

The Cement Industry at the dawn of Industry 4.0

Digital transformation @ TITAN

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Materials Community Dialogue**
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The dawn of Industry 4.0

Digital manufacturing is more than simple automation

"Industry 4.0"

Data, computing, connectivity

Big data
(real-time)

Sensors everywhere/
IoT

Cloud
technology

Artificial intelligence & AA

Automation
of knowledge

Machine
learning

Advanced
analytics

Human-machine interaction

Touch
interfaces

Virtual
and augmented
reality

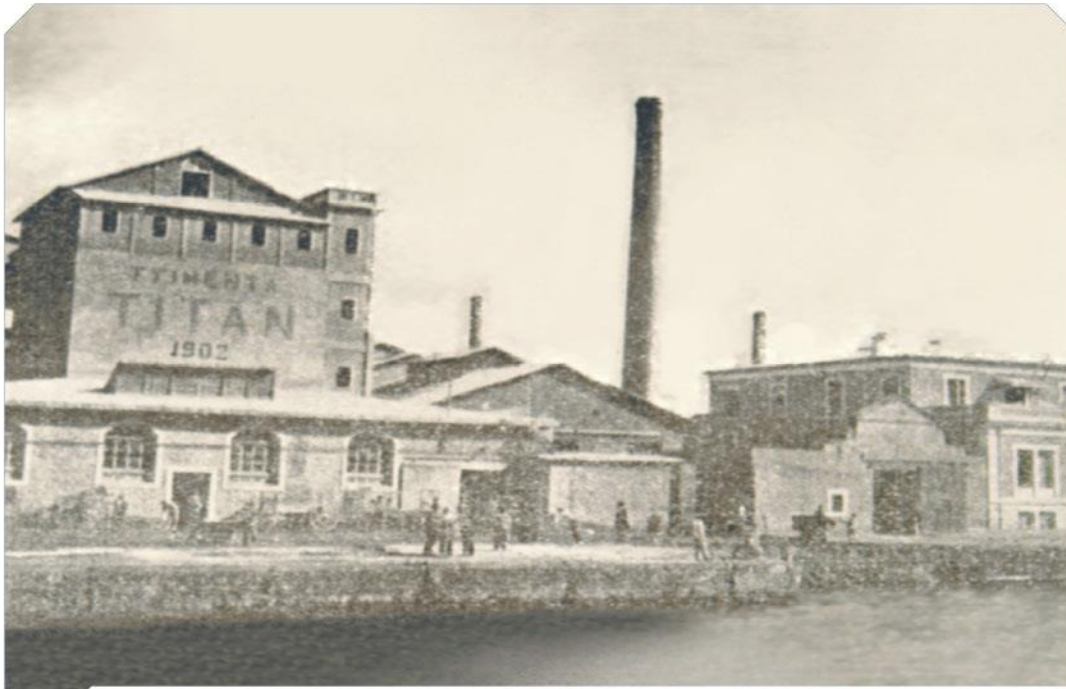
Digital-to-physical conversion

3D
printing

Advanced
robotics

Energy storage
and harvesting

Early consensus of 10%-15% increase
in operational effectiveness



How should a risk-averse, centenarian, heavy-industry company in a slow-moving sector, think about this new world?



Is digital really relevant for TITAN?



**OUR
PRODUCT?**

NO
(for the moment)



**OUR
BUSINESS
MODEL?**

NO
(for the moment)



