Developing a Smart Factory Strategy

Insights and experiences from industry leaders

25th June 2019

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Manufacturing Sector Shift

Vikram Singla, Industry Lead
UK Commercial Sector

Nick Kamen, Director
EMEA Industrial Sector

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Industrials at Hitachi

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Industry is at the very core of Hitachi

$81.8B consolidated revenue*

Thomson Reuters Top 100 Global Innovators

Industrial and IT Leader

#71 Fortune 500

15,000 + global customers

1,400+ strategic alliances

Heritage of innovation:
- **119,000** global patents
- **11,000** IoT patents
- **$3.5B** annual R&D*
- **$2.8B** 3-year IoT R&D*

15,000 global partners

110+ years technology and product development

860+ subsidiaries

304,000 employees

*As of March 2017

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Hitachi's Digital DNA

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OT

107+
YEARS

Operations Excellence & Industry Knowledge

IoT

Worldwide Patents
Since Year 2000

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$5.4B
2016 IoT Revenue

$2.8B
IoT Investments

6M
Connected Machines

16K
IoT Employees

11K
IoT Patents

FORTUNE 500 Top 10
Global Technology Companies by Revenues

- Apple
- SAMSUNG
- amazon
- FOXCONN
- Alphabet
- Microsoft
- HITACHI
- IBM
- HUAWEI
- SONY

IT

58+
YEARS

Digital Enablers & Disruptive Technologies

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1. Source: Procopio, Cory, Hatgreaves & Savitch LLP
2. Source: Top 50 Global Technology Companies". Fortune Magazine

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Hitachi Consulting is the global solutions and professional services organization within Hitachi Ltd and is a business integrator for the IoT era and a catalyst for digital transformation.

We collaborate with our clients to help them innovate faster, maximise operational efficiency and realise measurable, sustainable business and societal value.

As a consulting-led solutions company, we help our clients leverage data as a strategic asset to drive competitive differentiation, customer loyalty and growth.

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ORACLE IN **MANUFACTURING**
40+ YEARS OF INDUSTRY LEADERSHIP

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Oracle – A Service company Now

25,000 +
SaaS Customers

70%
Customer Driven Innovation

$6B+
R&D Annual Spend Since 2008

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Changing Landscape – Top Trends

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-> Mass Customisation

-> Data company

-> Competitive Differentiation

-> Experience economy (service-centric)

-> CSR impacting top line

-> Sustainability

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Changing Landscape – A few numbers

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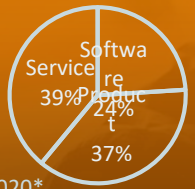
Increasing Focus on Software and Service in Innovation



Innovation in 2020*

- PWC 2016 Global Innovation 1000 Study

3D Printing will Reduce Product Introduction Timelines by 25%

-Gartner

Manufacturers that will update operations and operating models with IoT

75%

IDC FutureScape: Worldwide Manufacturing

Top Discrete Manufacturers providing Product-as-a-Service by 2018

40%

IDC FutureScape: Worldwide Manufacturing

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Changing Landscape – Data Company

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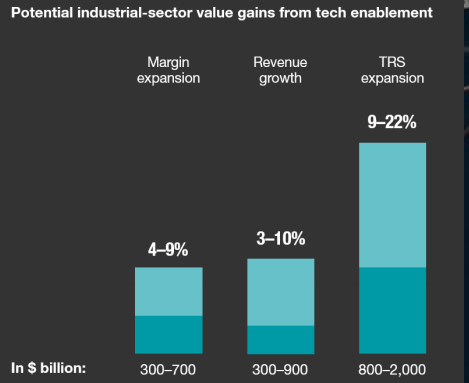
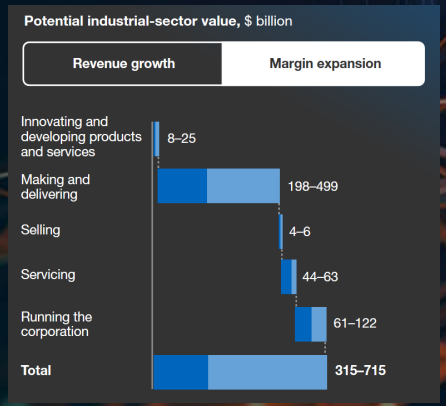
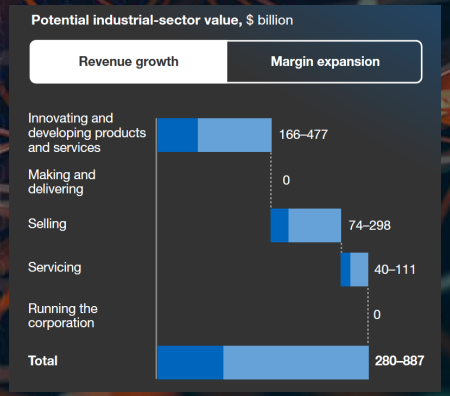
Value explosion

