sense

Electronics and Controls
Ability to Process

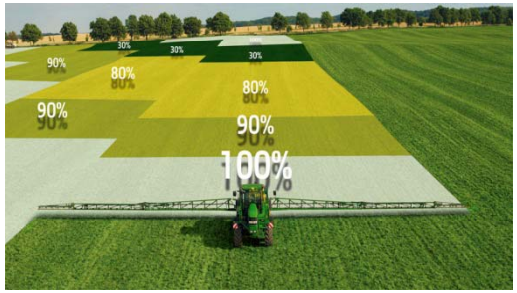
Physical Product

Electrical

Mechanical

Smart, Connected Product Examples

Smart products enabled by wired or wireless connectivity



John Deere FarmSight

- Harvesting sensors measure dry matter content and other soil nutrient factors
- Farm owner and dealer can proactively monitor equipment and fields to ensure peak agricultural efficiency
- Automatic, remote software updates and technician initiated solution implementation

GE's Smart Engines

- Data is used to predict inefficiencies, engine maintenance, fuel consumption, crew allocation and scheduling when these smart aircrafts can communicate with operators
- Operators know what maintenance is required before plane reaches service center
- Real-time monitoring of and communication with 30,000 engines simultaneously

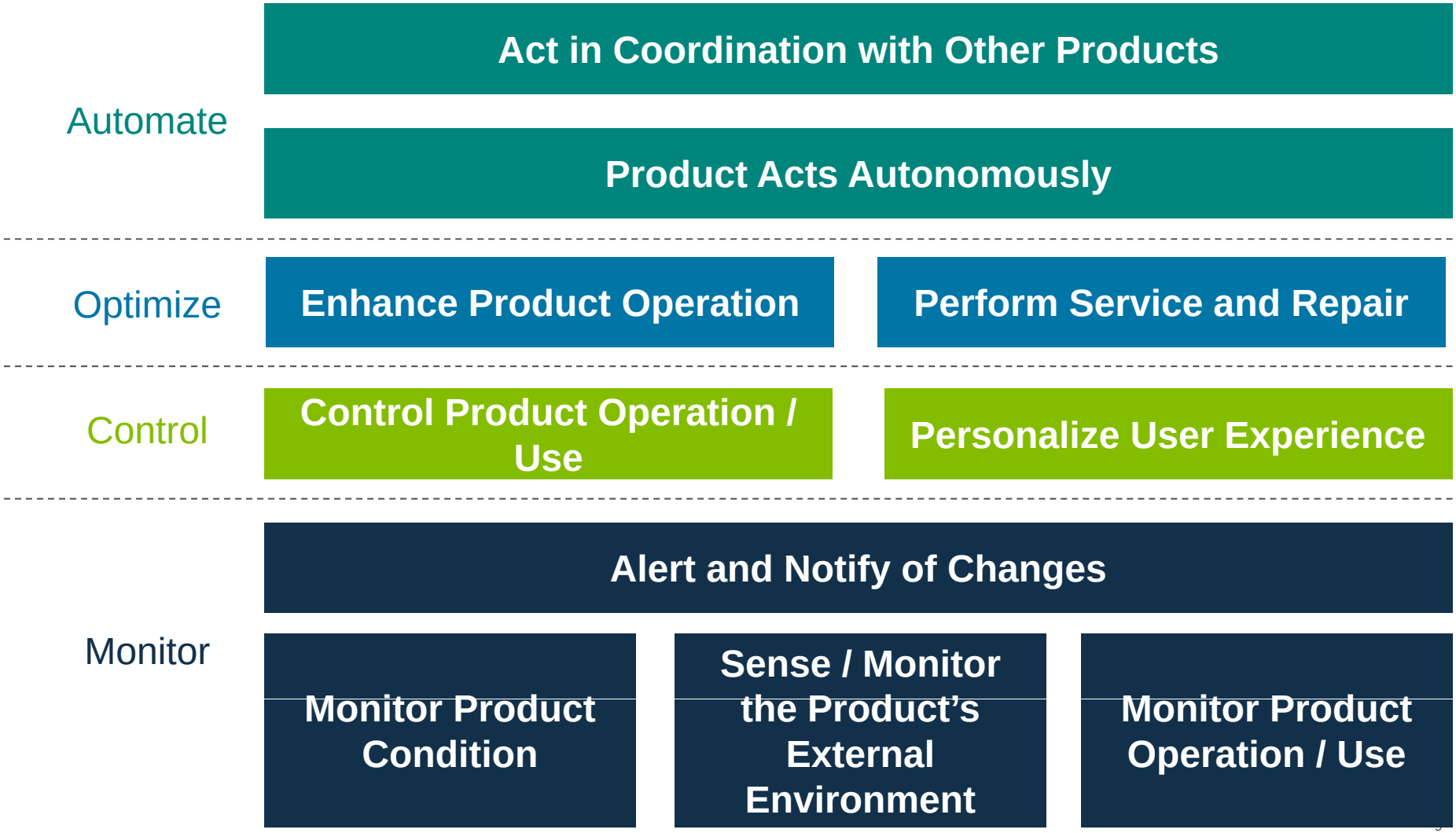
Philip's IntelliCap

- Controls the release of medicine and provides rich, detailed patient data to better inform drug development
- Records the location in the intestine using sensors and communicates wirelessly to an external receiver
- Physicians can interact with the capsule in real-time to provide further instructions

Capabilities of Smart, Connected Products

PTC

Four new categories of capabilities are enabled by smart, connected products



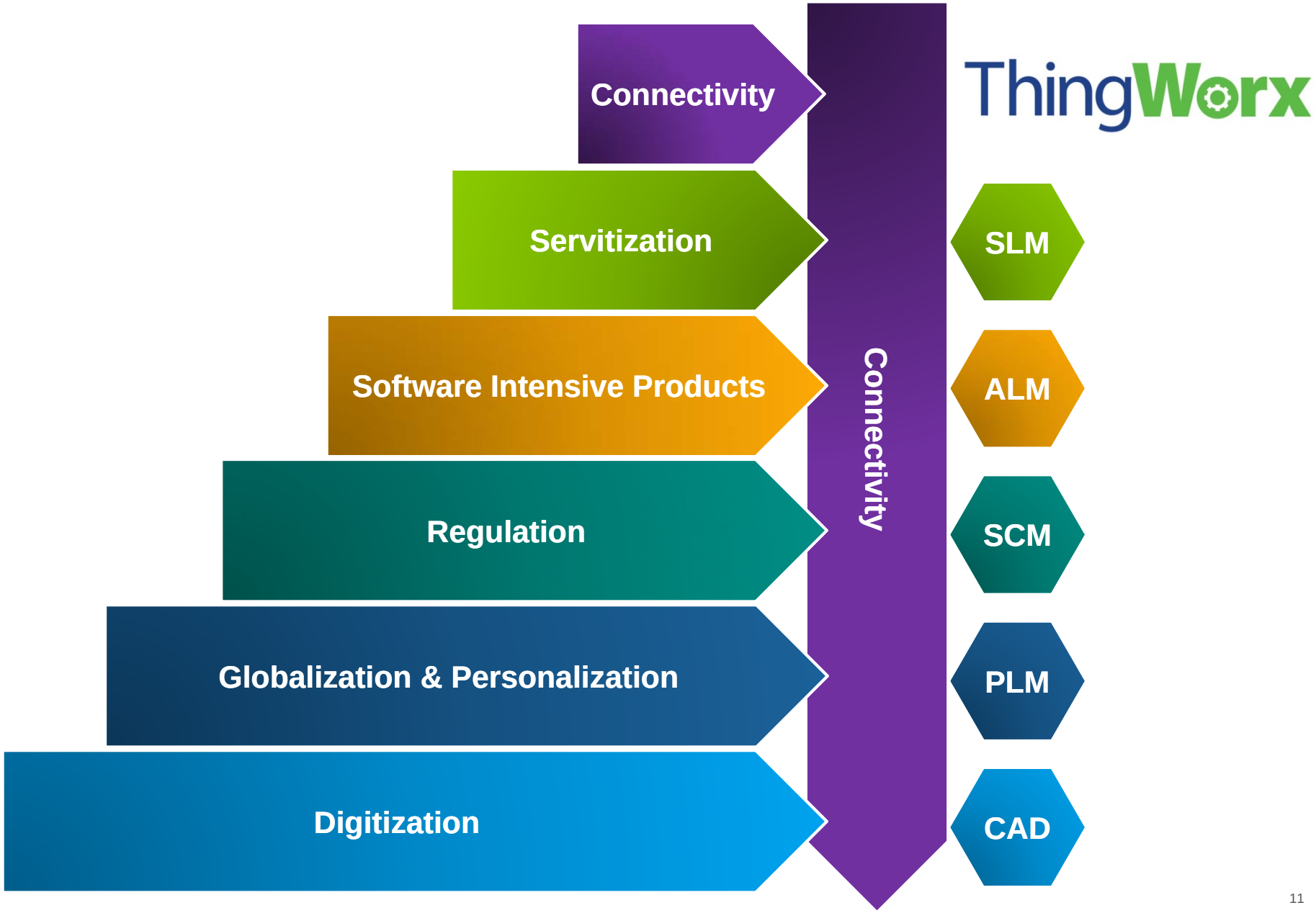
Impact of Smart, Connected Products on Manufacturers

