

Practical applications for digitalization in industry

Quicker and better insights to drive competitive advantage

Will Leonard - ABB

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Industrie 4.0 Cyber Security
Industrial Internet of Things Data
Cloud IT/OT Integration

ABB FORMULA-E

FIA FORMULA-E CHAMPIONSHIP



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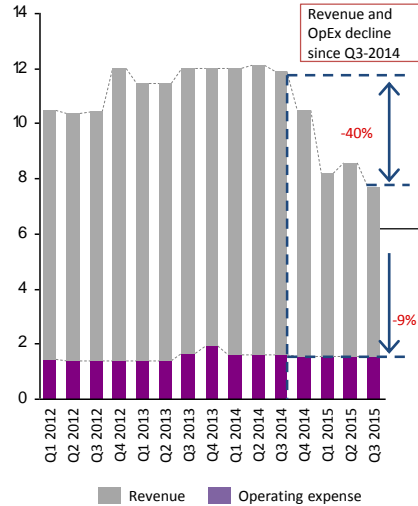
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A perfect storm

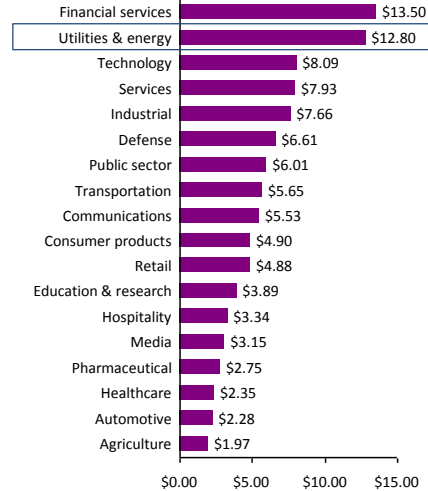
Inaction is not an option...

Revenues -40%, but OPEX only -9%—Average Rev/ OpEx (SB)



Source: Strategy & part of the PwC network

Cybercrime



Source: Ponemon Institute, September 2016

Aging workforce: 50% retiring in 10 years



Aging infrastructure:



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Digital technologies are driving new innovation

