Digital Transformation

An End-User Perspective

Dr. Tom Fiske

Principal Tech Strategist
US Technology Center - USTC
Ph.D. Chemical Engineering
tom.fiske@us.yokogawa.com

Dr. Maurice Wilkins

Executive Advisor
Global Marketing HQ
Ph.D. Chemical Engineering
maurice.wilkins@uk.yokogawa.com

Agenda

1. Introduction and Background
2. Digital Transformation
    - ◆ What it is, Challenges, The Journey and Enabling Technologies
3. Engagements
4. End-user Partnership Preferences
5. Key Findings & Summary

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- Since 2014, Dr. Maurice Wilkins and Dr. Tom Fiske have been engaging end-users and analysts to develop an Automation, IIoT, and DX vision

- Continually updated through interviews and workshops to reflect current market trends, end-user initiatives, and technology developments

- Goals:
  - Gather and disseminate information about end-user strategic automation and technology investments in technology and people
  - Closely follow current market and technology trends

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# What's the Difference?

Digitization
- converting information into a digital format (i.e. computer-readable), where information is organized into bits

Digitalization
- Business and workflow changes enabled with the use of digital information
- What you do with the information

Digital Transformation
- Enterprise operations and business transformation
- Impacts culture, skills and customer interactions

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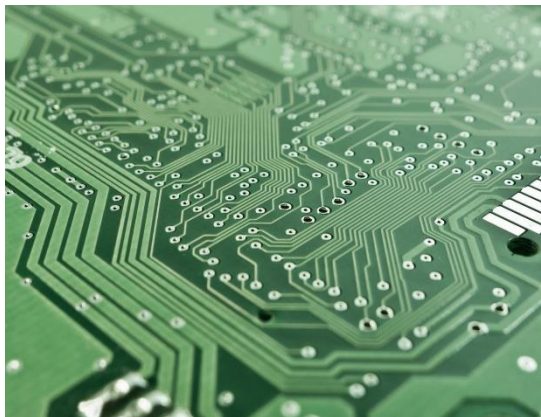
Process Industry State of Digital Maturity

To move to the next stage, prefer to adopt solutions that demonstrate positive impact on profitability, show ROI benefits and are affordable.

To move to the next stage, benefits in adoption of a new solution/retrofit/modernized, against existing infrastructure should be demonstrated. Further, building blocks towards a strategic vision should be established with buy-in from internal stakeholders.

Non-Digitizers
(45-50%)

Companies at this stage are constrained by significant profitability challenges, status-quo and cost-constraints. The cost of modernization and capital spending is a major restraint for these companies. Nonetheless, a minority within this segment are willing to invest in solutions related to cloud-based offerings, provided it gives them ROI benefits and profitability improvements.

Selective Digitizers
(35-40%)

