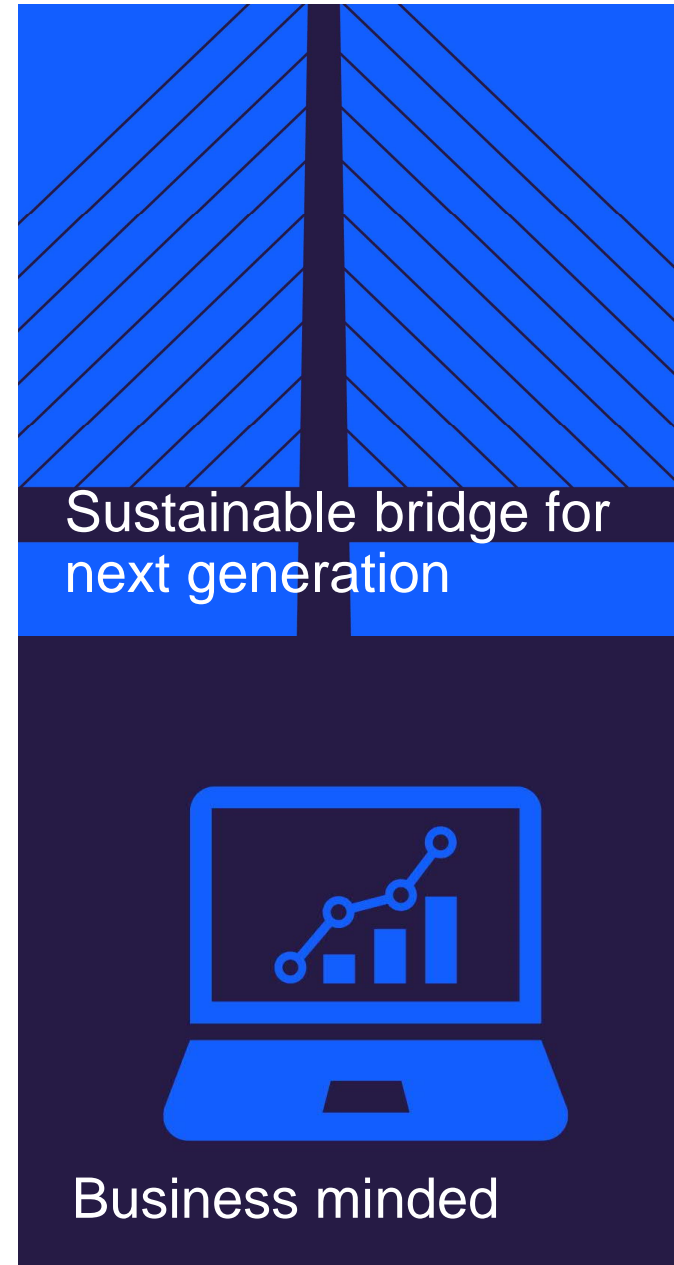


Datadrevet vedligehold og anvendelse af digital tvilling



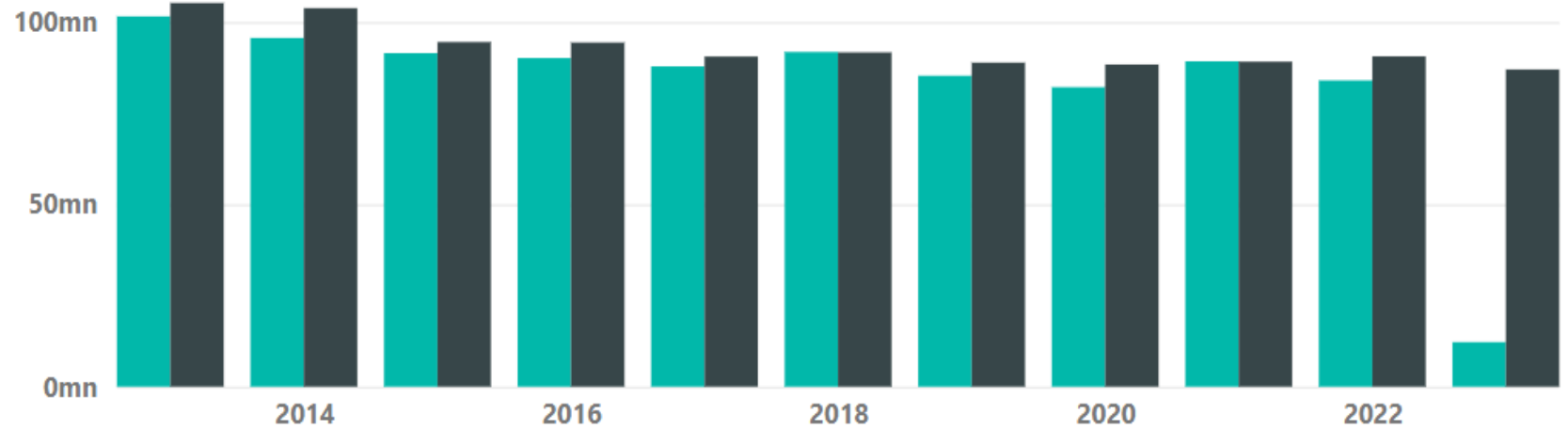
Bengt Hergart, Anlægsdirektør Øresundsbron