**THE WAY WE
DEFINE
COMPETITIVENESS?**

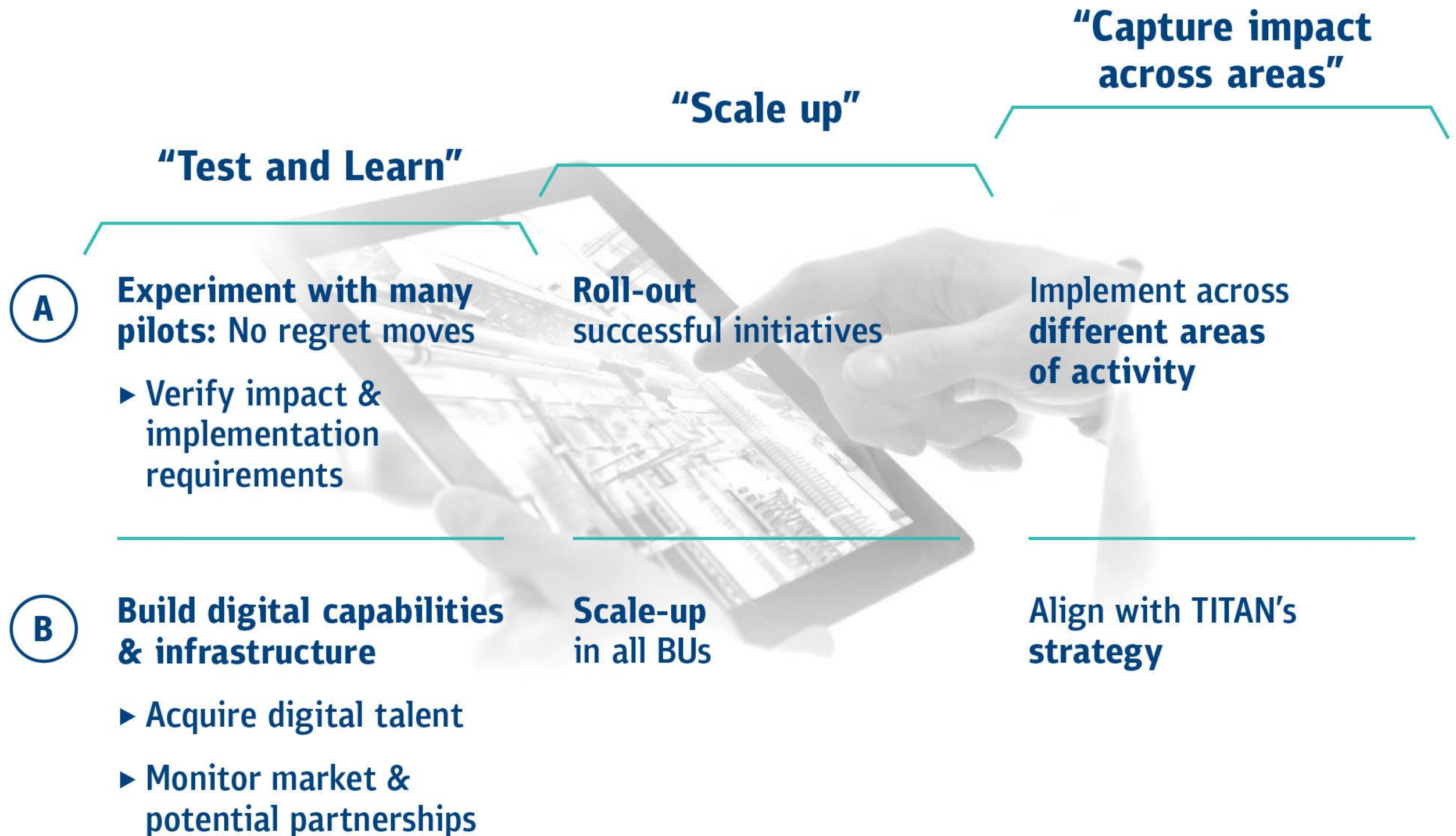
✓ YES

Our approach to Digital

TITAN's vision

- ▶ Fully sensorized, web-connected, predictive and self-optimizing cement plants
- ▶ Dynamic, real-time transparent, customer-enabled and seamless supply chain
- ▶ Data-enabled decisions, analytics-driven insights, paperless workflows and individual-customized internal processes
- ▶ Collaborative dynamic ecosystem with customers, business partners, service providers, suppliers, and communities.
- ▶ Best in-house team with new capabilities to support all the above.

Our test & learn approach



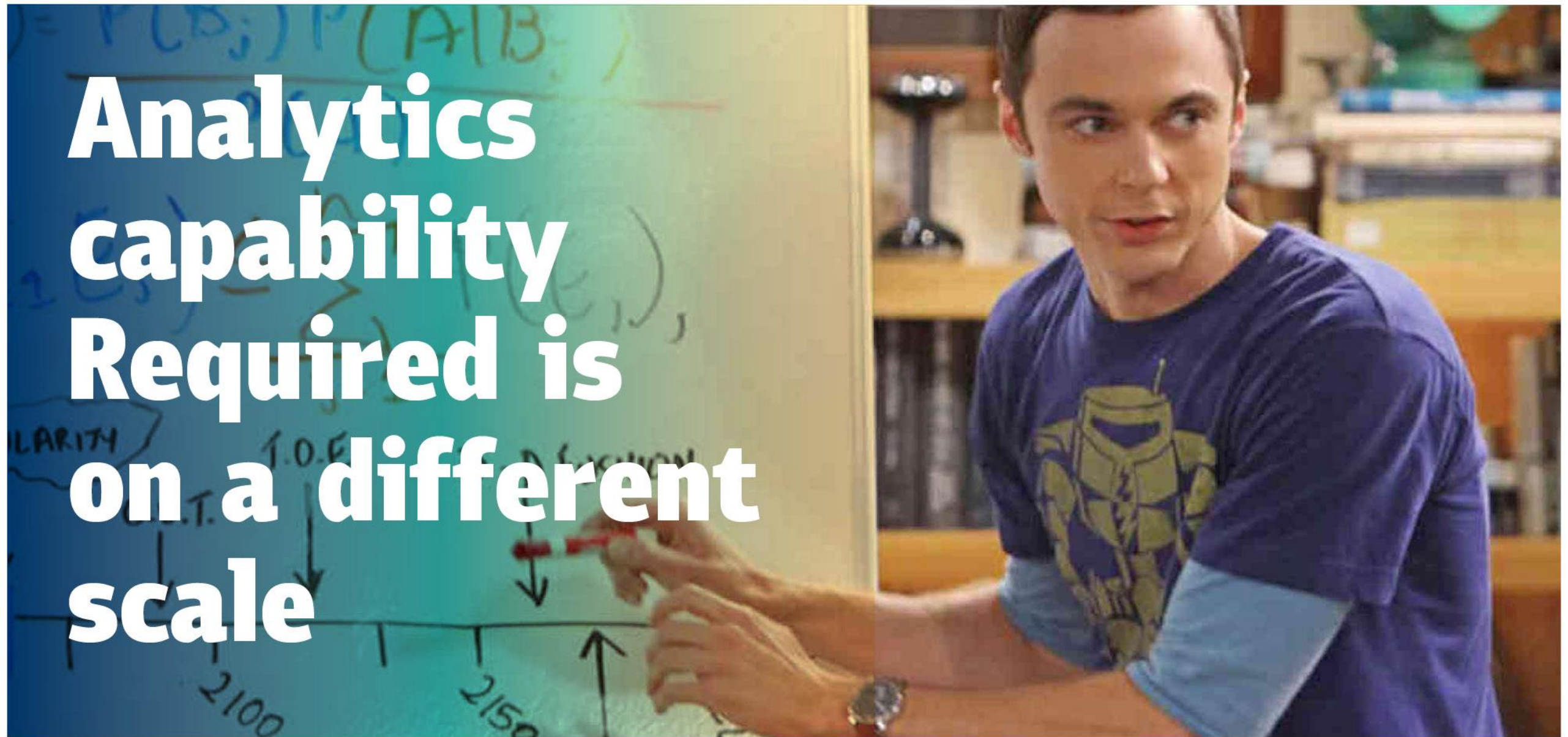
Lessons learned! (so far)