PTC

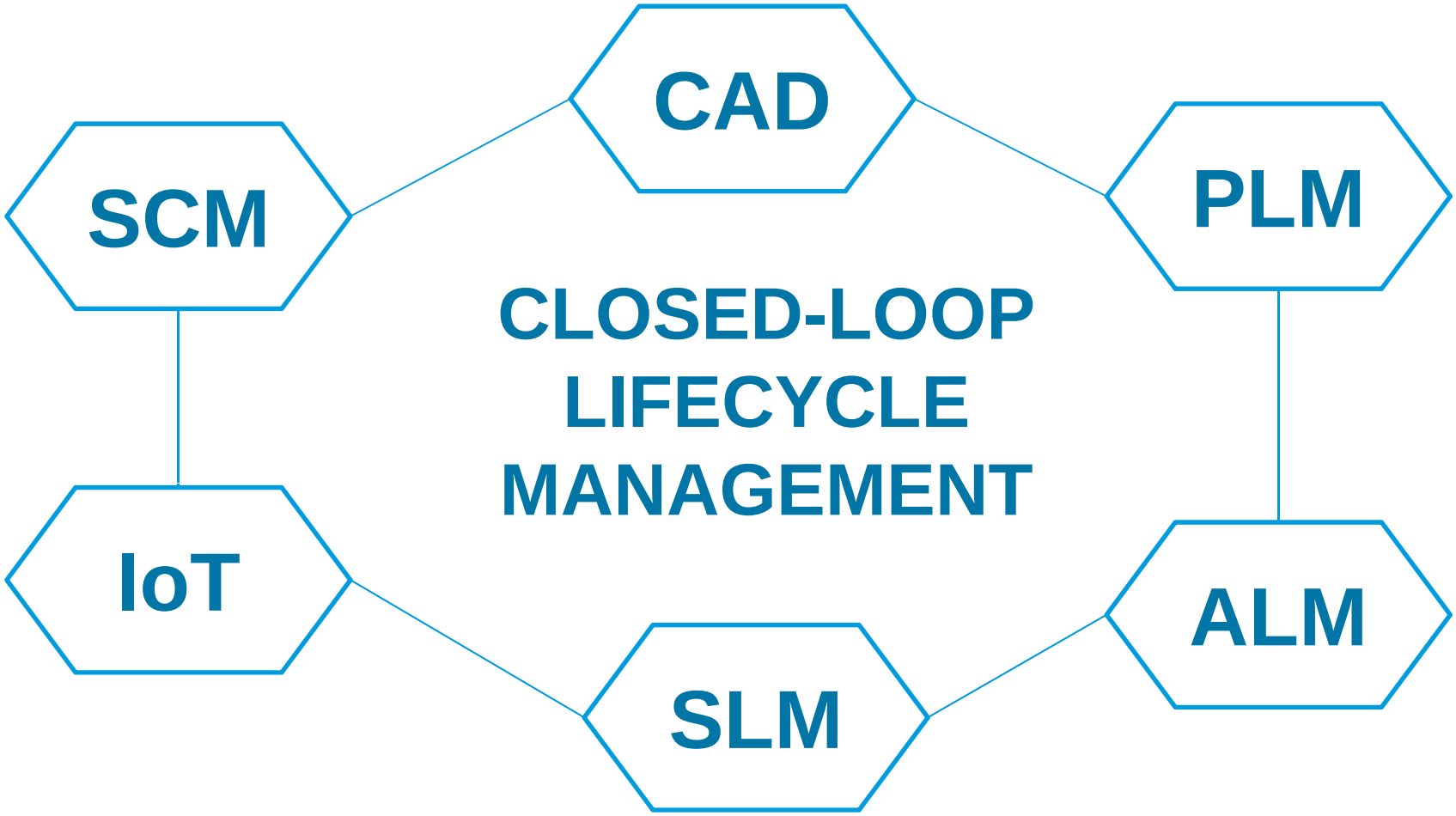
A shift in the emphasis of value and differentiation across industries

- **Value is Shifting from Hardware to Software**
  - As manufacturers seek to accelerate product innovation and efficiently meet the growing diversity of customer demand and regulation, they increasingly turn to software.
- **Value is Shifting from Product to Cloud**
  - Connecting smart products enable a digital component of the product in the cloud to extend capabilities within the product and deliver entirely new capabilities alongside the product.
- **Value is Shifting from Product to Service**
  - Products are now integrated with services that deliver new value throughout the entire product lifecycle or simply deliver the desired outcome via an on-demand service.