Long term targets

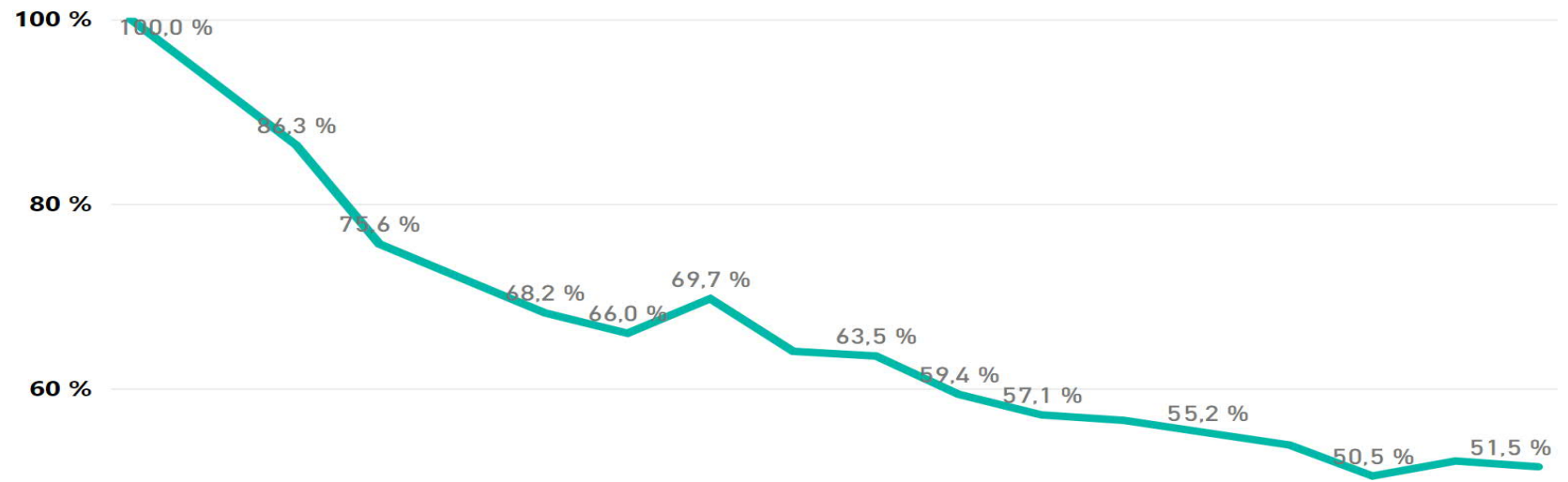


So far so good!

