

McKinsey
& Company

Winning in Changing – Digital Transformation for PetroChem Performance Excellence

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How to measure performance?

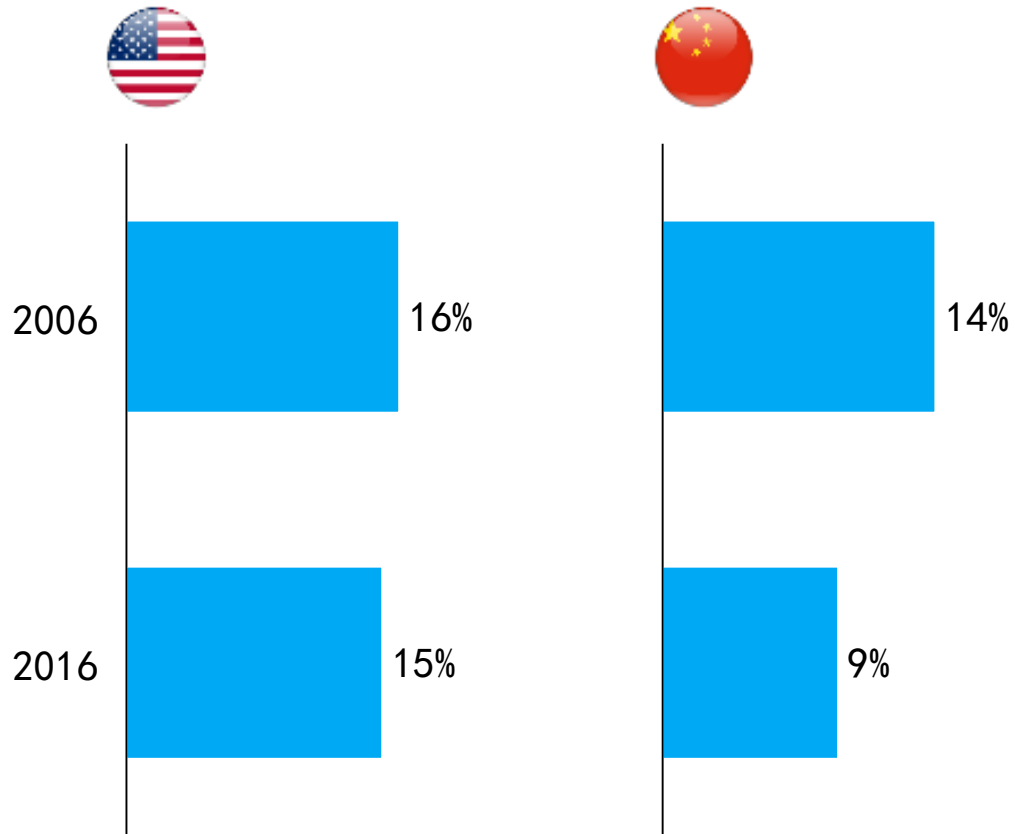
$$\text{Economic Value Added (EVA)} = (\text{ROIC} - \text{WACC}) \times \text{Capital Investment}$$

ROIC = Return on Invested Capital

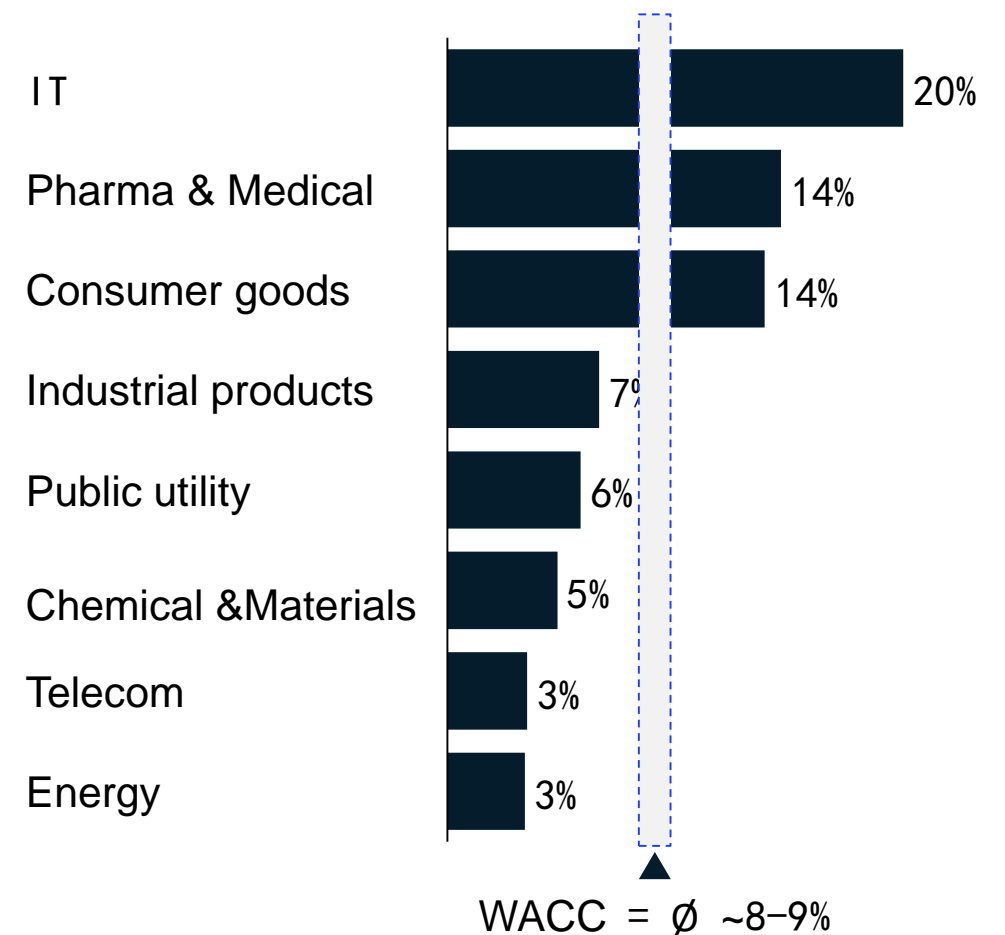
WACC = Weighted Average Cost of Capital

What are the biggest challenges of Chinese industrial companies?