These Major Forces Have Driven PTC's Evolution



Closed-Loop Lifecycle Management Opportunities



Closed-Loop Lifecycle Management Opportunities

Create

Connected Requirements Management

Monitor asset usage and compare actual performance vs. design requirements for better assessment of future needs.

Operate

Software Configuration and Release Management

Real time reporting of software versions and configurations compared with currently supported versions to prompt alerts for required updates or automatically deliver updates

Connected Quality Management

Analyze asset condition to automate failure reporting, and leverage performance data to identify quality issues and future design recommendations.

Service

Connected Field Service Management & Automated Service Execution

Error and warning codes are used to determine correct service event and provision correct parts/people.

Connected Service Knowledge Management

Real-time data on error and warning codes are used to automatically locates likely solutions and auto-creates support ticket querying product data to aide resolution.

Connected Service Parts Planning

Forecasted and installed based inventory optimization and automated replenishment based on up to date status of machine location, configuration, and status.

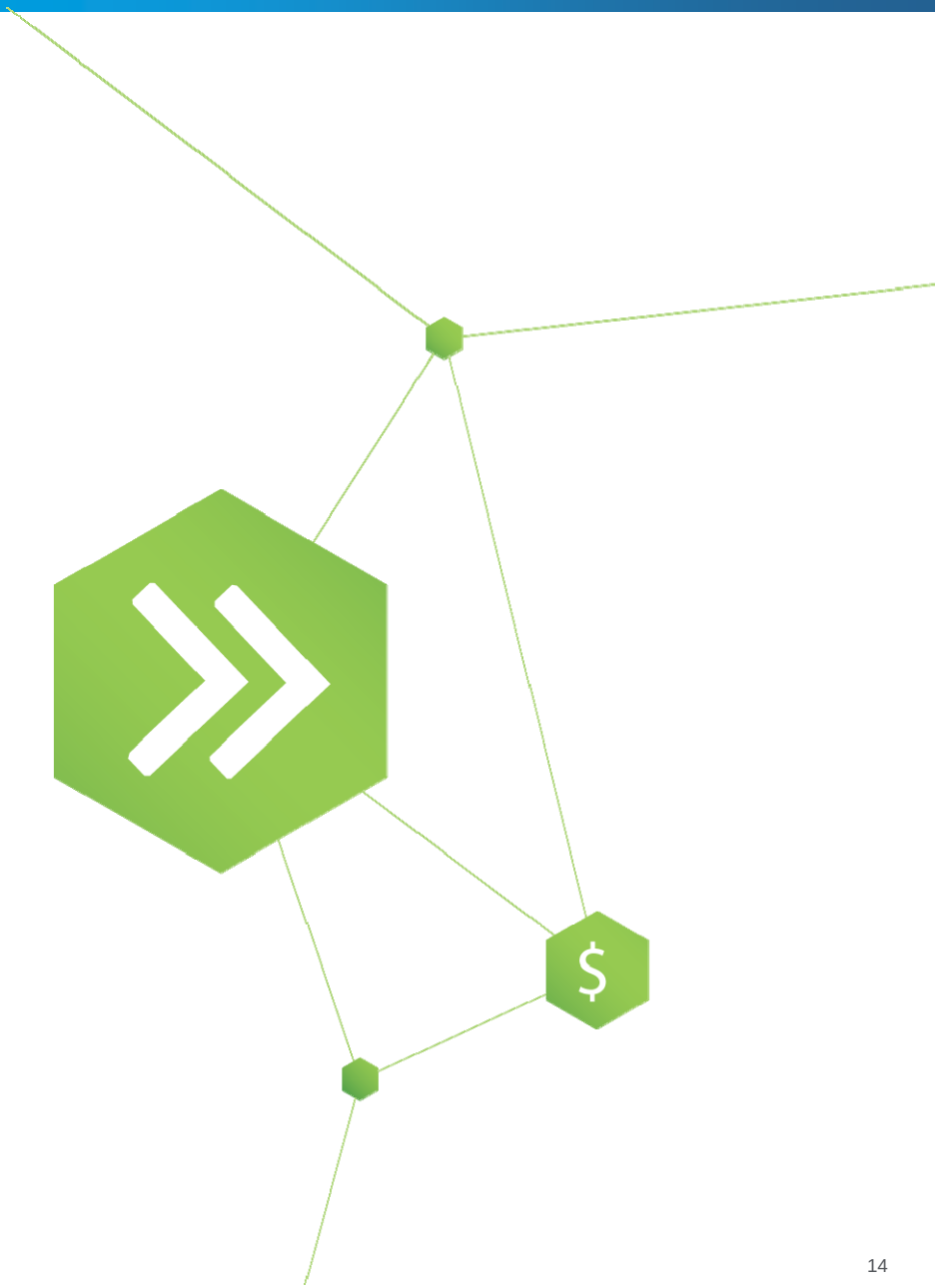
Connected Warranty and Contract Management

Identify root cause of failures to monitor and notify customer of non-compliance.