Operational Cost over time

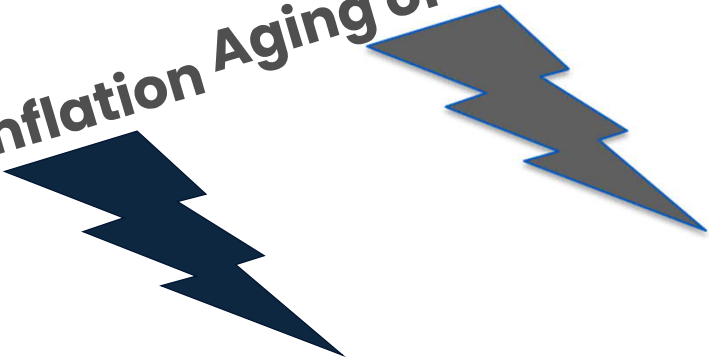


Reduced cost of re-investments

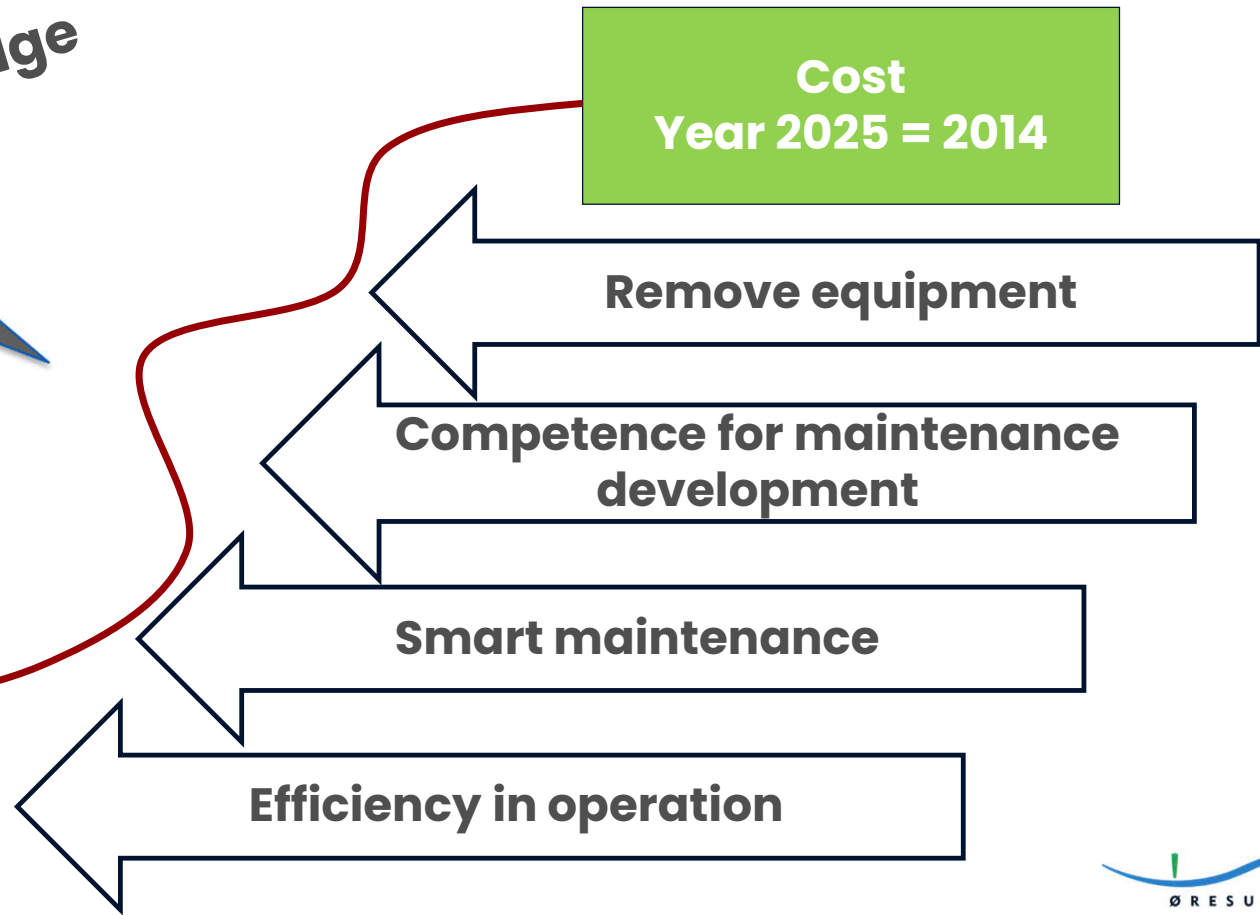


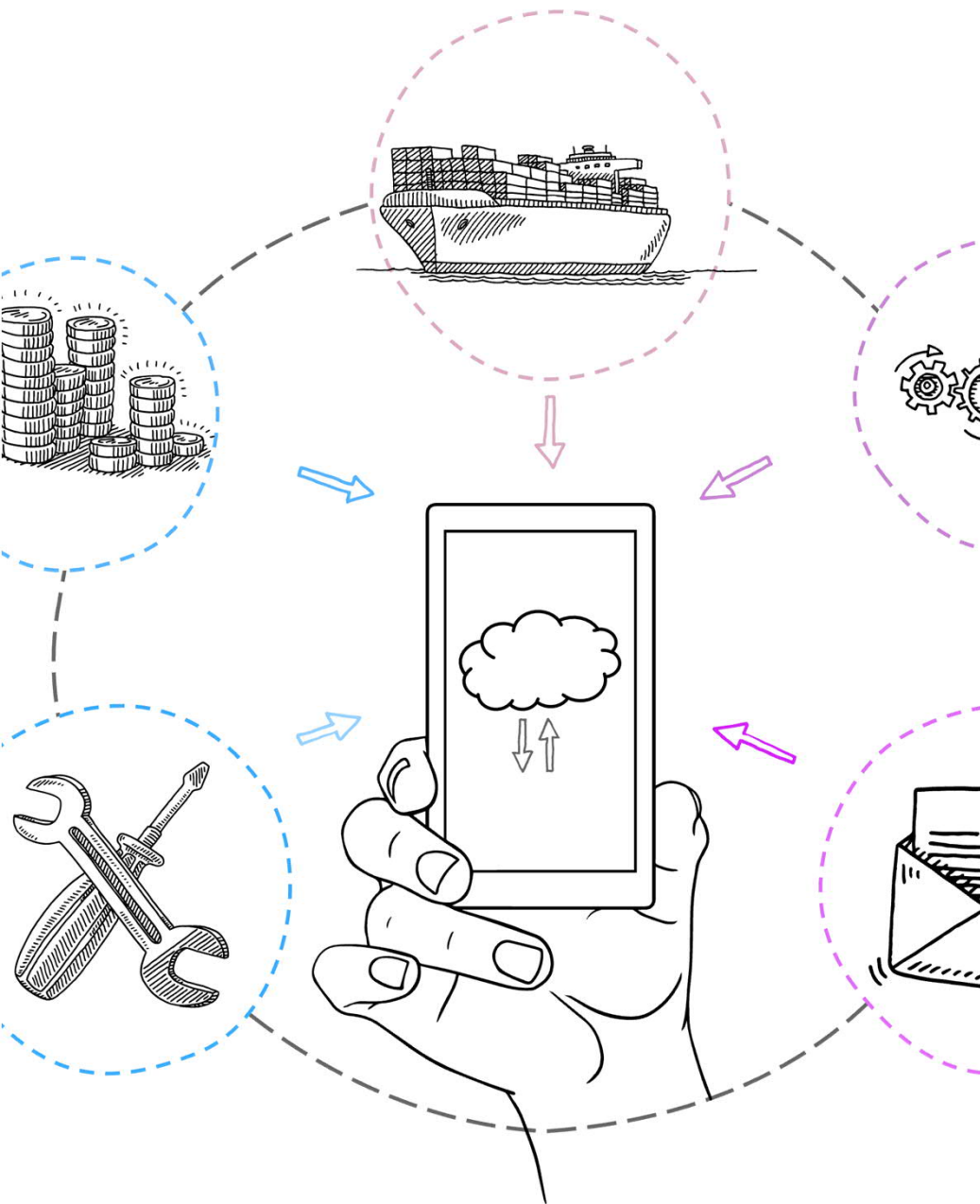
Smart maintenance is part of the solution

Inflation Aging of the bridge



Present situation





Smart Maintenance Øresundsbron

- **Bench marking & KPI**
- **Analyzing big data**
- **Predictive Maintenance**
- **Digitalized methods**

MAIN	DDD	NCA resultat		
		HCR	INI	EXI
0.0	NN	NN	NN	NN
3.3	NN	NN	NN	NN
6.7	NN	0.6	NN	NN
73.3	17.7	36.0	36.9	27.1
76.7	17.7	63.1	38.5	34.3
80.0	44.6	68.8	54.5	41.2
83.3	50.6	71.1	54.5	41.2
86.7	55.0	79.2	63.0	47.4
90.0	55.0	90.2	63.0	61.4
93.3	84.8	90.2	63.0	70.3
96.7	84.8	90.2	63.0	70.3
100.0	84.8	90.2	63.0	70.3