Media is focused on B2C but the “killer app” is in B2B

Virtual/ augmented reality



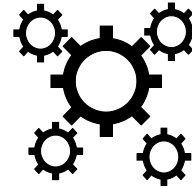
Software-defined machines



Machine learning



Time-sensitive networking



Big data



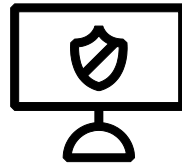
Inexpensive computing



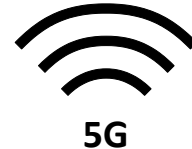
Cloud computing



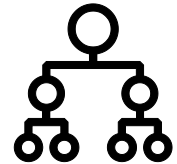
Cybersecurity



Connectivity



Blockchain



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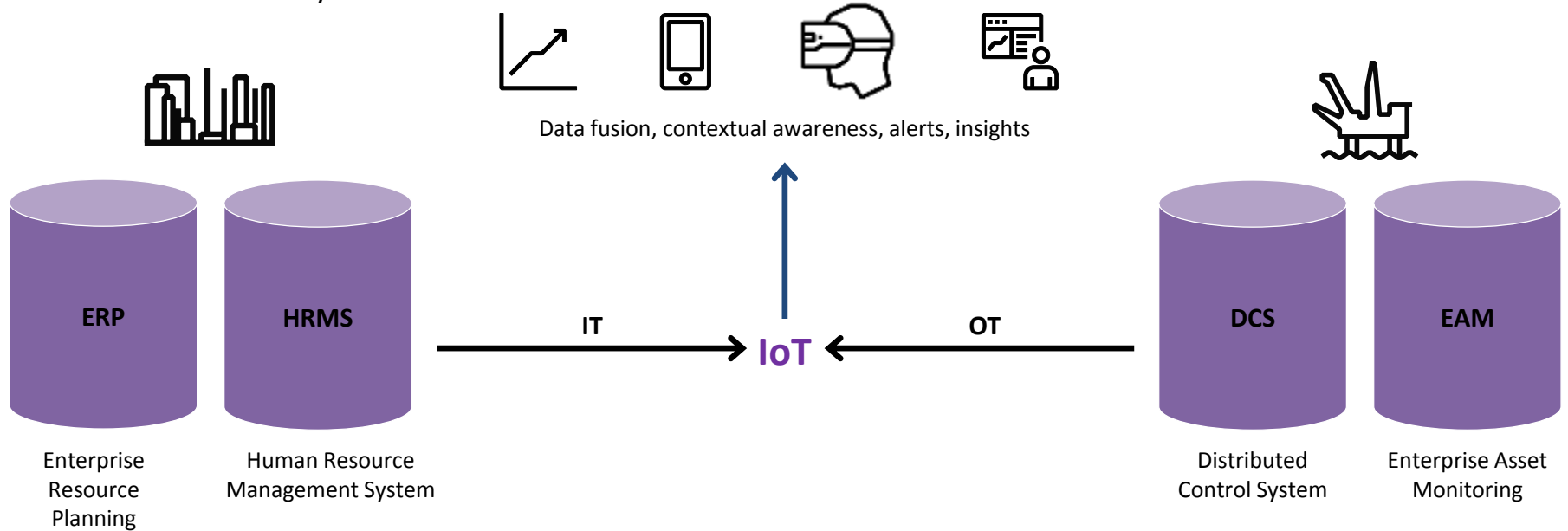


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IT & OT integration

The undiscovered country...



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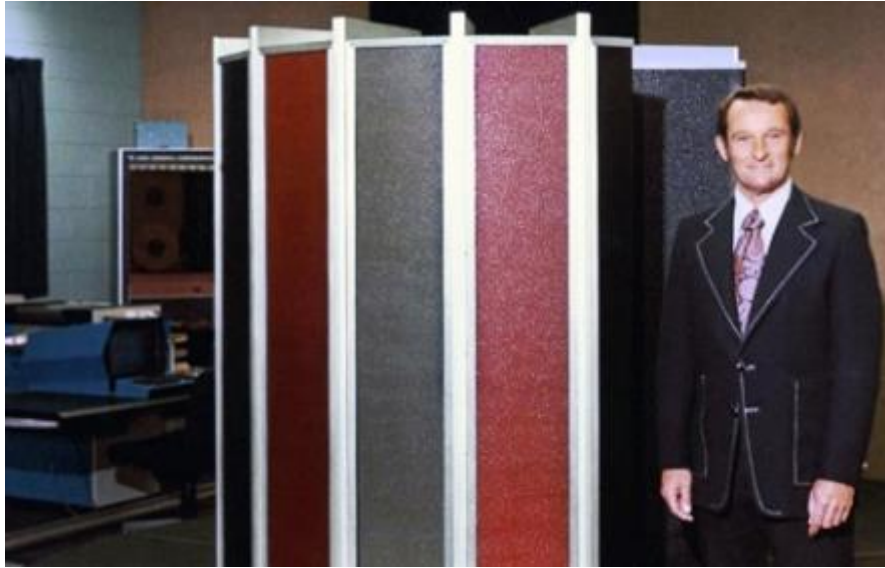
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The age of modular production