Performance at global industrial companies has been flatlining for years, but new innovations in data, connectivity, and cheap processing power and storage may soon jump-start performance.







Source – McKinsey

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Changing Landscape – Experience Economy

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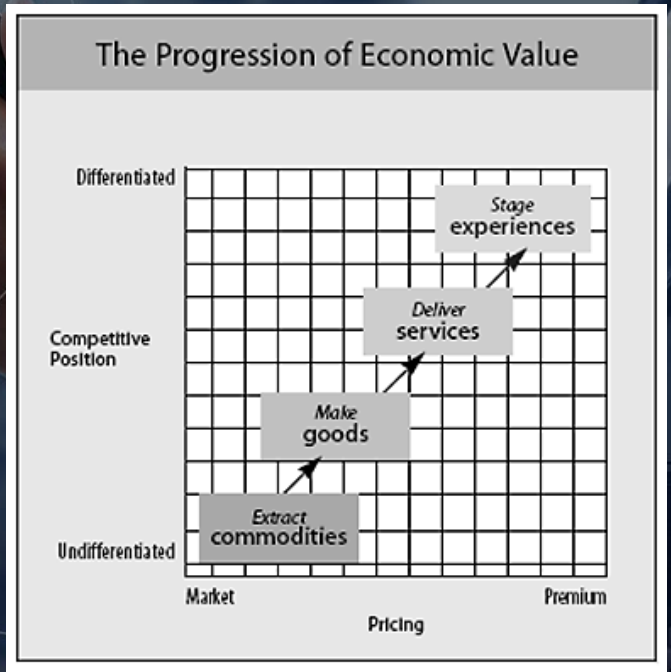
Moving towards outcome based business models for competitive differentiation



Source - HBR

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Sustainability - A view from IET report

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There is urgency to act on industrial sustainability in the UK in a post-Brexit era (Smart et al, 2017). Champions (such as Interface, M&S, Toyota and Unilever to name a few) are recognised by customers and wider consumers as leaders and innovators, and build trust and brand loyalty.

There is urgency to act on industrial sustainability in the UK. Sustainability in this context reflects the triple bottom line approach in addressing: People, Profit, Planet or Social, Financial and Environmental issues and opportunities (Elkington, 1999). The benefits to companies start with reducing costs and quickly develop into building resilience to supply chain shocks, building customer loyalty, developing new market opportunities and contributing to the health of workforces and the communities they operate within.

Many companies start by focusing on the bottom line by reducing cost, then realise the greater advantages in addressing innovation, market leadership and building resilience to strengthen the "top line". We still have a perceived abundance of materials but need to protect ourselves against shortages driven by inability to purchase those materials or their physical exhaustion. The significance of the risk of climate change impacting locally and globally is now so great that the risk of not reacting far outweighs the perceived costs of acting.