ROIC of listed companies in China and America, 2006:2016

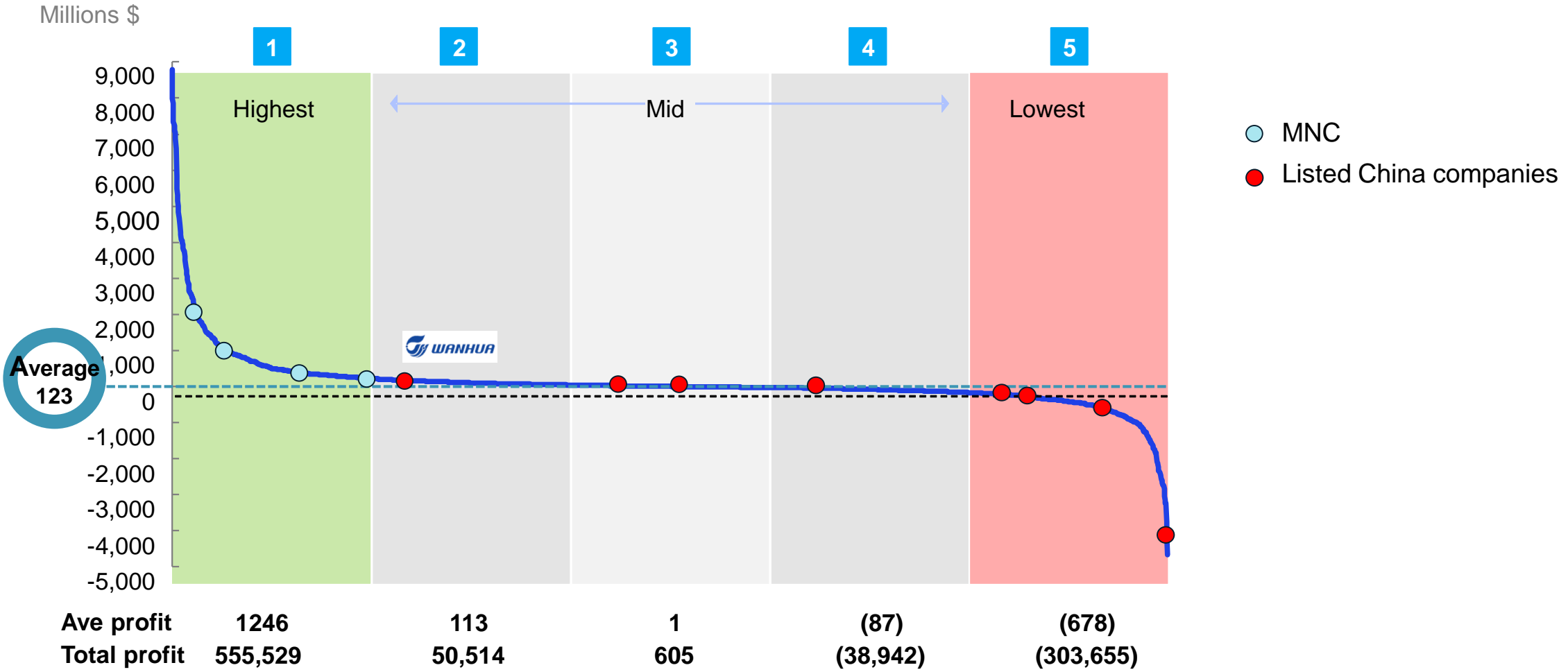


ROIC of different industries in China, 2016



Ranking of worldwide companies on economy value added

A Comparison of Average Economic Value Added (EVA) Created by 2240 Listed Companies in the World in the Past Five Years



Source, McKinsey

During global digital wave, we see three key drivers from leading companies' transformation



1

Market demand upgrade and change

Generate new product & service demand

Mid to long term

2

Driving innovation, and capturing new business

Business model renovation with huge opportunities

Short to mid term

3

Core business digitalization and tech upgrade

Realize huge & tangible impact

Immediate



Incubator



Accelerator

Our experience shows that significant impact can be delivered on different dimensions over the entire value chain