PTC Strategy: Product and Service Advantage

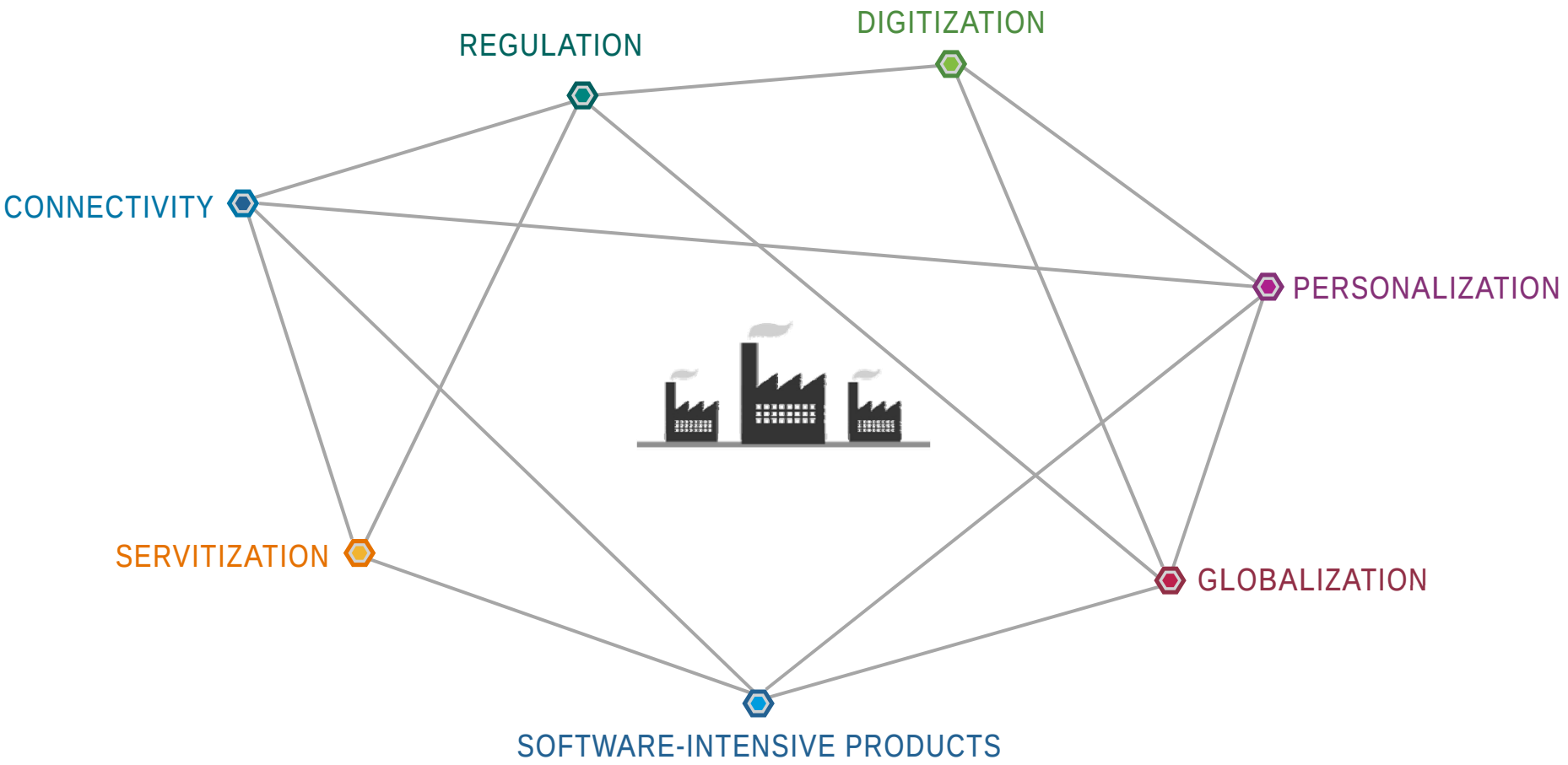
PTC®

Technology solutions that transform the way you create, operate, and service products