System architecture: IT

Yesterday



Today



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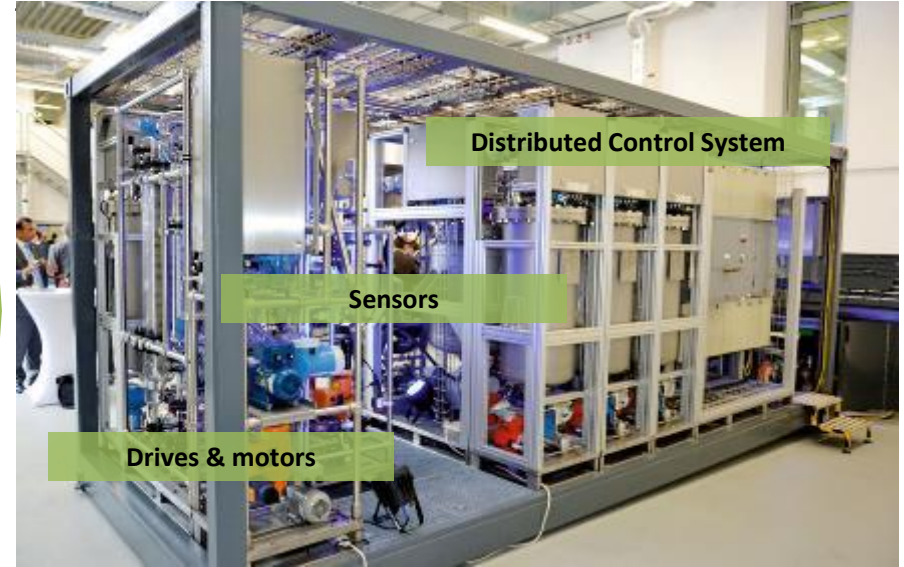
The age of modular production

System architecture: Process Industries

Today



Tomorrow



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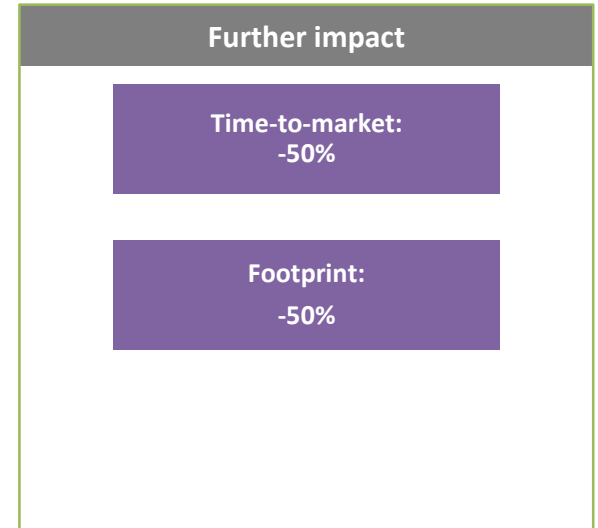
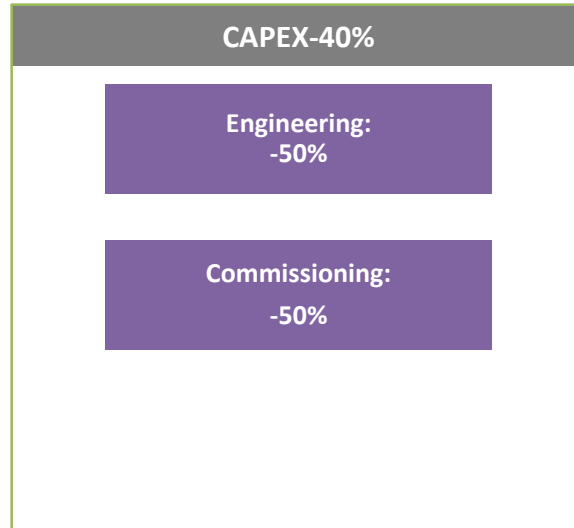
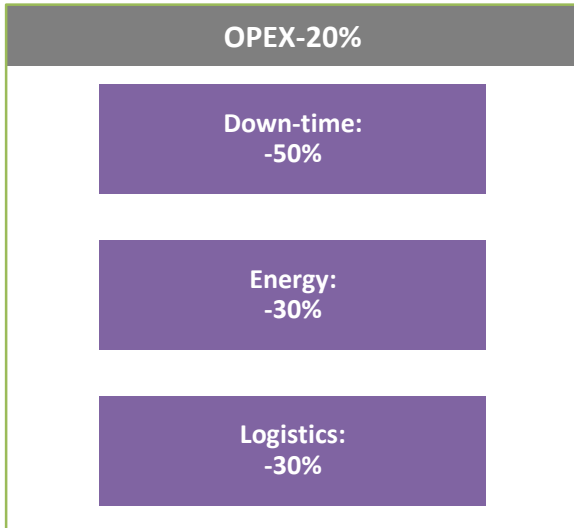