55%

Productivity increase through automation and Advanced Analytics

30%

Engineering costs reduction

50%

Inventory holding cost reduction

50%

Time-to-market reduction

20%

Costs of non-quality reduction

85%

Forecasting accuracy increase

.....more than 60% are based on Advanced Analysis

Major levers



Advanced Analytics

Deep analysis using advanced methods such as neural network and machine learning



Process Digitalization

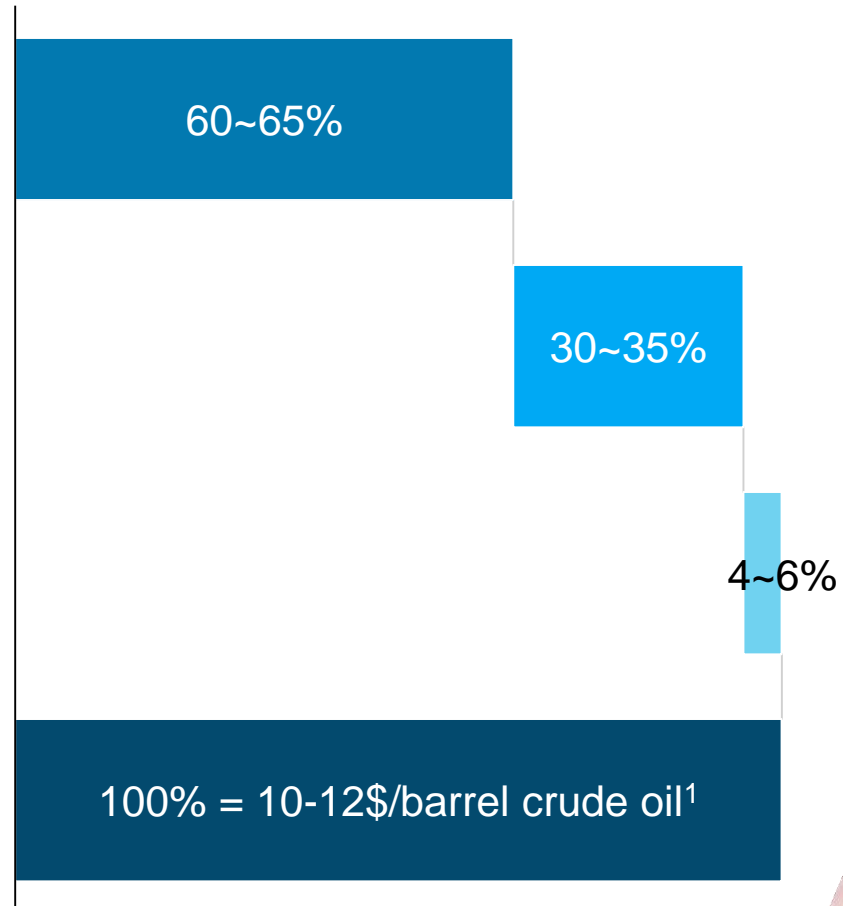
De-bottleneck of information flow by digitalization, such as removing the redundant human-machine interface, etc.



Robot and Remote Control

Replace high repeatable and high risk work by machine

Value distribution



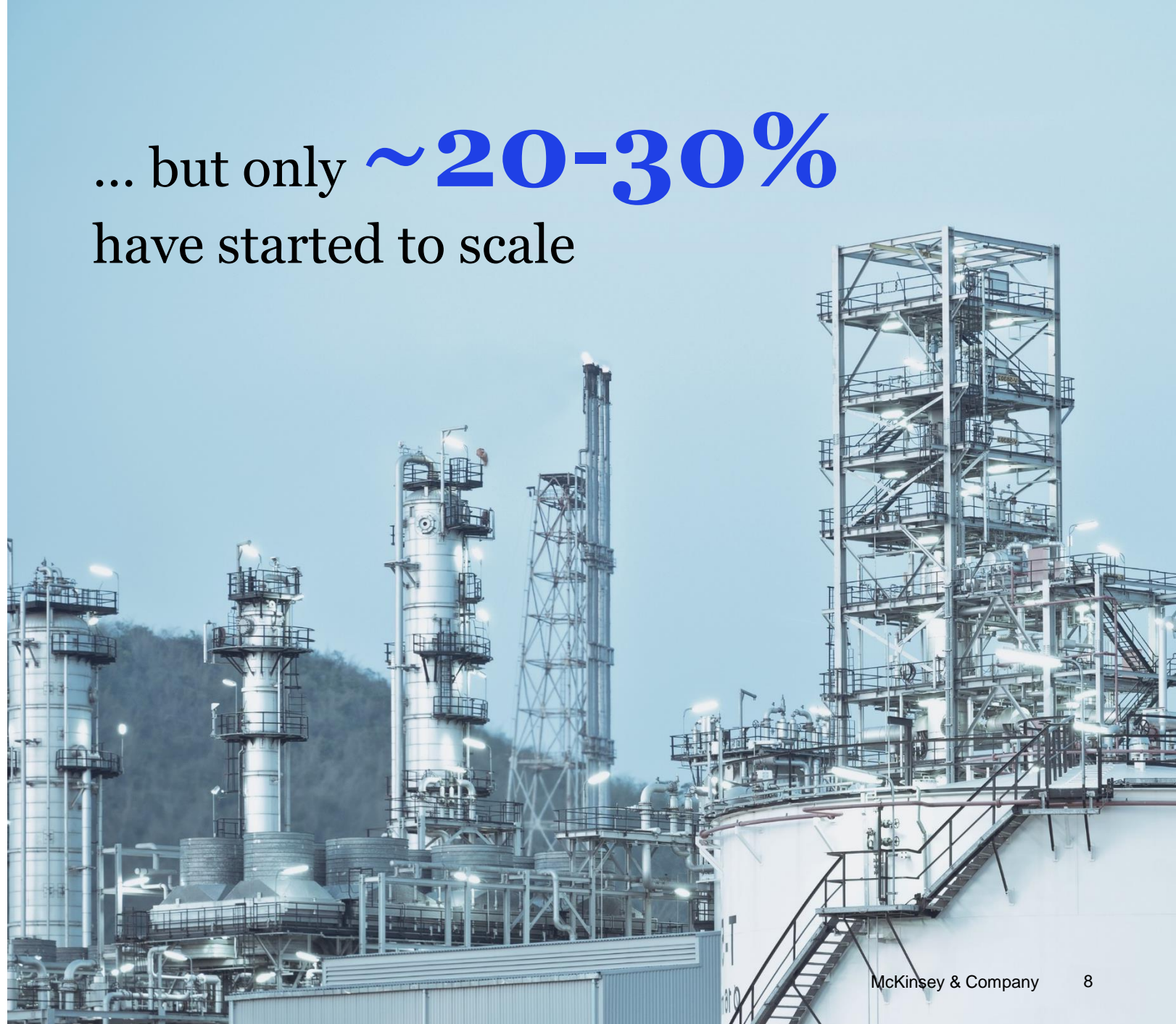
¹End to end value chain of Oil & Gas industry



... but only **~20-30%**
have started to scale

“~100%”

see the impact
potential that is
proven in “zillion”
POCs ...