Data driven
Decisions



External
integration



Smart
Maintenance



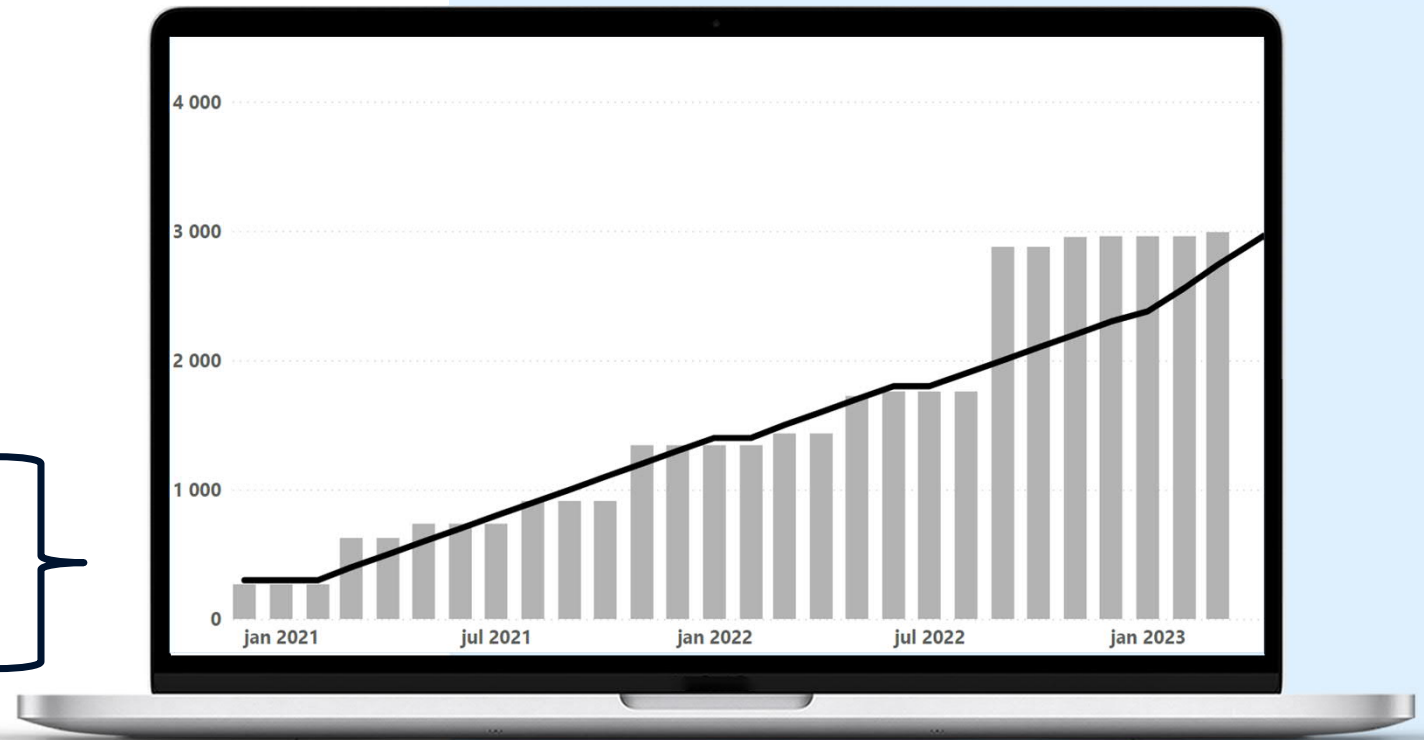
Human capital
resources



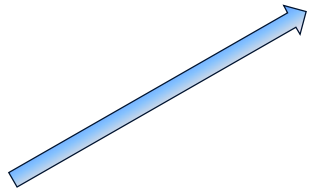
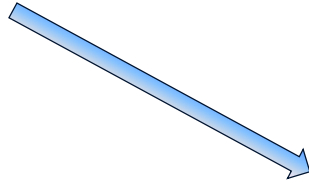
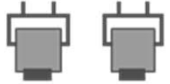
Internal
integration

KPI: Data-driven Maintenance

Class	Sub-group
Corrective	Immediate
	Deferred
Preventive	Pre-determined
	Condition-based, manual
	Condition-based, data
Predictive	Machine learning, AI