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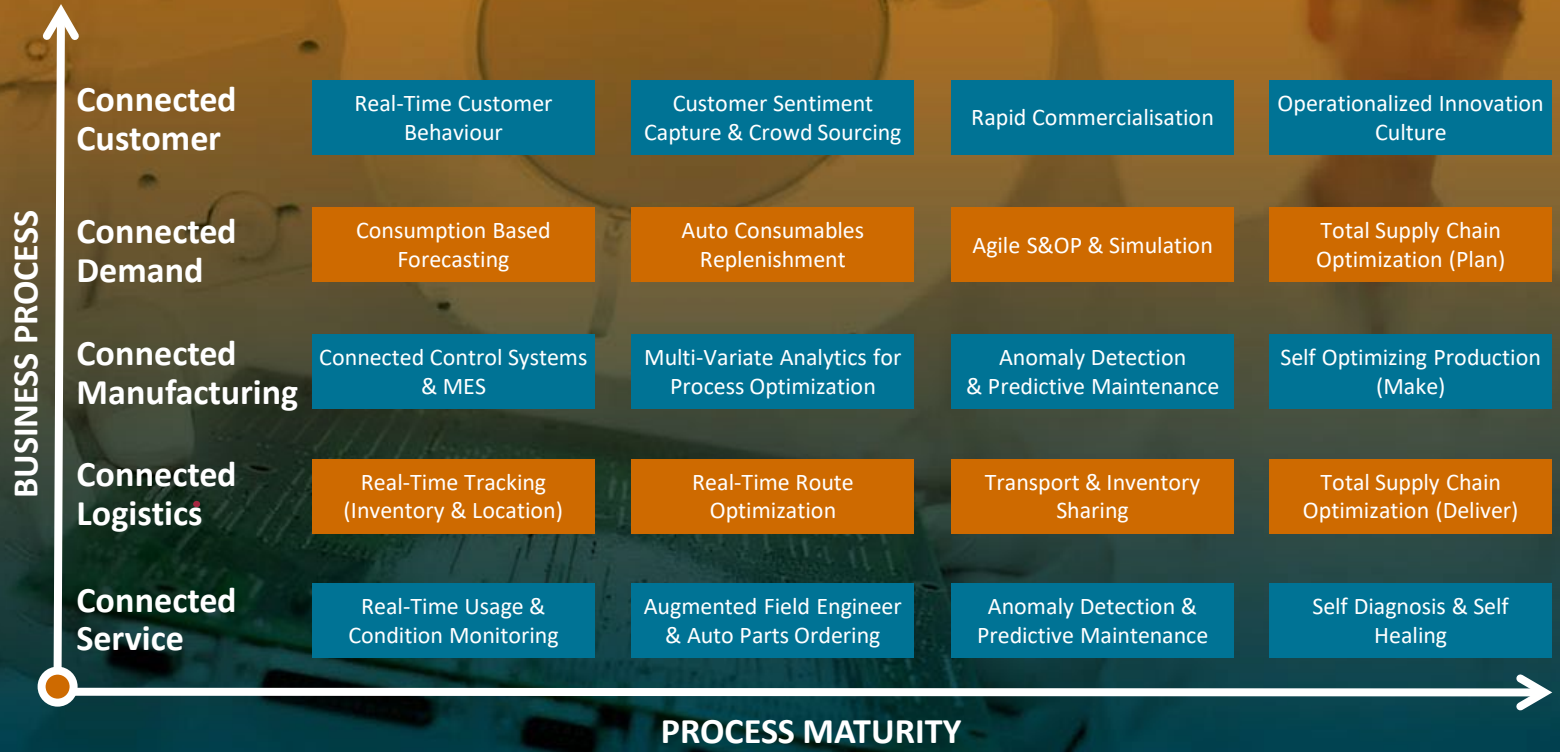
Source - IET

Connecting Business Processes

Opportunities for improvement



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Connecting Business Processes - IT/OT

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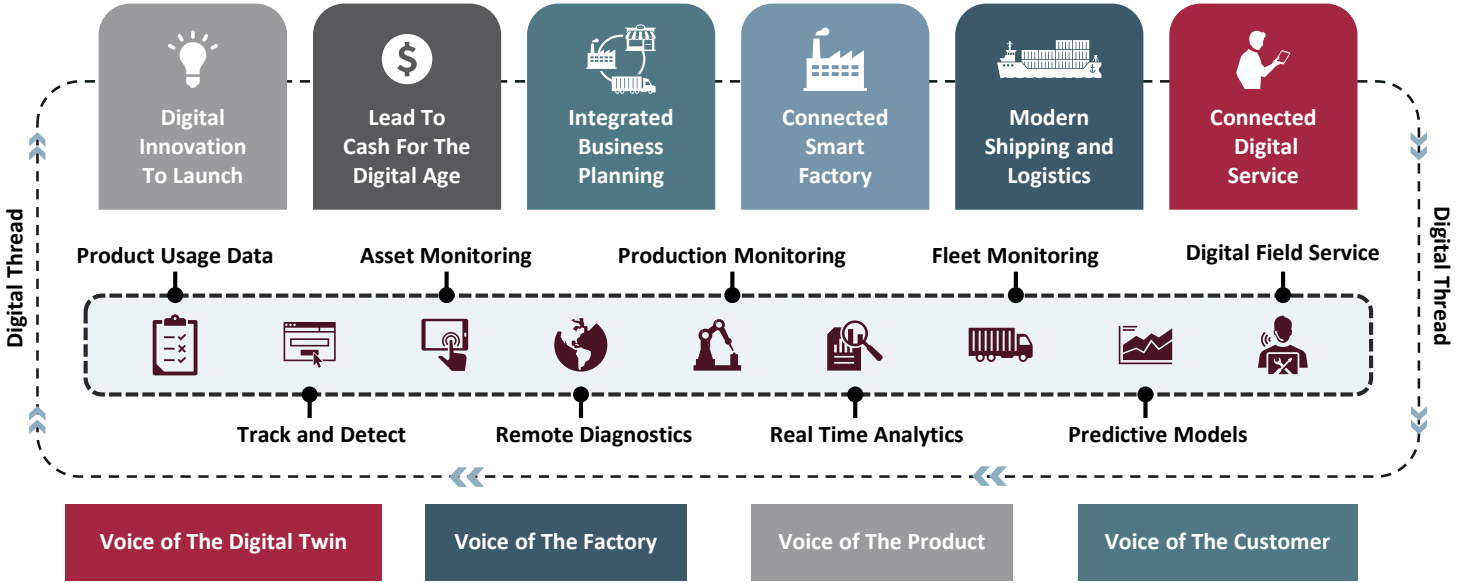