We see the following key challenges



Technology jungle out there

What to choose – "everybody offers everything"; first mover or fast follower; what will be the standard ... ?

Governance and organization

Where to anchor; who decides in a world of "100 interfaces"; how to shelter ... ?

Talent and capabilities

Who can/should lead it; whom do I need; where to get the expertise from ... ?

Lack of usable data availability

What data are really required; where to get them from ... ?

Mindset – technology forward and not impact back

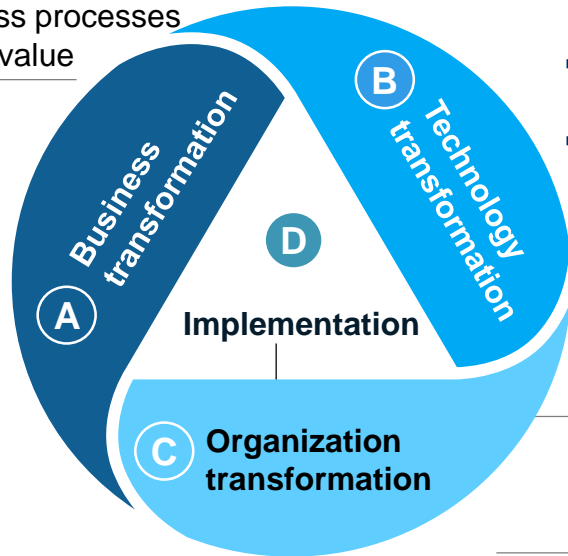
Where is the business case; do I really need a cloud and all the gadgets ... ?

**... and
neglecting
“good
classic”
LEAN**

The best-in-class approach is a triple transformation along 4 dedicated elements

Triple transformation is required

- Use cases such as Advanced Analytics (AA)
- Digitized Business processes
- All cases tied to value



- 2-speed IT and data architecture
- Backbone systems for rapid deployment

- New governance, roles, and skills required
- New ways of working

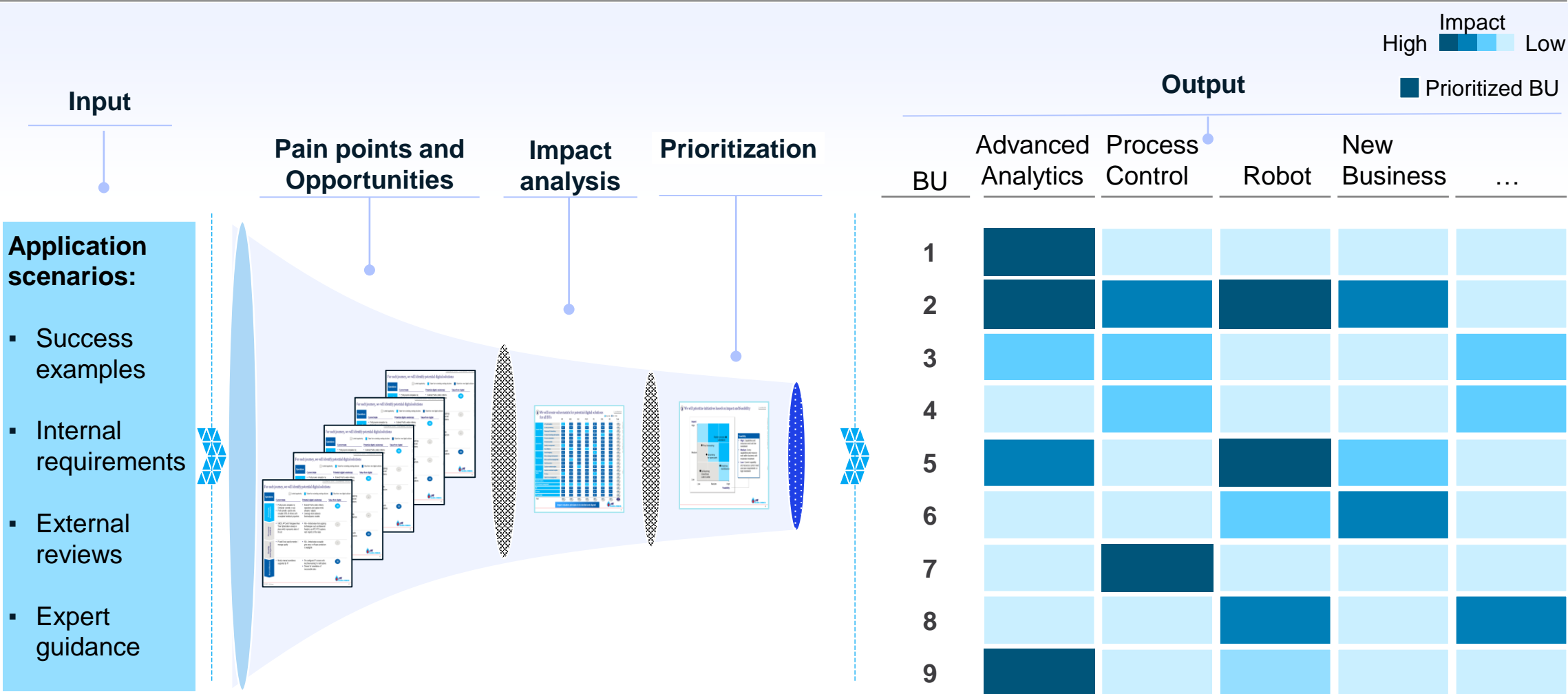
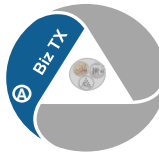
- Develop digital talents
- Establish digital center of excellence (DCOE)



Each of them is must to have

- Lacking of business transformation is not able to get expected ROIC
- Lacking of technology transformation is a digital case study only
- Lacking of organizational transformation is not sustainable
- Lacking of implementation is touch and see. The strategic planning is not able to be achieved