Companies at this stage want to pursue digitization, but need to be selective due to investment and cost constraints. They have standardized on certain IT solutions, but the value-chain is still siloed and fragmented. Also, managing change in these organizations is challenging, and can thus slowdown the absorption of new technologies and processes. Overall motivation can be considered lukewarm.
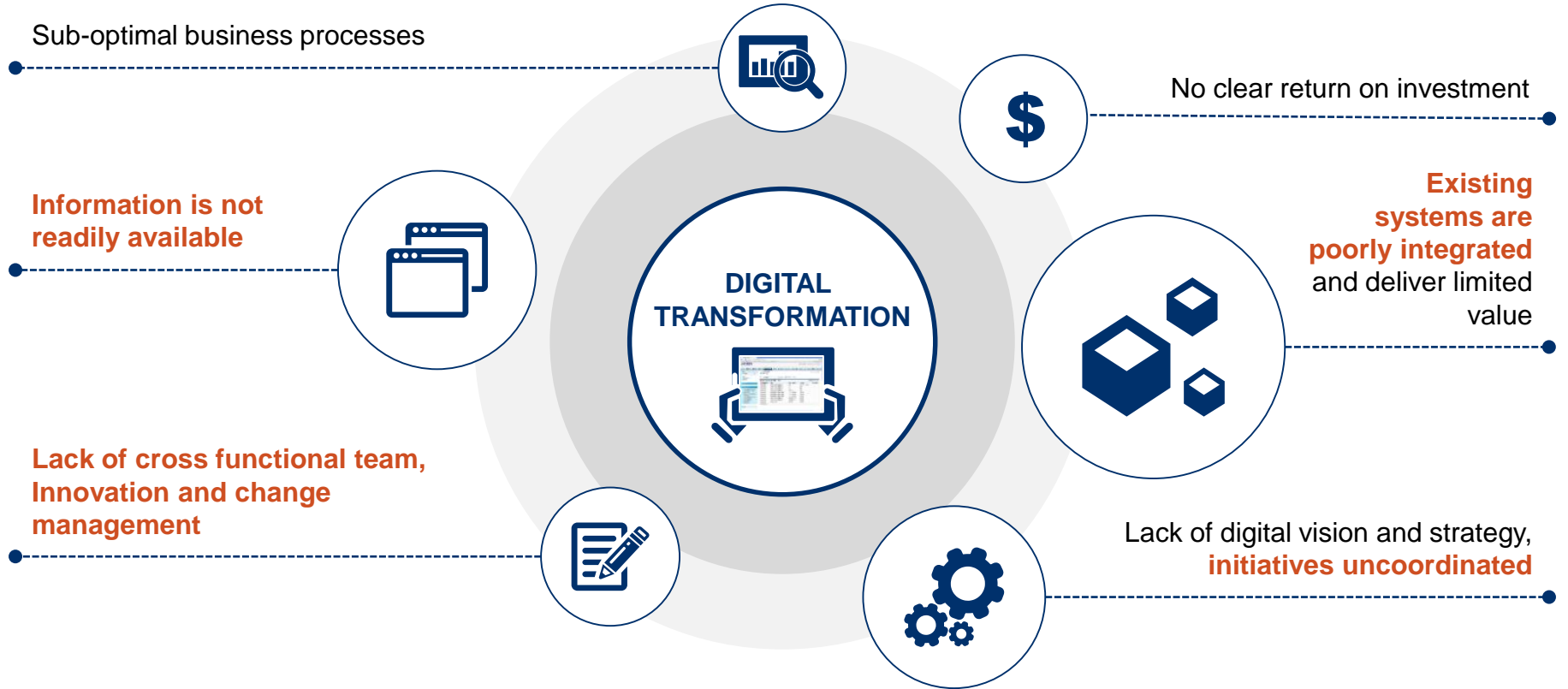
Enterprise Digitizers (<10%)

Companies at this stage have a strategic, enterprise perspective of digitization, combined with a willingness to partner with one or more solution providers with a strategic technology vision.