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The age of modular production

Business value—Proven using industrial case studies

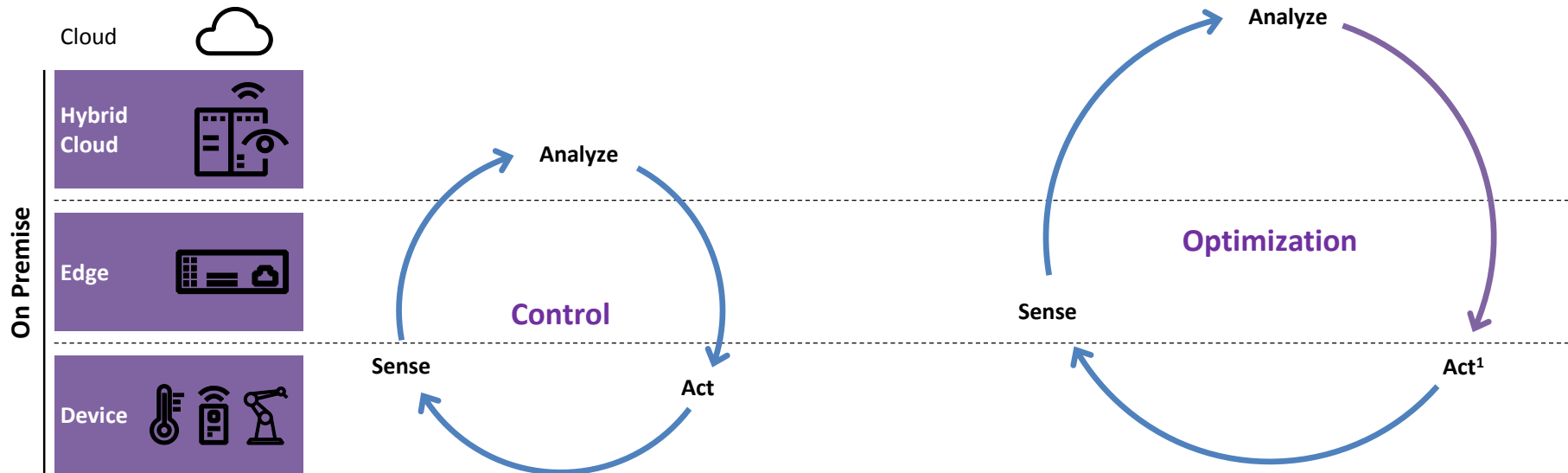


ARC Advisory Group expects that 20-25% of today's market will move towards modular production!

There are two loops: Control loop & asset loop

Realtime

Days/weeks/months



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A portfolio of digital offerings

Addressing the entire value chain



SECTOR SOLUTIONS

Smart Wells
Flow Assurance
Production Optimization



Production
Performance
Solutions and
Services



Energy
Management
Process Power
Energy Analytics



Asset Management
and Condition
Monitoring



Operations, Safety
& Security
Management



Digital Project
Execution

Collaborative Operation Centers

Connectivity & Cyber Security

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Business value - Maintenance spend is the most significant opportunity

It's also one of the most overlooked

40%

- Oil and gas industry's **net operational expenses** in scheduled and unscheduled maintenance¹
- Digital maintenance strategies has been embraced at less than 20% of sites offshore in mature basins

x

30%

- Amount by which well-executed digitalized maintenance can **cut maintenance costs**
- Range of results observed: 15-40% in actual cost reductions