A clear understanding where the value is coming from is required to prioritize the commercial domains to reinvent

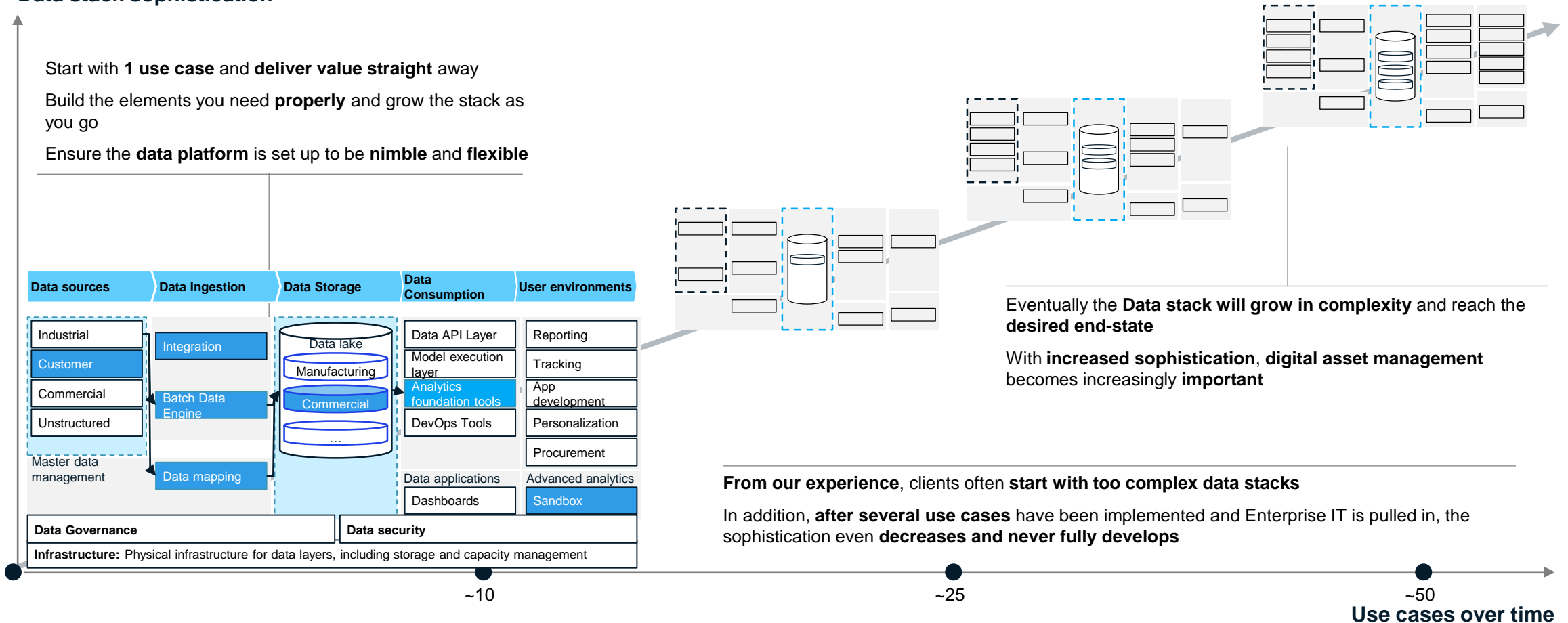


Building the data stack is done step by step through use cases to be successful



Data stack sophistication

- Start with **1 use case** and **deliver value straight away**
- Build the elements you need **properly** and grow the stack as you go
- Ensure the **data platform** is set up to be **nimble** and **flexible**



Dual speed IT is the core tech support for digital transformation, and perfect dual speed IT can support agile solution development and implementation



Dual Speed IT



Responsibility

- Core systems(e.g.ERP & CRM) and enterprise architecture(including process and capability)
- Monitoring and management solution
- IT centralized focus
- Demand, development, infra and app options are managed by CIO

Key Focus

- Stability
- Reliability
- Annual / quarter launch



- Digital process, product and service;
- Digital development (e.g. internet/mobility)
- Business focus and close to customers (internal and external)
- CIO managing infra and app operations, demand and development

- Time to market
- Agile and innovation

Have you heard of "Hackthon"?

The most pivotal insight is: It is not about just advanced tools, but experienced people using them



