PwC Factory Intelligence – A Smart Transition

Reduce Costs, Improve Efficiencies, Increased Profitability = Globally Competitive

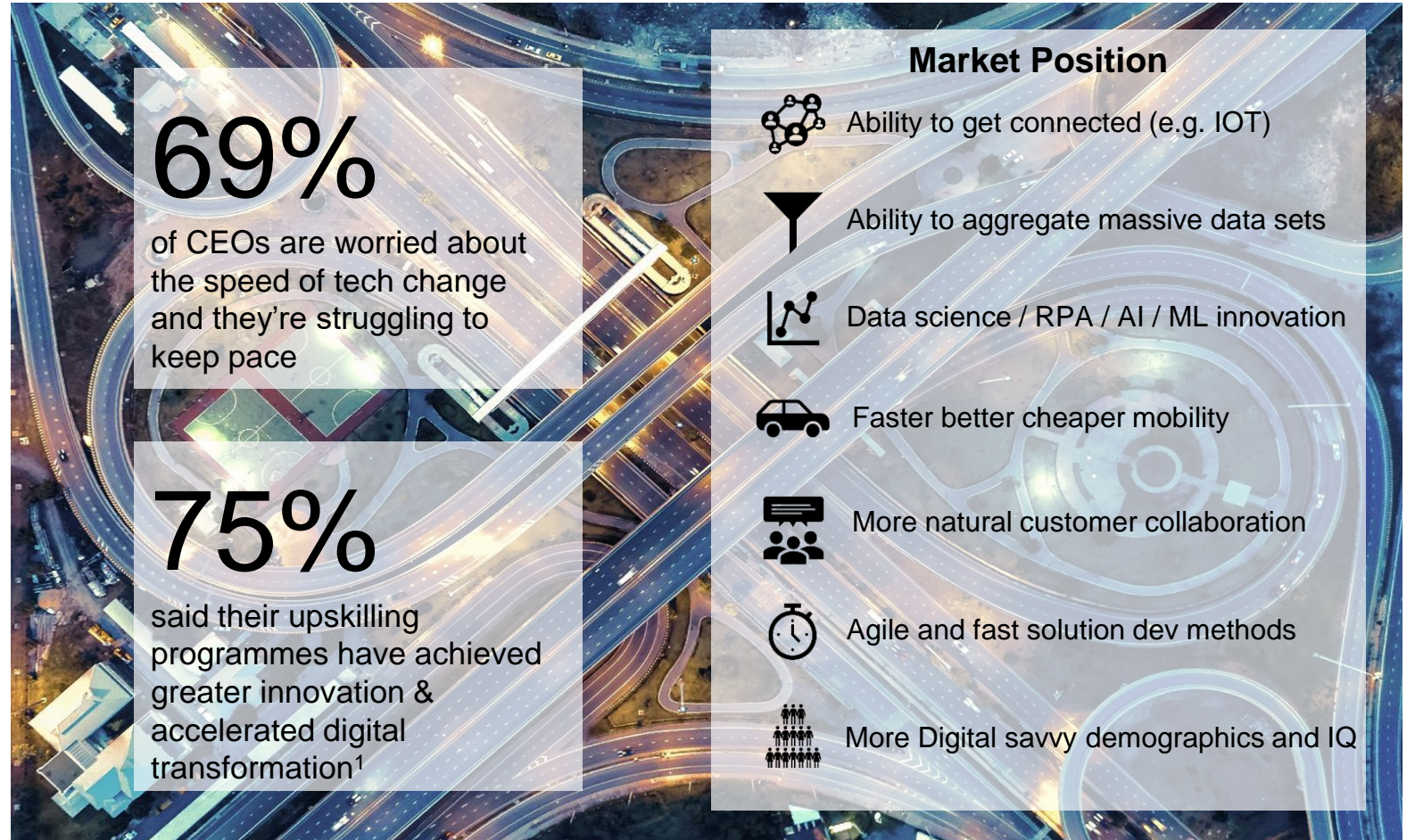March 2021

pwc

Digital transformation

Company strategy & positioning

> **Digital transformation is combining strategy & operations with technology innovation, analytics, and design to rapidly increase productivity, address pain points, push forward adaptive business models or disrupt the industry**
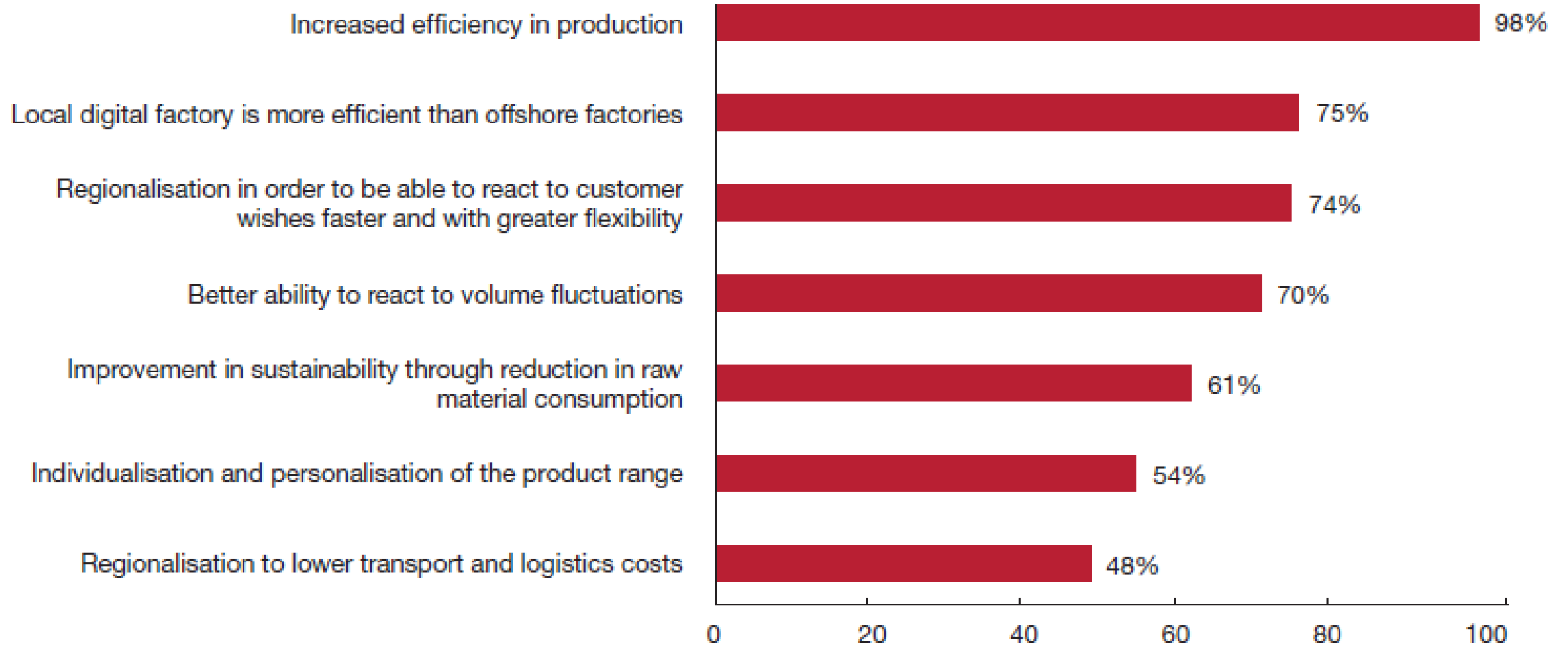>
> Digital Global Champions Study, 2018

69%
of CEOs are worried about the speed of tech change and they're struggling to keep pace

75%
said their upskilling programmes have achieved greater innovation & accelerated digital transformation[1]

Market Position

- Ability to get connected (e.g. IOT)
- Ability to aggregate massive data sets
- Data science / RPA / AI / ML innovation
- Faster better cheaper mobility
- More natural customer collaboration
- Agile and fast solution dev methods
- More Digital savvy demographics and IQ

Why Smart Manufacturing?

The main reason for setting up digital factories...