Analyzing big data



Equipment

Sensors

Collect

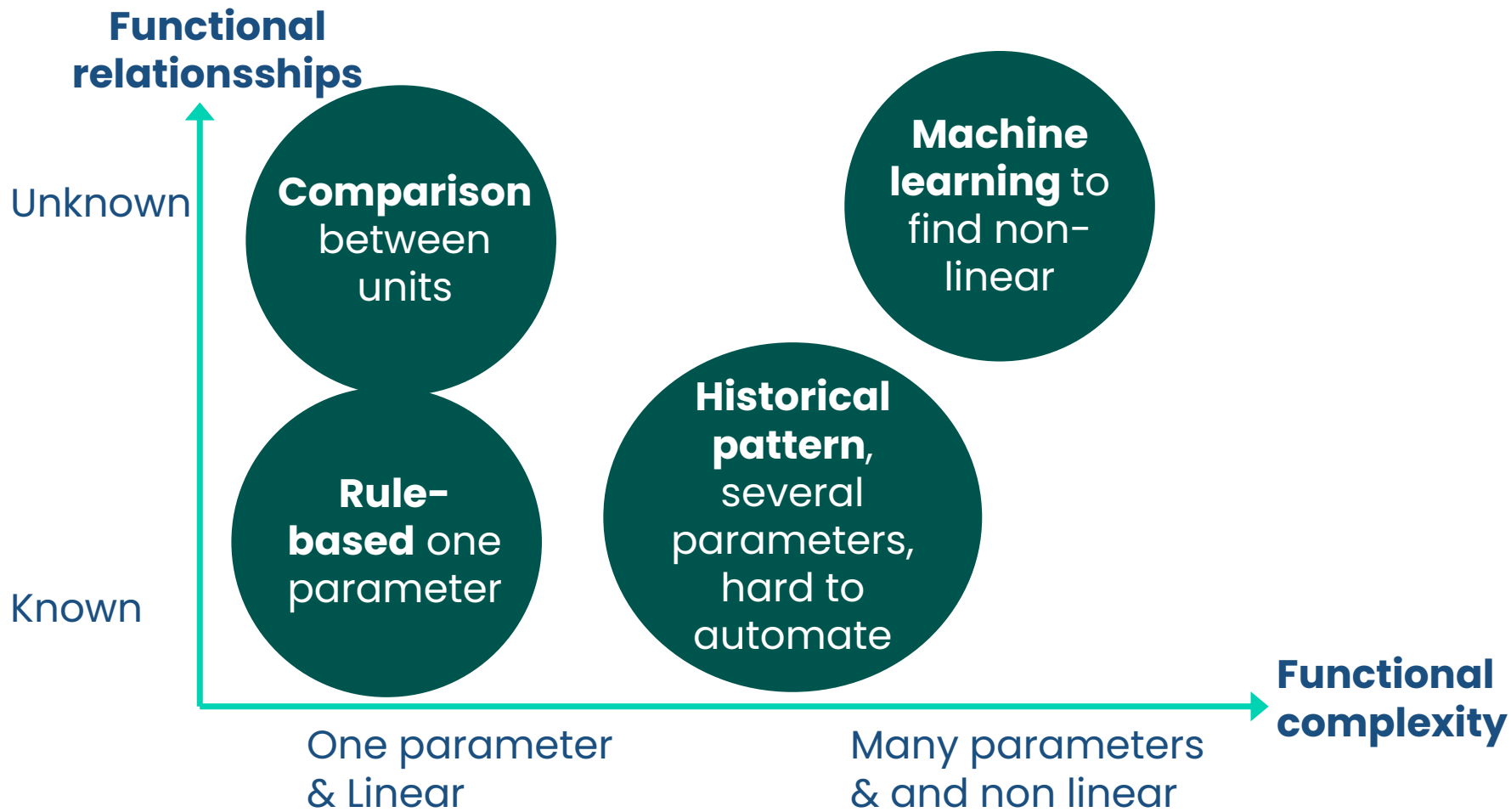
Store

Analyze

Tools &
Competence



Differentiated approach



EXAMPLE: MACHINE HEALTH IN RAILROAD SWITCH

98.86%
99.41%

97.7%
98.74%

98.85%
99.85%

Example: Solar cell plant



Example: Dehumidifier inside steel girder

Better monitoring of the dehumidifiers functions and health.