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Cloud – Ensuring technology is always current

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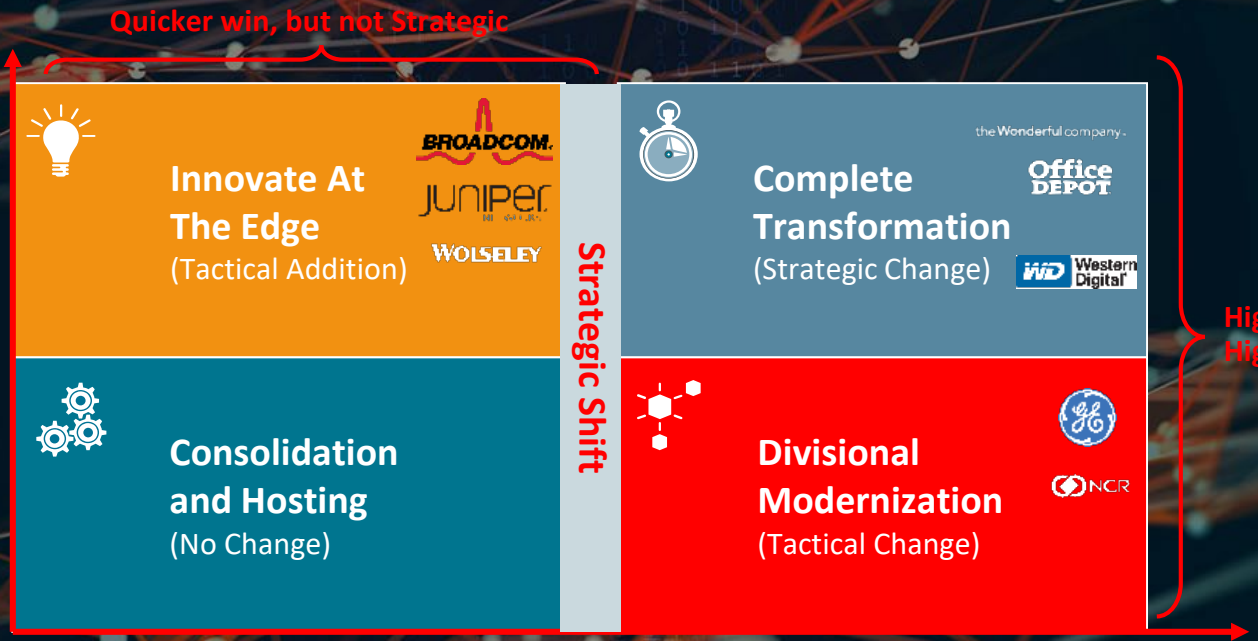

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Adapting to Change (3 Use Cases)

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	Old World (Traditional)		**New World** (Modern)
Maintenance	Managing OEE	→	Maximise OEE
Products/ Services	Transactional	→	Relationship
Energy Mgmt	Carefree Consumption	→	Social Awareness

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Summary

- **The sector must change to achieve significant improvement in performance**
- **Business Processes need to be reimagined to deliver value in the modern context**
- **OT/IT needs to be looked at holistically and this technology foundation must be always current and able to incorporate emerging technologies**