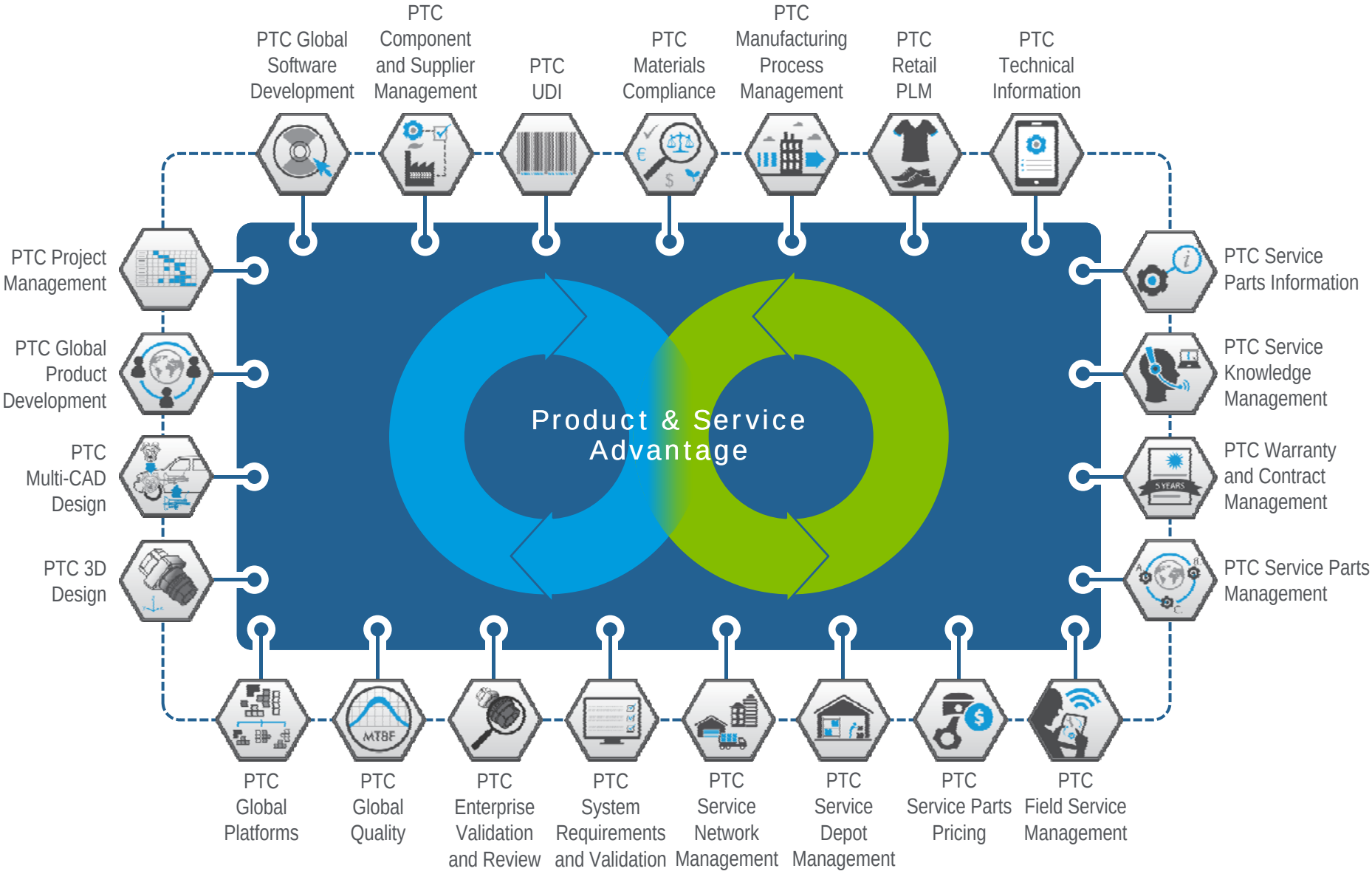
Major Forces of Transformation in Manufacturing Sector

PTC



External forces are reshaping the manufacturing landscape	Products are evolving to be smart, connected and global	Value is fundamentally shifting from product to service	When combined, these forces will transform the industry

PTC System of Solutions



ThingWorx

PTC Acquires ThingWorx – the *Leading* IoT Platform

ThingWorx™
A PTC® Business

- Rapid application development and execution platform
- Modern architecture with flexibility to deploy on premise or in the cloud
- Technology leadership in Smart, Connected Products & Manufacturing
- Recognized as the industry leader