=

12%

- Amount by which well-executed digitalized maintenance **can cut total operational costs**
- In typical operations, the total cost of operations is equivalent to half the plant's EBITDA

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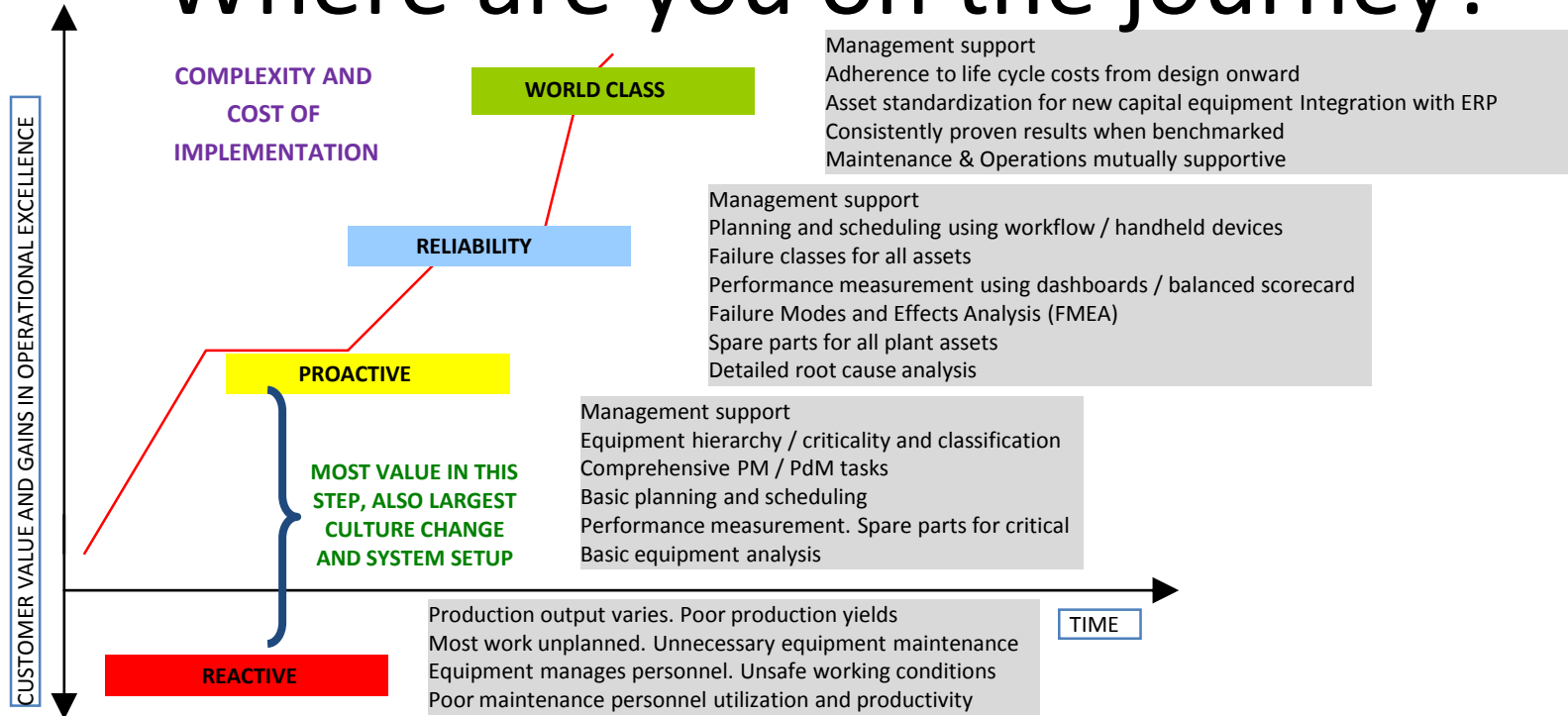
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Best Practice Reliability – Where are you on the journey?