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Peer Discussion Sessions

Setting the Scene – Simon Nicholson, Oracle

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Considerations & Catalysts

Define the business outcomes and metrics that will determine progress to achievement

Real-time responses needs observation and action of real-time data – yesterday's news is useful if it influences tomorrow's behaviour

Enterprise process is managed by enterprise systems; therefore the OT and IT worlds must co-exist

The Digital thread goes from the sensor on the machine right through to product use by the customer

Are we watching or monitoring?
Watching is passive and depends on 3rd parties for assessment and action - Monitoring is actively identifying and invoking action:

- something has gone wrong or is not right
- something is going to go wrong (based on expertise/experience) and activating action in anticipation
- something is going great and understanding why

Monitoring is learning and enables the application of the learning to change future behaviour/process

Key tools for monitoring

- Thresholds: if detected or exceeded act
- Anomalies: that didn't sound/feel/look normal: act
- Trends: patterns of behaviour that might indicate an issue or an opportunity: act
- Predictions: based on previous learnings we can see where this might end up: act

Make it easy to apply: Digital Twin

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Questions to be raised?

- How do I currently measure production efficiency and machine uptime?
- Do I react to alerts and failures or predict how to focus resources on maintenance?
- What do Connected Products & Services mean to the way I run my business?
- Do I have an Energy Management strategy & target?
- What is my organisation's strategy for creating a 'Digital Thread'?
- What is the impact of NOT adopting Smart Factory concepts?
- Do I know where to start the journey – what do I focus on first?

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Predictive Maintenance

Discussion

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Predictive Maintenance

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Data analytics help to decide the right maintenance actions at the right times

AS IS

Corrective maintenance: After Failure

Time based maintenance: Periodic

Issue: 75% of work-orders generated on a time schedule may not be necessary and the maintenance expense may be avoidable.

TO BE

Predictive maintenance: As Needed

Real-time monitoring

Failure/performance analysis/prediction

On-demand maintenance

Reduce maintenance cost

Reduce repair cost

Evaluate maintenance quality

Increase availability

Reduce replacement cost

Right part at the right time

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PdM Use Cases Per Level

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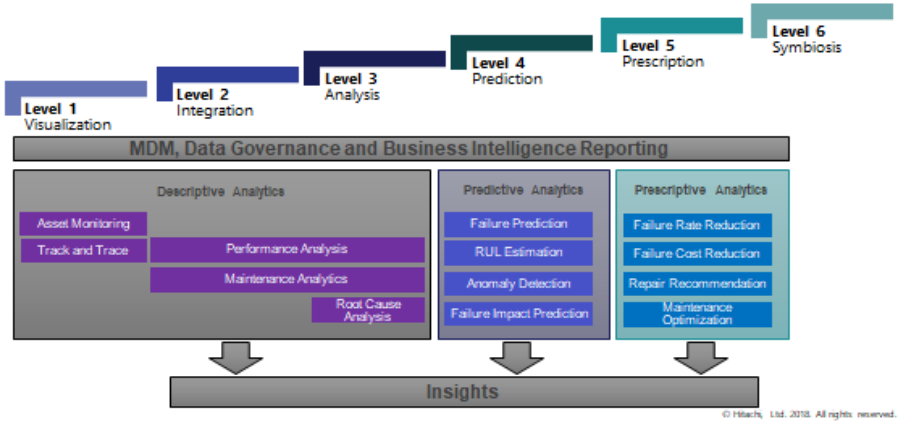

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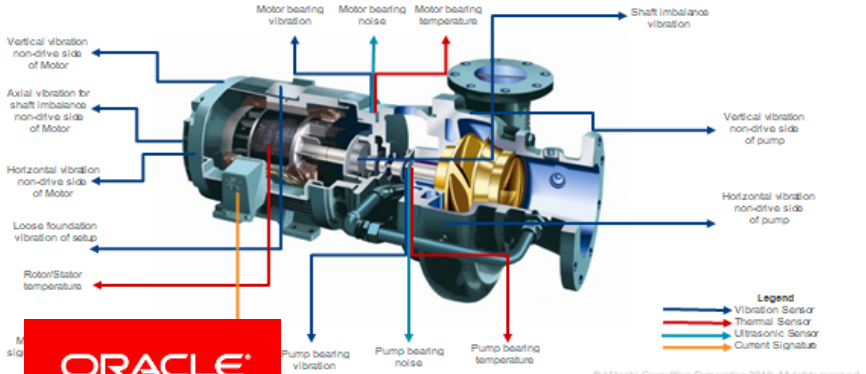
Typical Example of Instrumentation