They are challenged by the huge volume of data that they are already collecting and desire to strengthen their predictive analytics capability, and overall collaboration capability. These companies also have standardized IT infrastructure across their enterprises.
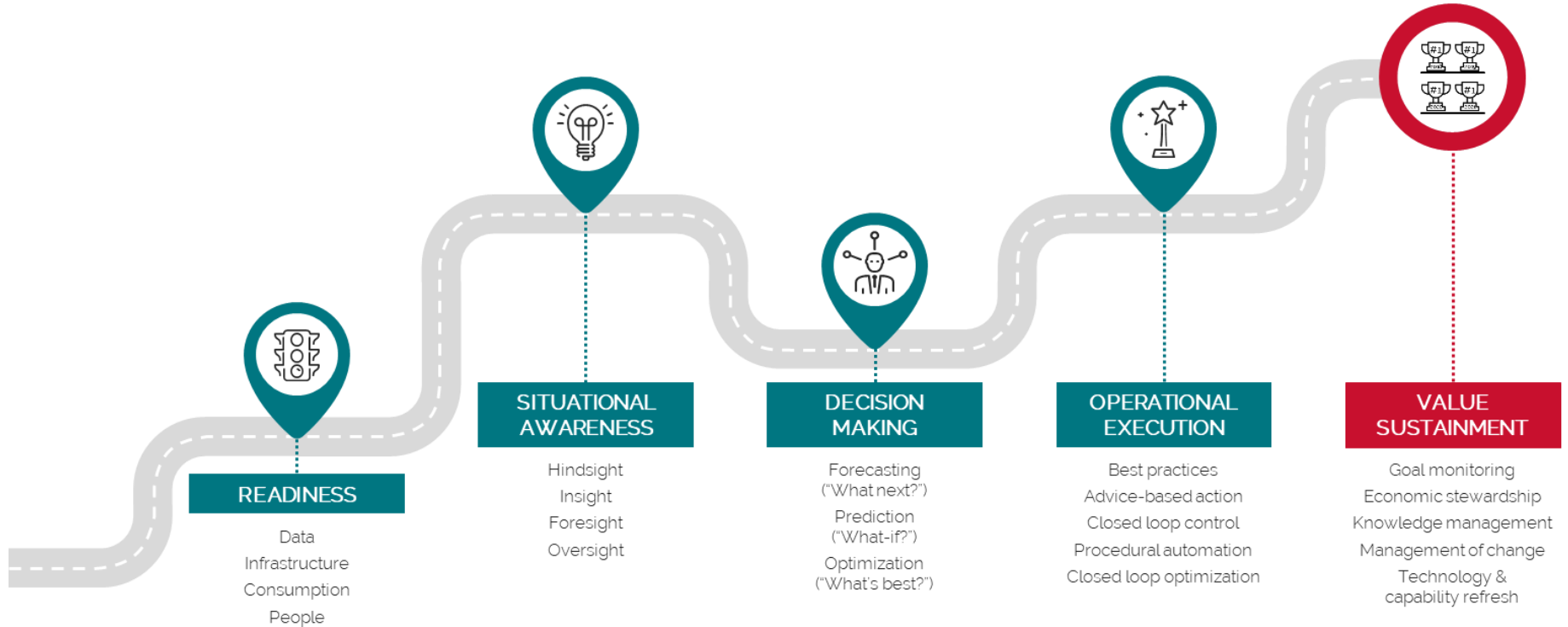
Source: Frost & Sullivan

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Challenges in the Digital Age

Sub-optimal business processes

No clear return on investment

Information is not readily available

Existing systems are poorly integrated and deliver limited value

DIGITAL TRANSFORMATION

Lack of cross functional team, Innovation and change management

Lack of digital vision and strategy, **initiatives uncoordinated**

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Digital Roadmap: The Journey

READINESS

Data
Infrastructure
Consumption
People

SITUATIONAL AWARENESS

Hindsight
Insight
Foresight
Oversight

DECISION MAKING

Forecasting
("What next?")
Prediction
("What-if?")
Optimization
("What's best?")

OPERATIONAL EXECUTION

Best practices
Advice-based action
Closed loop control
Procedural automation
Closed loop optimization

VALUE SUSTAINMENT

Goal monitoring
Economic stewardship
Knowledge management
Management of change
Technology &
capability refresh

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Drivers and Enablers of Digital Transformation

Upskilling

Cloud & Edge

Data Analytics

IoT Platform

DCS & SCADA

Virtualization

Safety and Security

Mobile Automation

Digital Twin

Smart Sensors
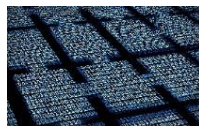
Robots and drones

3D Printing

Modularization

AR, VR, MR, & Wearables

Blockchain

Cognition

Artificial Intelligence

5G Wireless

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End-User Engagements: Upstream

- Keeps technology vision and roadmap updated and desires to see similar supplier roadmaps
- Cyber security is a major concern
- Asset tracking is an issue - major pieces of capital equipment could go missing
- Investigating Blockchain

- "Digitizing" their organization under their modernization efforts and set up a DX team under the CIO for high value projects
- Monitoring thousands of sensors around the world and relaying information in context back to mobile operators
- Remotely monitor thousands of pieces of equipment and apply predictive models
- Use automated procedure control offshore and in remote locations
- Move large amounts of data supplied by low cost sensors to cloud
- Low cost IIoT platform for data handling
- Use UAVs and intrinsically safe robots for inspections, data collection and surveillance

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End-User Engagements: Downstream

- Focus on asset maintenance, reliability and optimization using data analytics and digital twins
- Operator checks with tablets but issues with I.S. and glare
- Also using mobile technology for traceability and to aid shift handovers
- Implementing digital tools to support operators tasks
- Using drones for stack and pipeline inspections and perimeter monitoring but at early stages – want to use them inside vessels