- Detects decreases in efficiency
→ energy savings
- From calendar based to condition based maintenance
→ time and financial saving
- Optimations of fan and dehumidifier interactions
→ 50% less runtime
→ energy savings

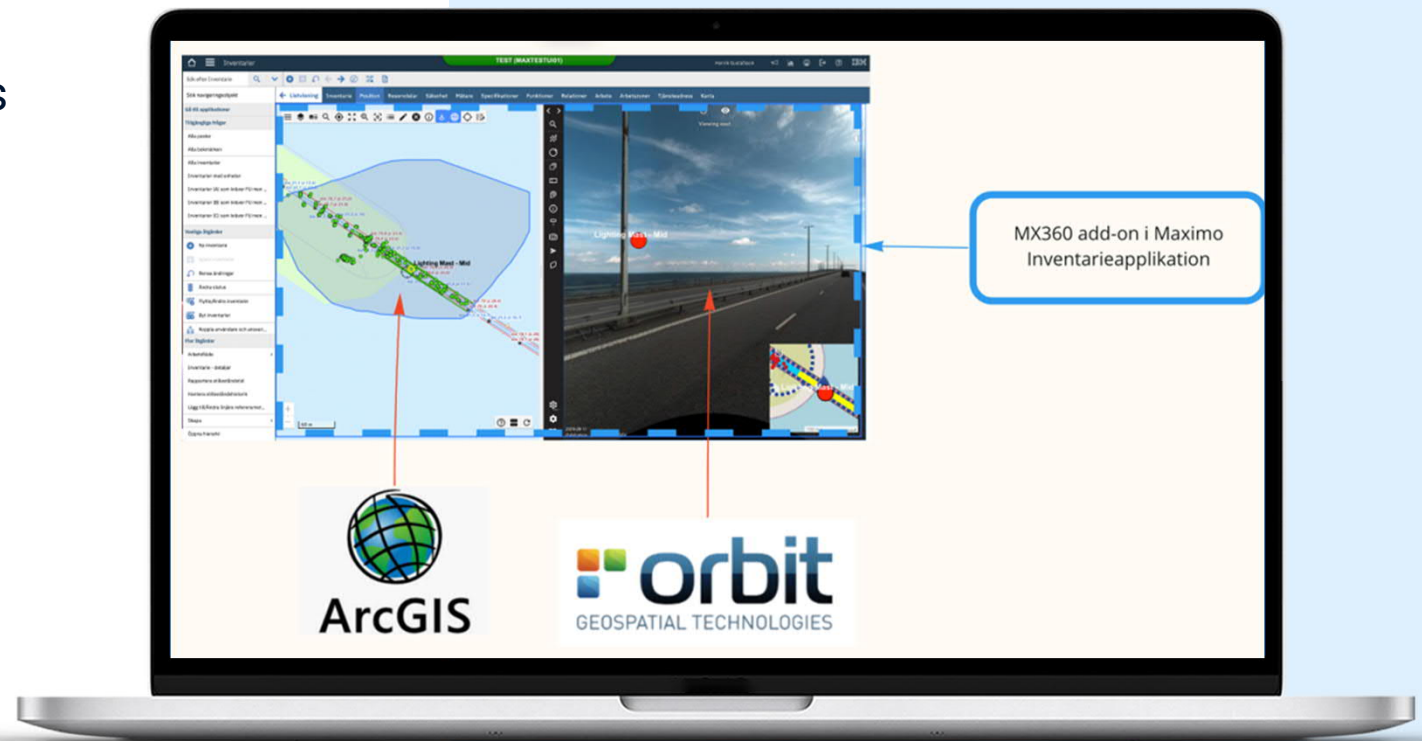
Learnings

- Smart maintenance is a way of cutting cost.
- KPI:s are a way of increasing the speed of change.
- Assessment models for smart maint. can be use across branches.
- ML algorithms are still not a mature business nor scalable.



MX360 – Our digital twin

- Digital planning in projects
- Training and knowledge
- Accessibility
- Low freq. condition inspection
- ⇒ Cost savings
- ⇒ Safety
- ⇒ Availability





IBM Maximo

Enterprise Asset Management

Användarnamn:

trivalo-hgu

Lösenord:

.....

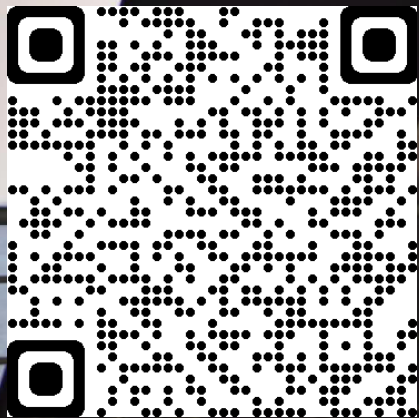
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