Reason	Percentage
Increased efficiency in production	98%
Local digital factory is more efficient than offshore factories	75%
Regionalisation in order to be able to react to customer wishes faster and with greater flexibility	74%
Better ability to react to volume fluctuations	70%
Improvement in sustainability through reduction in raw material consumption	61%
Individualisation and personalisation of the product range	54%
Regionalisation to lower transport and logistics costs	48%

Source: PwC – PwC Digital Operations Study 2018

Tomorrow's manufacturing operations become more complex requiring real-time information to react and make corrective actions

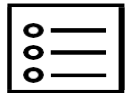**End-customer expectations change and make operations more complex…**

…and challenge companies to answer to the key questions on time across plants with corrective actions.

- **Product individualization and smaller lot sizes**
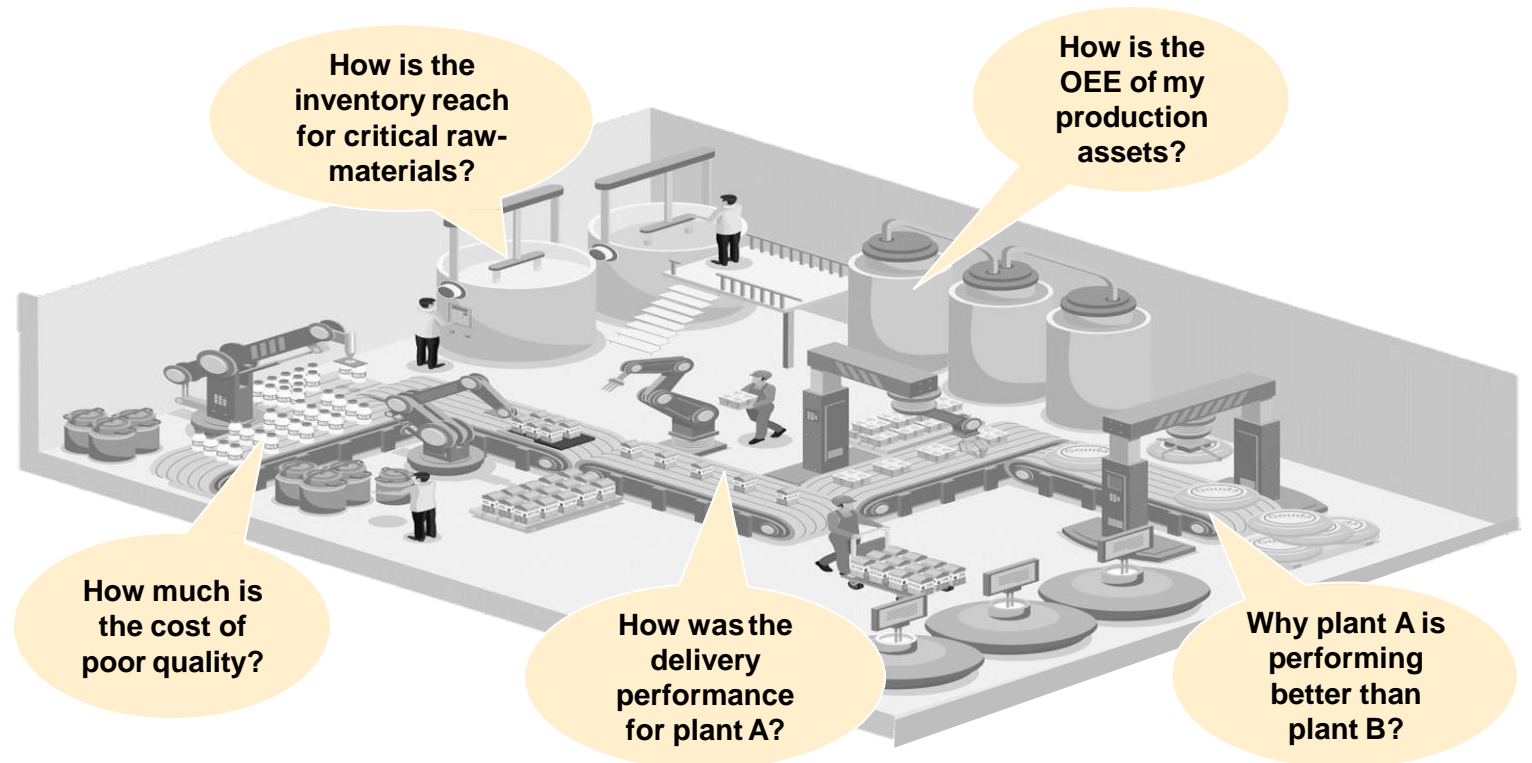- **Reduction of lead times to respond to demand**
- **E2E traceability, sustainability and safety requirements**
- **Volatile demand due to global crises**
- **Constant cost pressure**

How is the inventory reach for critical raw-materials?