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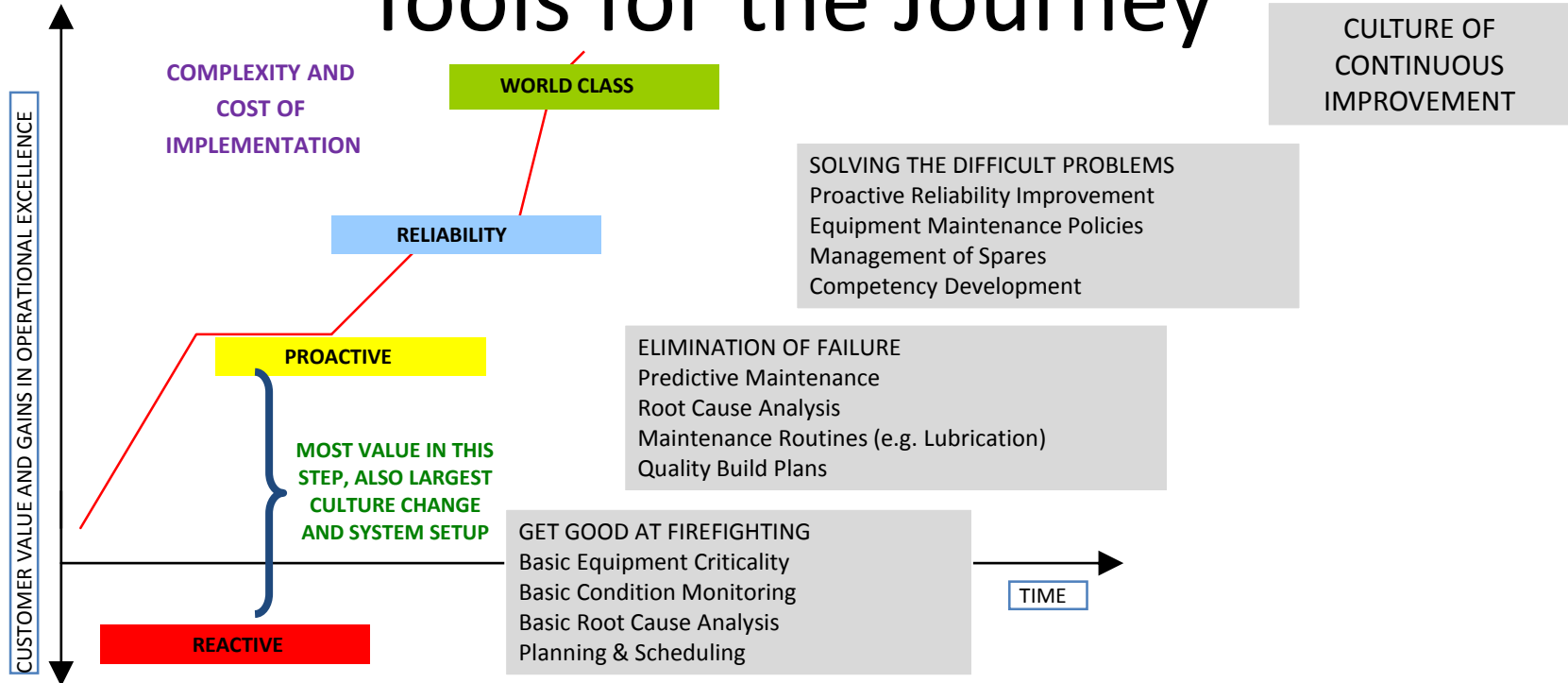
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Best Practice Reliability – Tools for the Journey



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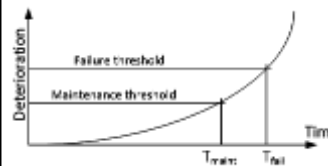
To derive the benefits from digital, maintenance mind-sets must change

And a shift to reliability-centered maintenance must be embraced

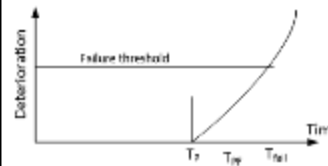
Unrealized potential from digital...