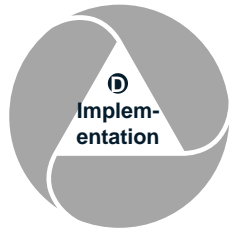
Advanced analytics



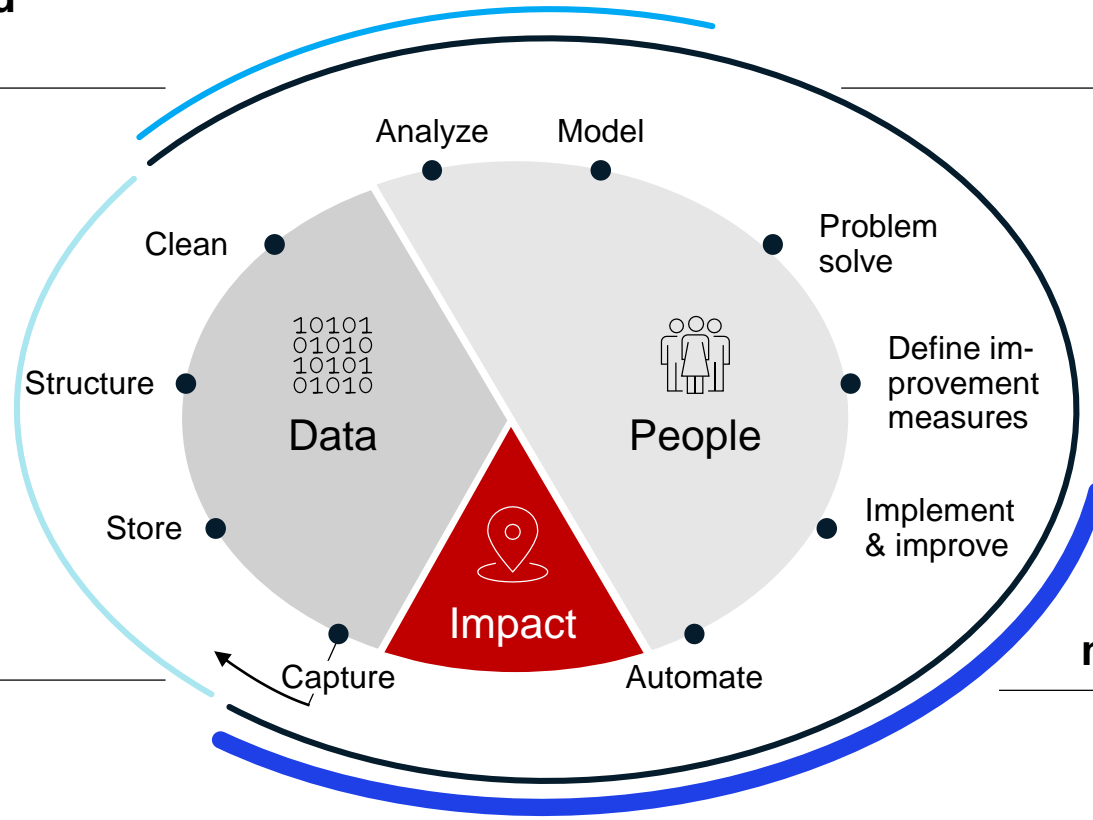
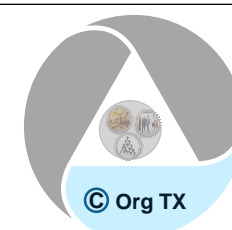
Domain expertise



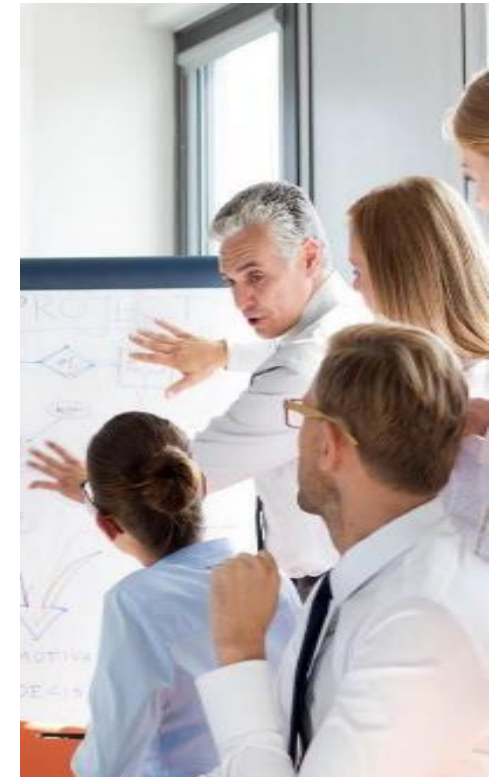
IT expertise



Change management



Finally it is all about people!



Building a cross-skilled team, with many roles supplied internally, while Data Scientist & Agile Development relying on external hires