How is the OEE of my production assets?

How much is the cost of poor quality?

How was the delivery performance for plant A?

Why plant A is performing better than plant B?

We currently see four digital trends which will further emerge and change manufacturing industries by 2025

1

Manufacturing becomes data-driven and AI-enabled

Data & AI enable higher OEE and quality. Use cases such as real-time monitoring, predictive maintenance, traceability and process mining are transferring from pilot to scaled application.

2

Manufacturers are building Digital Production Platforms & CoE's

Manufacturing industries are investing into their own data lakes and analytics centers of excellence, which are key enablers for their digital production use cases.

3

Manufacturing & IT companies jointly invest in open IIoT platforms

Initiatives such as the Open Manufacturing Platform (OMP) or ADAMOS are taking off in the manufacturing industry, where production companies and software vendors are jointly designing IIoT platform blueprints.

4

Equipment becomes commodity, software interfaces are key

While factory equipment (e.g. AGV) is getting more connected and intelligent, the hardware becomes commodity, while the software and especially standardized interfaces are a key.

While those trends will increase the potential of a Smart Factory, many companies struggle to unlock real business impact and achieve scale

Why Smart Factory projects fail and don't scale

No clarity on business impacts

Business needs should be the driver for the technology changes. Business should drive the technology, and not vice versa.

Scaling roadmap is not drawn

If scaling roadmap is missing, the full business impact of the Smart Factory Transformation cannot be shown which will slow down adoption and value realization.

Missing integration & collaboration among various teams

To truly digitalize production processes a close integration of business, technology and user experience is key for the project success.

Missing talent and expertise for implementation

Smart Factory Transformation requires a diverse set of skills to ensure a scalable, reliable & secure solution that can deliver true business value
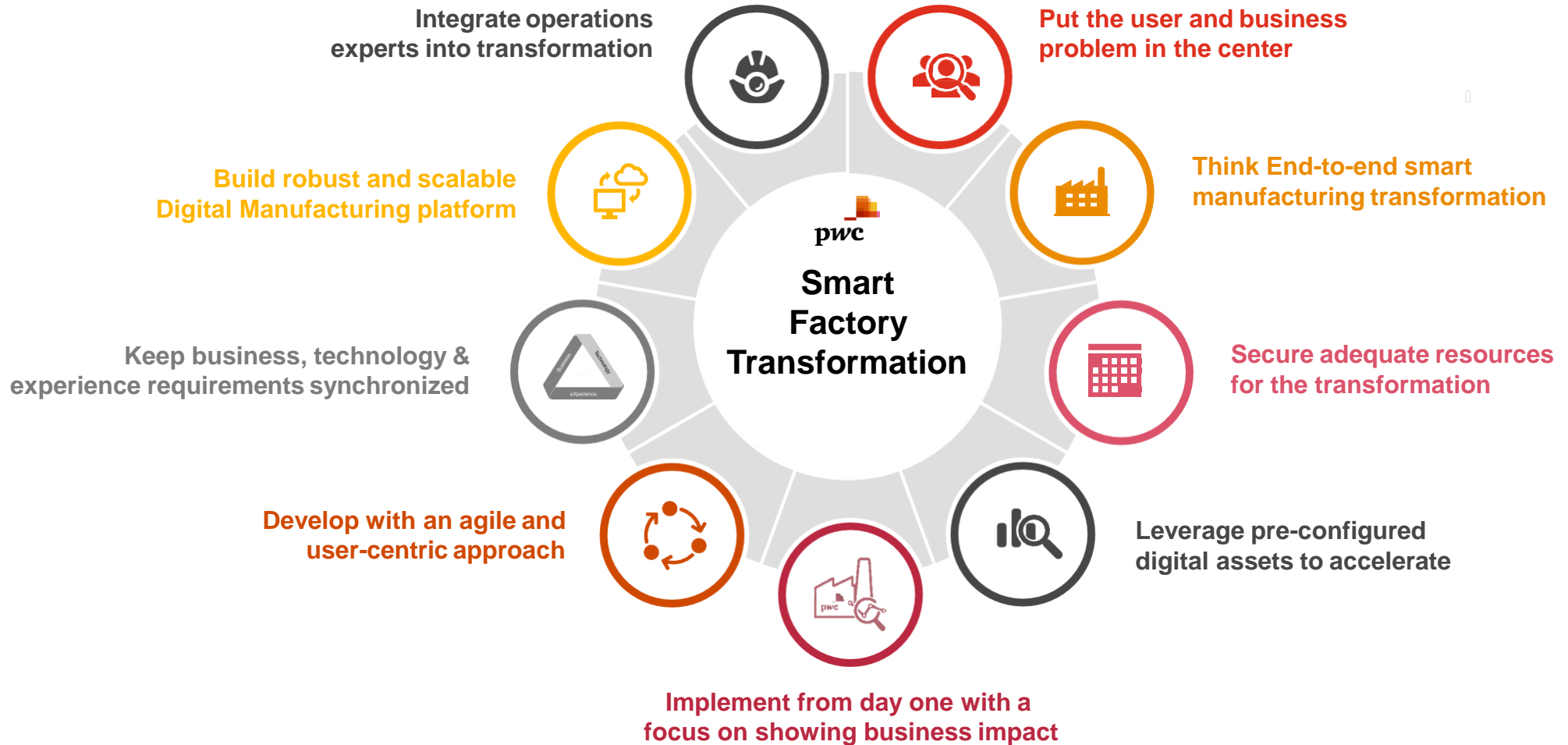
Changing priority & missing management commitment