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- Data driven company - CIO is responsible for IIoT strategy
- Want an inexpensive IIoT platform
- Need transparency throughout the supply chain
- Use AI to analyze data including weather, equipment status etc. – for better decisions but data not in DCS
- Want a low-cost wireless sensor

Sushi Sensor®

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End-User Engagement: Chemicals

- Used procedure automation to control potentially hazardous process
- Have a large group working on DX
- Working on Open Automation, NAMUR Open Architecture
- Driving remote and autonomous operations – want to remove shift operators
- Add value to customers through digitally enabled products and services

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Diverse Assets and Operations

- Diverse portfolio where different organizations are at different stages of DX initiatives:
  - One subsidiary just starting – forming a DX team
  - Another subsidiary started DX in 2015 – leadership totally committed
- Focus on 'lick and stick' sensors LAN enabled to bypass PCN
- Using drones for tank and chimney monitoring
- Priorities are – mobile and work processes
  - Saved $7m/yr by tracking the activities of scaffold contractors
- Collects sensor data and sends directly to the cloud
- Change the way people think and act

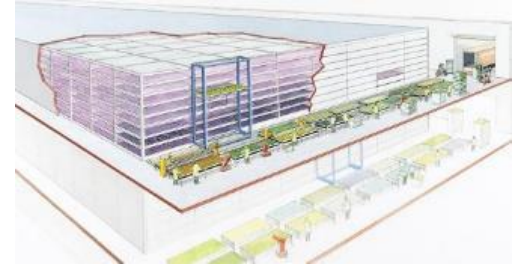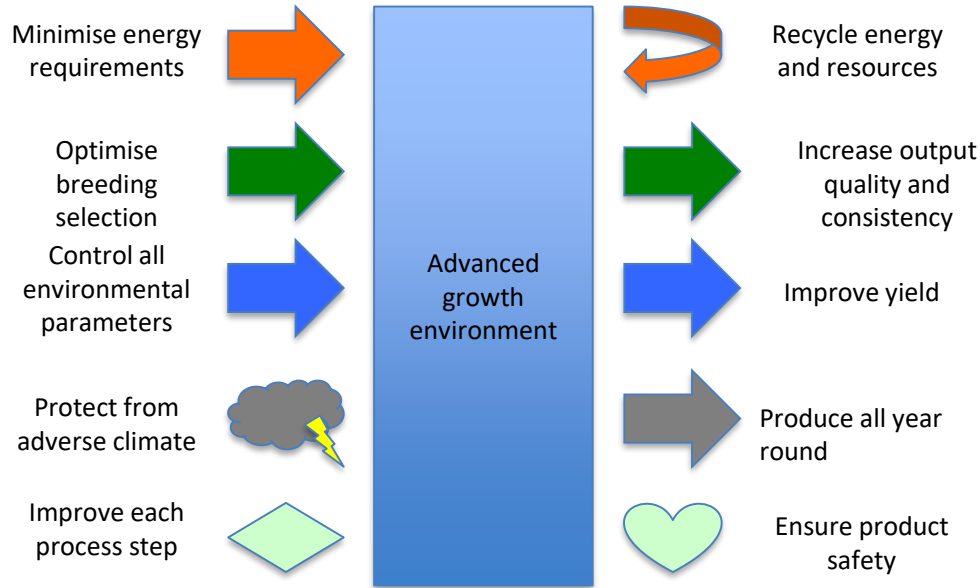Co-innovating tomorrow ™

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Other Engagements

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Multi-faceted UK DX Workshop – Summer 2018

- Will DX change markets?
  - Netflix will make money from the car market
  - Look at the entire lifecycle rather than parts of it
- Will DX change operations?
  - SMEs are more agile and can change quickly
  - Move from engineering to IT driven strategies
  - Everyone knows what they don't want but no-one knows what they do want
    - Need a DX Strategy
  - More regulation and zero incidents
- How will DX change the supply chain?
  - Younger generations don't want to own anything e.g. cars, music
  - Licensed use of in-car software e.g. BMW Connect
  - How to feed a growing population

Business Futures Network

University of Surrey, UK

Accenture

Innovate UK

Living PlanIT

Manufacturing Technology Centre

Urban Energy, ENGIE UK

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Minimise energy requirements ➡