- Large amounts of data are being collected
- Intelligence to exploit this data has lagged limiting potential to:
 - Optimize resource use
 - Carry out smart maintenance
 - Improve operational support
- Majority of failures have a failure distribution unrelated to age and yet we still do maintenance as if the opposite were the case

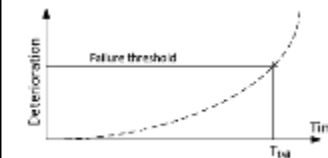
...due to maintenance habits unsupported by facts



Gradual observable failure progression:
We have a measure of gradual deterioration that can be estimated for the lifetime of the device.



Observable sudden failure progression is different from gradual failure progression in that operation could go on for long time before the onset of any observable deterioration



Non-observable Failure Progression occurs when the failure mechanism defeats test and inspection.

It is also about knowing when best to apply digital solutions

Prerequisites

- A fault condition that is detectable (directly or indirectly)
- Sufficient instrumentation to allow parameters to be observed
- Data about fault progression, to assess equipment condition
- Mature maintenance strategy and procedures

Benefits

- Predictive maintenance
- Longer asset life
- Improved energy efficiency
- Increased production



Connecting the unconnected

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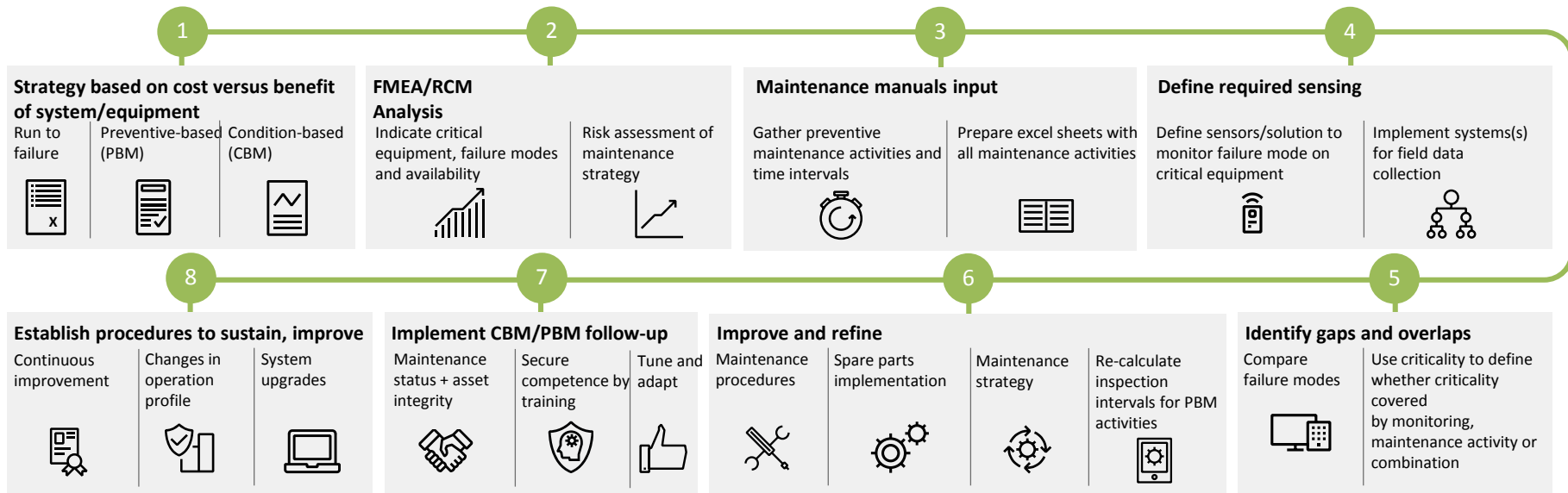