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Moving to predictive maintenance practices can **save 10% to 20%** over preventative maintenance **…enabled by technology convergence**

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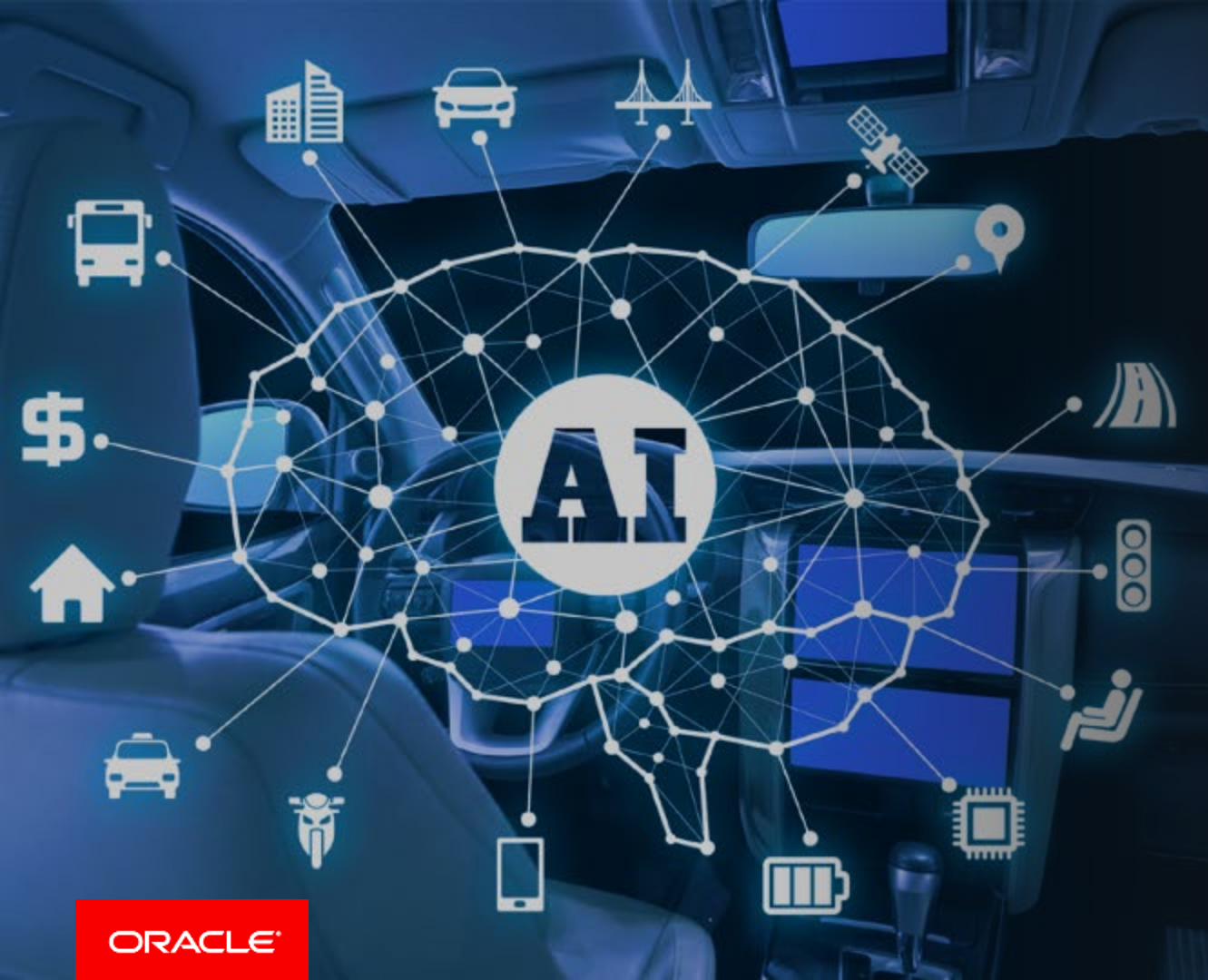