Optimise breeding selection ➡

Control all environmental parameters ➡

Advanced growth environment

Recycle energy and resources

Increase output quality and consistency ➡

Improve yield ➡

Protect from adverse climate

Improve each process step

Produce all year round ➡

Ensure product safety

■ June 2019 – Ocado invests £17m in 'vertical' farms

BusinessFutures

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Survey Results – User Preferred Partners for DX
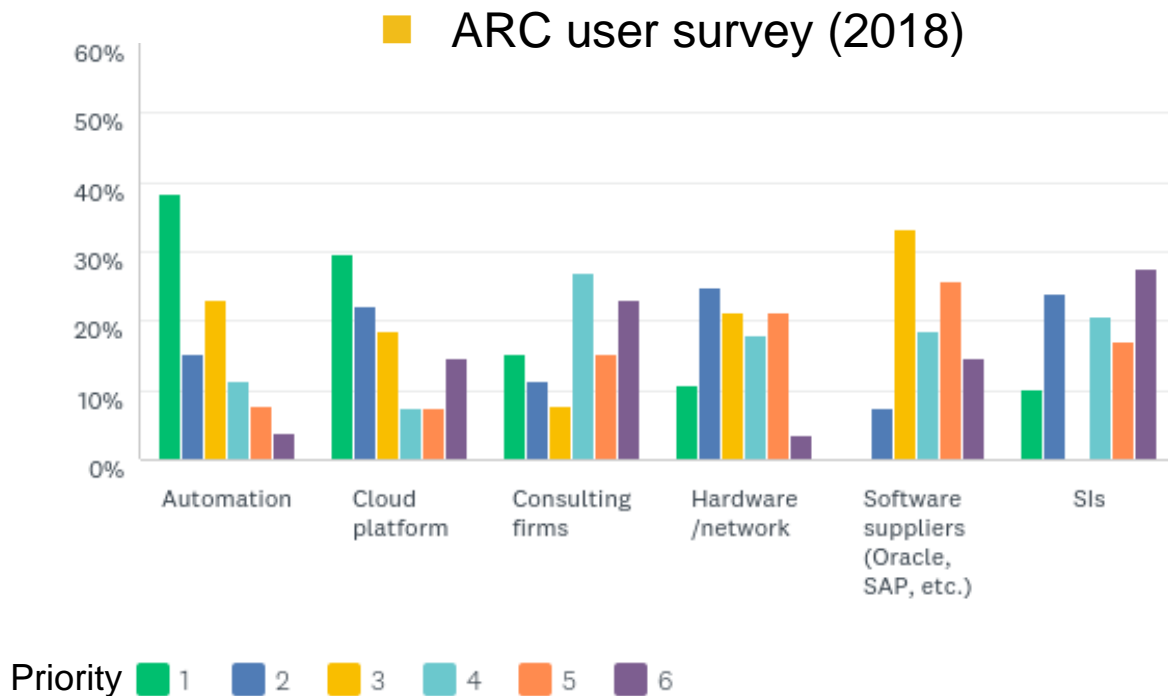
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Obsolescence

Project & Operating Costs

Cyber Security

Low Cost & Flexible Sensors

Cloud

Commonalities

Open Automation

Analytics

Improved Communications

Collect and Analyse Data Outside PCN

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Typical Use Cases and Focus Areas

- **Major focus areas:**
  - Predictive maintenance
  - Operations
  - Supply chain management
  - Improving customer experience
- **Other areas include:**
  - Remote monitoring
  - Remote operations
  - Asset performance management
    - Digital twins
    - Big data and analytics
  - Remote inspection
  - Increased level of automation
  - Mobile and connected workers
  - Wearable devices
  - 3D printing
  - Ecosystems for value chain collaboration
  - New business and services

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Summary

- IoT and DX are the most significant developments in recent times
- DX and Innovation Teams are being set up
    - Headed by Chief Innovation Officer or Digital Technology Officer in more advanced organizations
- Speed is essential
    - Learning is almost more important than getting it 100% right first time
- Low cost platform and sensors are important – IoT readiness is a factor
    - Want to leverage the edge and cloud more extensively
- De-emphasising the DCS for data and information offloading as much as possible to IoT
- Biggest challenges are people – skills, resistance to change, project management, silos, empowerment, IoT related organizational structure

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