Data is the secret sauce

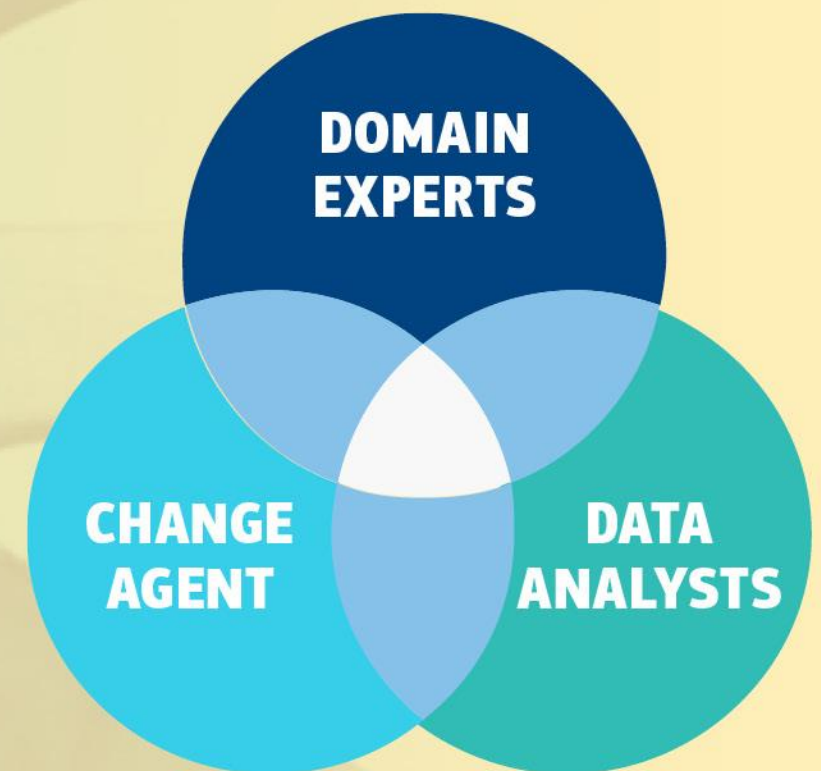
**Start early
as digital tools
need big data sets**

- ▶ **Sensors**
- ▶ **Connectivity**
- ▶ **Storage**
- ▶ **Ownership**



Results come from combining complementary skill sets

Complementary skill sets

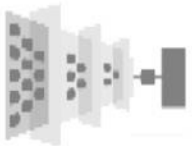


The plan ahead

The plan ahead



a Roll out and scale up successful pilots



b Grow pipeline of new pilots



c Articulate and test new partnership models



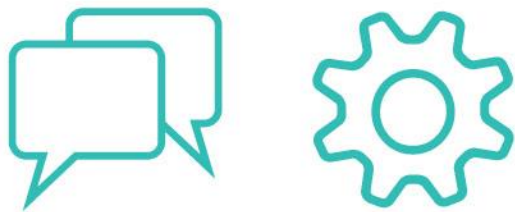
d Ramp up our capabilities

The plan ahead

c Forming non-traditional partnerships outside the business

OEMs

looking to
co-develop
solutions



STARTUPS

with own
(but immature)
algorithms



CONSULTANTS

building
new service
lines

ACADEMICS

wanting to try lab
pilots in the
real world