Harbor Research
San Francisco | Boston | Zurich

Gartner | 2011
COOL VENDOR

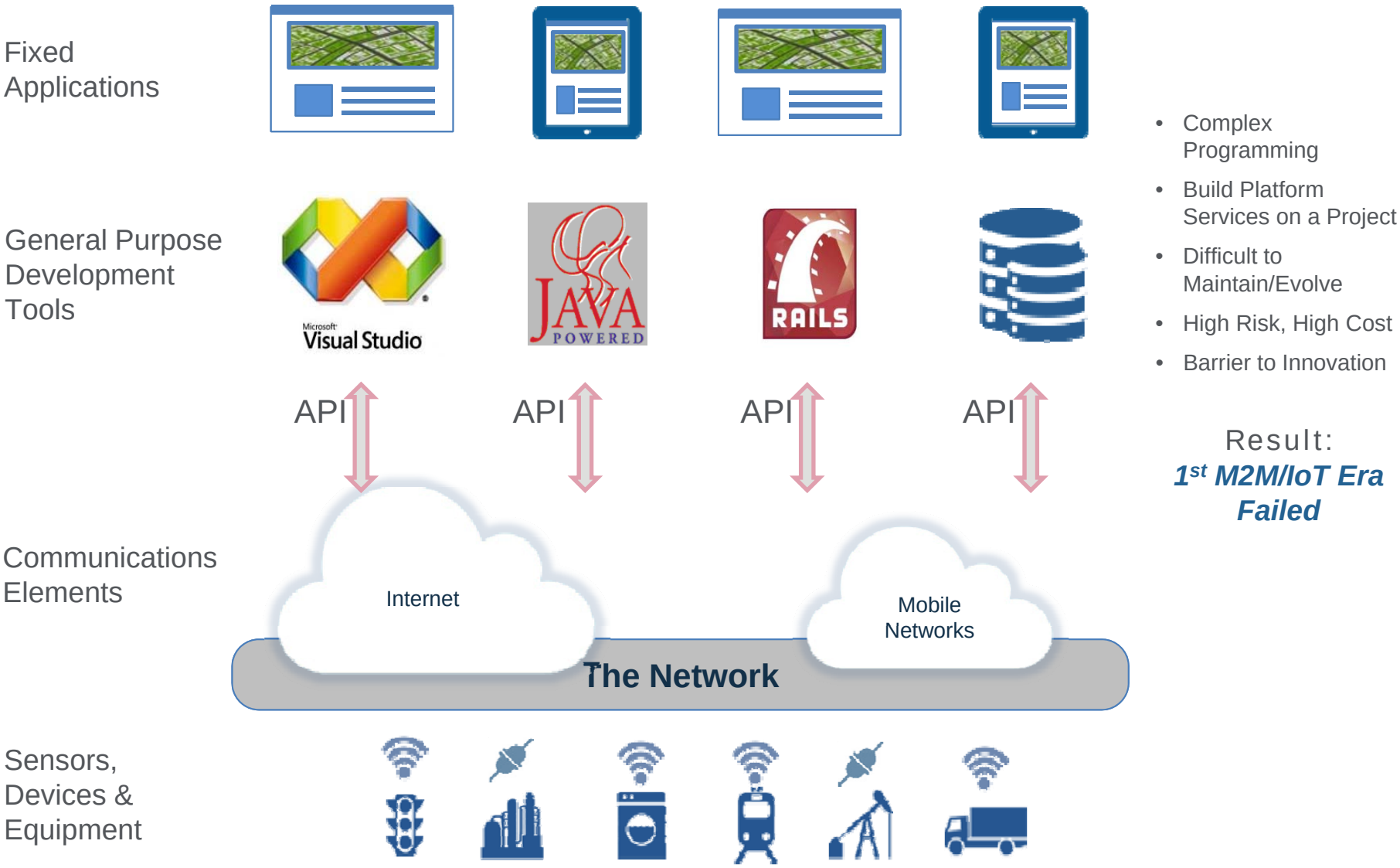
FROST & SULLIVAN
2012 BEST PRACTICES AWARD
New Product Innovation Award

CW 2013 value chain awards

BATTLE OF THE PLATFORMS 2013

Enable the development and deployment of intuitive and powerful IoT applications 10X faster

IoT Application Development Before ThingWorx



- Complex Programming
- Build Platform Services on a Project
- Difficult to Maintain/Evolve
- High Risk, High Cost
- Barrier to Innovation

Result:
1st M2M/IoT Era Failed

ThingWorx - Purpose Built for IoT Development

PTC

Dynamic Applications

Application Enablement

MASHUP BUILD

Eternal System ervices

SYSTEM/SE CE INTEGRATI

STORAGE ENGINE

ThingWorx
A PTC Business

Develop and Deploy IoT Applications

10X Faster

Communications Elements

Internet

Mobile etworks

The Network

Sensors, Devices & Equipment

translate

amazon webservices

twilio

CLOUD SERVICES

PTC

Salesforce

SAP

IBM maximo

ORACLE

BUSINESS SYSTEMS (ERP, CRM)