Current organization

Excellence teams

Black Belts

Process Engineering

SBS data scientists

BU data scientists

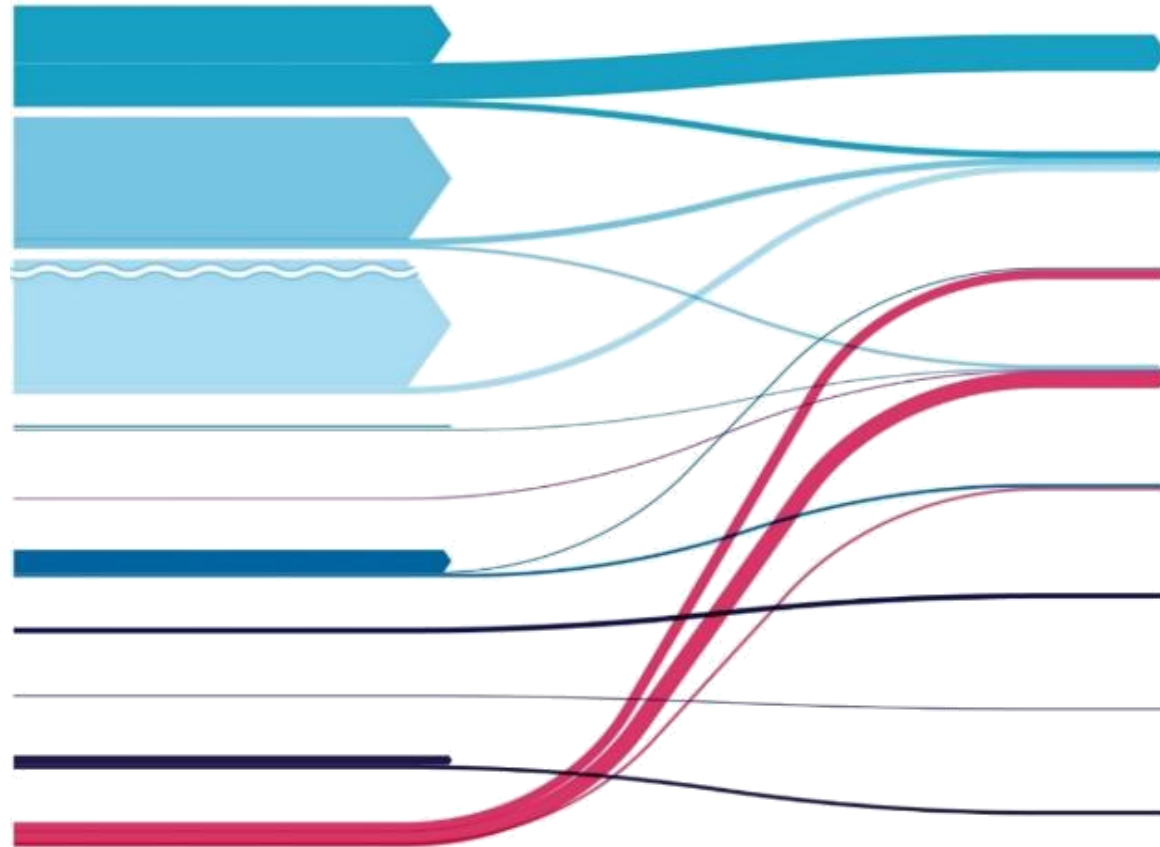
Engineering Technology

Data Stewards

Data architect

Data engineering and BI team¹

Market



New digital organization

Industry 4.0 Excellence change team

Translators

Agile development team

Data scientists

Automation team

Data Stewards

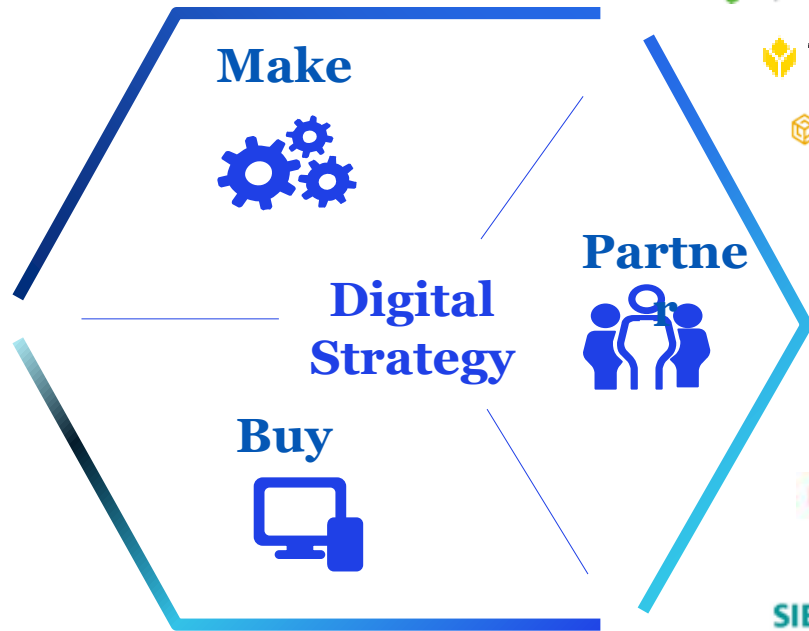
Data architect

Data engineering for Industrial

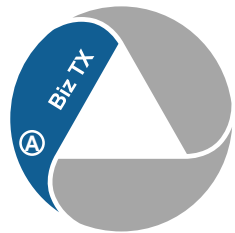
Successful digital transformation means you are among the first to identify external technology and make it to own knowledge



Is your digital ecosystem strong enough?



There are 7 key ingredients to transform into the ‘Industrial Company of the Future’



Strategy

A ‘Strategic Aspiration’ adopt a shaping posture to their value chain and the future of how the functions work

Domains

B ‘Prioritise which domains to reinvent’ based on value

Commercial and customer experience

Sales growth
optimisation
CX design

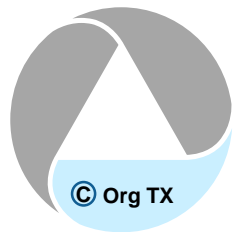
Pricing & margin mgmt.
Business model
innovation

Operations

Yield and energy/
Raw material usage

Maintenance
and reliability

Integrated supply chain Procurement excellence



Enablers

C

‘Develop critical mass
of translators’

Talent

D

Focus on agile
technology delivery’

Agile Delivery

E

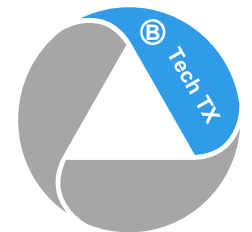
‘Decouple the legacy
technology stack’

Technology

F

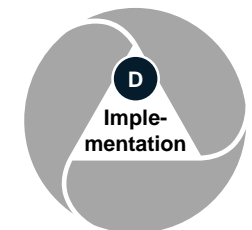
‘Extend to external,
unstructured,
proprietary data’