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Connected Products

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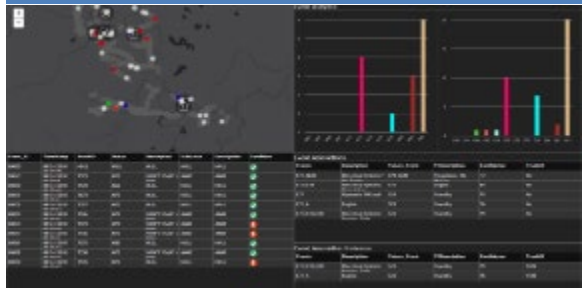
Connected Products & Services

Manufacturing organisations are developing innovative solutions based on new data creation, integration and analytics models which create possibilities of new business and revenue streams such as Connected Products.

End products are IoT-enabled and deliver insight about condition, usage, location, and other key factors enabling manufacturers to move from a traditional CAPEX model to an OPEX model based on SLA's to their clients supported via IoT Remote Monitoring & Control sensors and platforms.

Operational Recommendation

Failure Prediction



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Energy Management

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Organizations are struggling with significant energy spend

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Commercial organizations spend up to **33%** of their Operating Expense on energy*

Industrial organizations spend up to **50%** of their Operating Expense on energy*

Portion of energy in buildings used inefficiently or unnecessarily: **30%**

Source: www.energystar.gov

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Limited visibility, limited control

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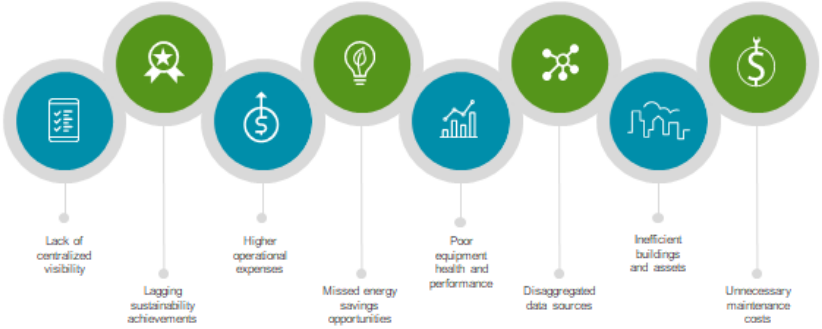
Most companies have limited visibility into energy spend leading to:



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Hitachi's Energy Maturity Continuum

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Hitachi's smart energy solution can reduce energy costs by up to 25%

Level 1 — Reactive
- Reactive approach
- Limited to basic utility bill payments

Level 2 — Conventional
- Decentralized control
- Site by site energy management
- Individual energy initiates
- Siloed view of facilities and energy usage

Level 3 — Awareness
- Energy Monitoring System installed
- Portfolio wide visibility to facilities and energy usage
- Consolidated view of completed energy projects
- Prioritization of new projects through predictive modeling

Level 4 — Optimized
- Centralized directives
- Optimized facility assets across the portfolio
- Predictive and preventative capabilities regarding asset health
- Controlled energy usage and maintained savings

Level 5 — Integrated
- Automated integration of multiple facility systems spanning across various operational cost layers
- Maximum operational efficiency
- Significant decreases in operational expenses

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Driving Connectivity For Smart Facilities

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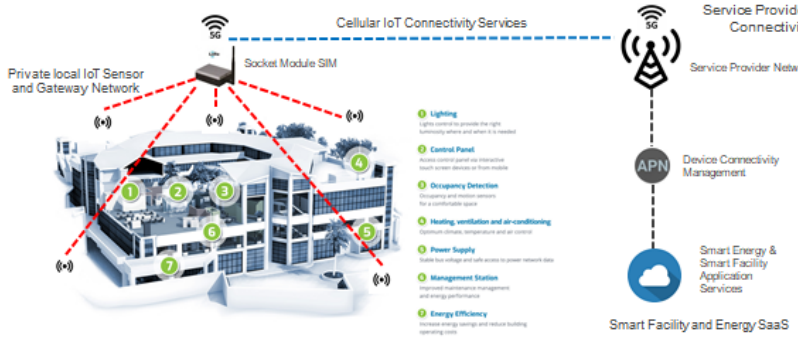

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Next Steps

Continue the discussion

- Event Questionnaire
- Write up of event and discussions into PDF document to share
- Access to event materials as part of post event communications
- Follow up from Hitachi and Oracle in next 2 weeks

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