BIG DATA ANALYTICS

IoT Platform Combines ThingWorx and PTC Strengths

PTC

PTC Connected Solutions

ThingWorx Marketplace Apps

Custom Customer Apps

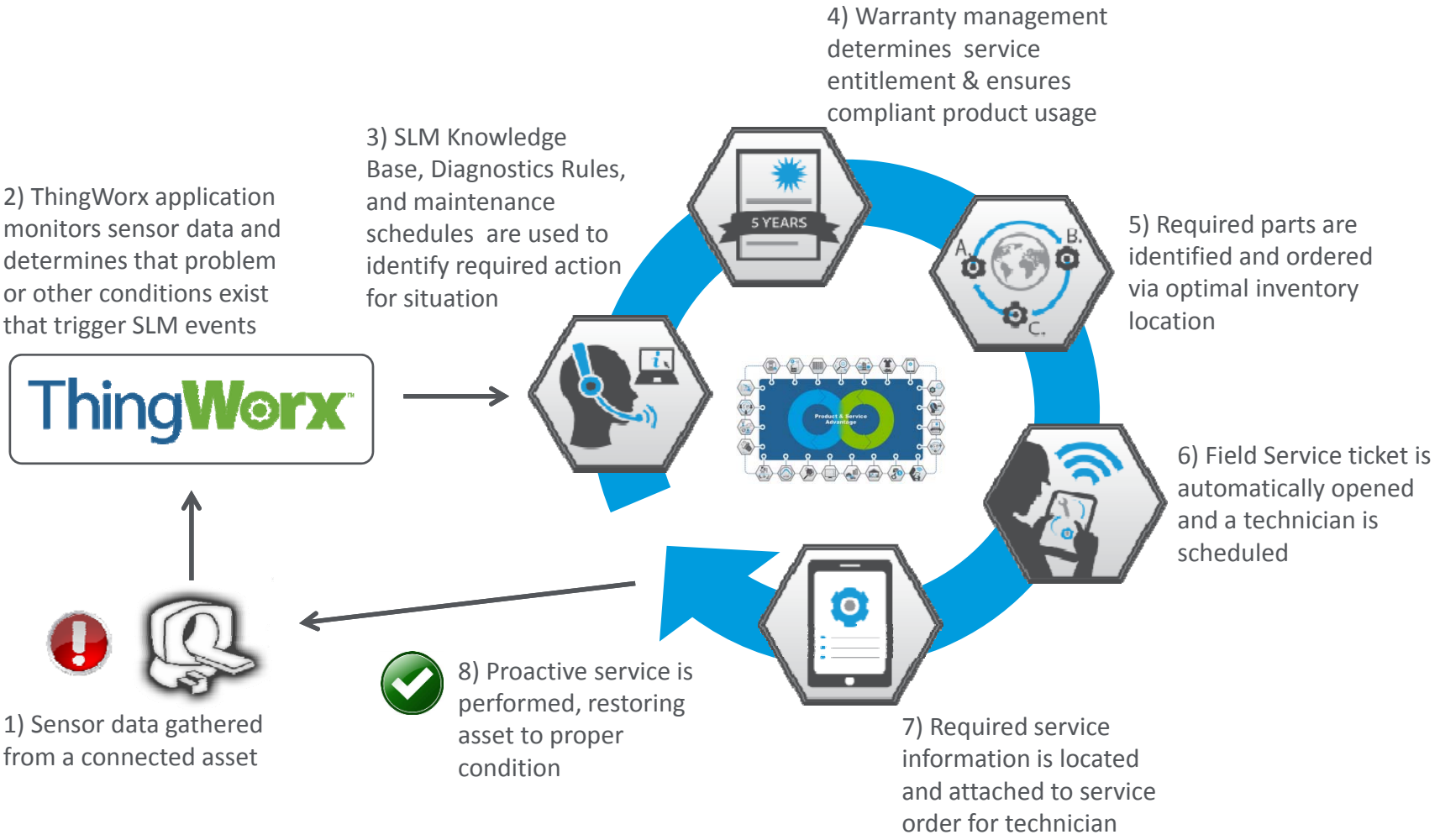
ThingWorx

Smart, Connected Products
Machine Sensor Data

CRM MES
MRO ERP

Financial and Customer Data
Product and Service Definition

Automated Service Lifecycle Management



PTC®

PRODUCT & SERVICE ADVANTAGE®