Data



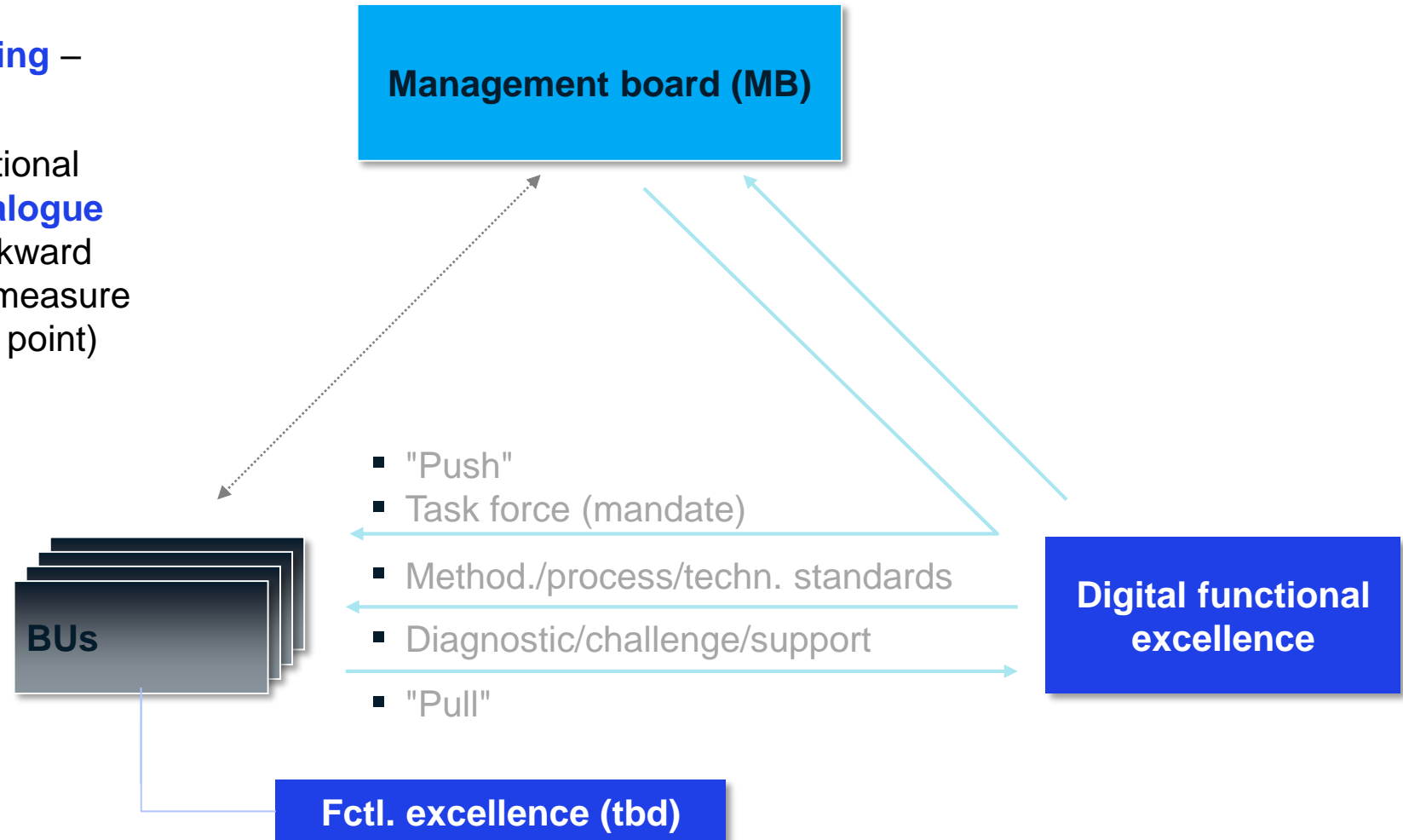
Execution

G ‘Adoption & Operating Model Change’



Digital transformation is an impact driven, CEO led, and top – down action……

- **Aspirational objective setting** – performance and maturity
- Detailed and dedicated functional excellence **performance dialogue** (including KPI setting) – backward and forward looking on unit measure level (i.e., dedicated agenda point)



.....which also requires a systemic design

Success factors

- **Top-down implementation** Implement from head office to each department
- **CEO lead** CEO lead, CXO assist
- **Light house** Build light house to show value and directions

Core elements and contents

- Strategy development
- Opportunity prioritization
- Future state design
- Ability assessment
- Resource needs



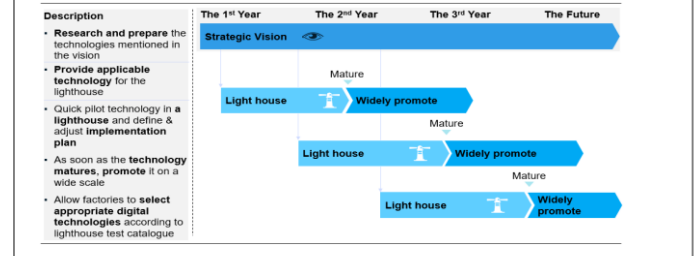
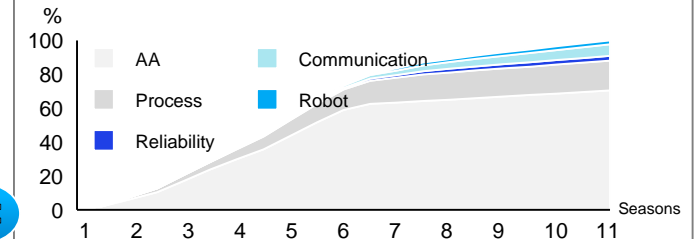
Systemic transformation design

- People training
- Data architecture build up
- Agile delivery
- Digital ecosystem establish
- Re-organization



Outcome

- Benefits continuously landed
- Step by step implementation



With more than 100 digital transformations, McKinsey developed our recipe to make digital transformation successful

1 Significant and huge impact, but not necessarily where you think they are from

- This wave of digitization will bring significant impact to the petrochemicals industry
- The impact will primarily come from running assets more efficiently, but there are also opportunities on new business model

2 Many are trying, few true transformations

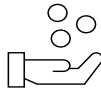
- Most companies find it challenging to scale and achieve the full potential
- Most of the domestic petrochemical digitalization still stays in the stage of visualization and informatization, while few enterprises really apply advanced analysis to actual operation

3 This is a transformation



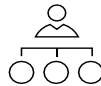
C-suite ownership

Ensure risk taking



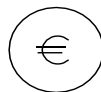
Business ownerships

Not IT ownership



Installation of gov./org.

“Sheltered Highlander” approach



Impact back

Not technology forward



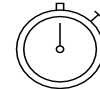
Expertise based technology application

Not buying a tool



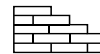
Lighthouses

Proof the pudding and show it



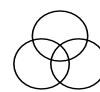
Agility and speed

Run sprints of 100 days



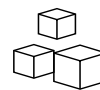
Build ecosystem

Develop expertise “sourcing” plan



Systemic deployment

Similar to LEAN – TS, MS, PS¹



Tech capability building

From the very top to the bottom

1. Technical System, Management System, People System

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petrochemical topics.

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