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You must also have a structured approach for change

Eight-step plan for transitioning to digital maintenance: Developed and proven with early adopters



Collaborative Operations

Realizing the value of digitalization

Current practice



- People work in silos
- Amount of data is overwhelming
- Isolated from subject matter experts
- Hard to identify the right actions
- Best practices are not utilized

Collaborative Operations



- People are connected
- Correct information is available
- Continuous collaboration with experts
- Improvements are identified quickly
- Changes are implemented fast

Become 10-35% more profitable and productive

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In practice... Collaborative Operations™

Customer examples

Norske Shell (oil & gas)

“Remote services enable Shell to realize 70% condition-based maintenance in gas production facilities”



Leading Indian cement manufacturer

Enterprise-wide digital service partner for energy efficiency and reliability enhancement



Metsä Fibre (pulp & paper)

Range of digital services for condition monitoring of critical equipment for newest Pulp & Paper plant



Genting (marine)

Propulsion, electric power plant, automation, software and digital services for five new cruise ships



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Where to start

Avoid trying to do too much too fast

Be methodical and evidence-based

Identify opportunities

Define collaboration

Pilot projects

Evolve engagement

- You do not have to do it all at once to develop the “perfect, large-scale plan”
- Use well-selected and define pilot projects to fix specific issues and only roll out on a large scale once proven
 - Proves / disproves initiatives
 - Controls cost and risk
 - Carry out smart maintenance
- Consider lines of sight to your data and identify the best way to attack specific problem areas

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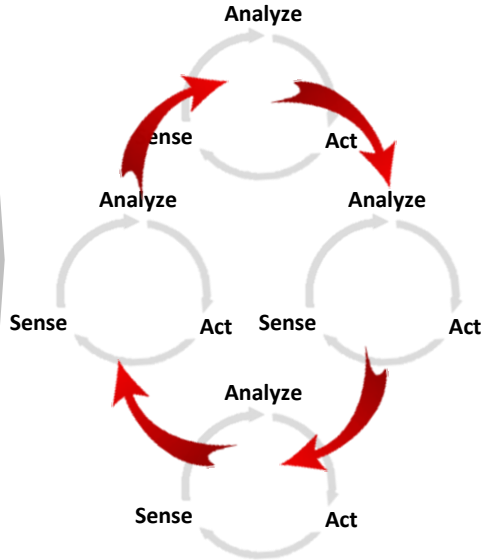
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How we can help deliver value

ABB Ability™ - Digitally connected products and services providing expertise

Together
Do better
Do more
Know more

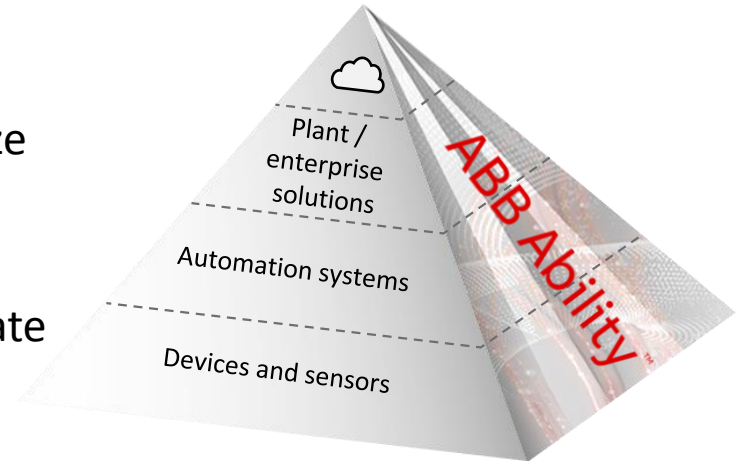


Collaborate

Optimize

Automate

Assess



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Thank you for listening

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