Crucial support and backing of senior management is key to the success of such initiatives in hard times. Patience is the key and outcome will follow.

PwC's Smart Factory approach

… addresses clients needs from an organizational and a technical point of view as it seeks for a solution from an operational perspective by also providing an Azure based digital asset that is designed to accelerate use case development and provides the necessary framework to leverage the potential of analytics within the production environment.

To successfully transform Factories into Smart Factories, business & technology expertise needs to go hand in hand

Integrate operations experts into transformation

Put the user and business problem in the center

Build robust and scalable Digital Manufacturing platform

Think End-to-end smart manufacturing transformation

Smart Factory Transformation

Keep business, technology & experience requirements synchronized

Secure adequate resources for the transformation

Develop with an agile and user-centric approach

Leverage pre-configured digital assets to accelerate

Implement from day one with a focus on showing business impact

Smart Factory decision makers from a business & technical background needs to be addressed according their individual needs

Chief Executive Officer

- Aims for further digitalization of his business
- Ensures competitiveness in the market and derives new business models through the use of new technologies
- Reinforces data-driven decisions and management by unlocking the potential of data
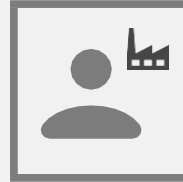
Head of Manufacturing

- Seeks for cross-plant transparency, even though, plants vary significantly
- Leverages IoT & Data Analytics to increase productivity and efficiency within the production processes
- Increases product quality and reduces costs by further optimizing processes through digital solutions

Head of Industry 4.0

- Identifies promising areas for I4.0 applications within the company
- Develops unified automation strategy and processes that are scalable globally by taking into account local specifics of plants
- Empowers employees to work with and use new applications to leverage the potential
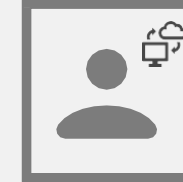
Chief Information Officer

- Aligns the IT & Data-Strategy to the overall corporate strategy
- Drives innovation within the company
- Discovers new relevant technical developments for the company and evaluates their potential
- Ensures constant service and availability of IT-systems

IIoT Center of Excellence

- Identifies and develops scalable solutions for optimal cost-benefit ratio
- Ensures the implementation of use cases from PoC to MVP and productive operationalization
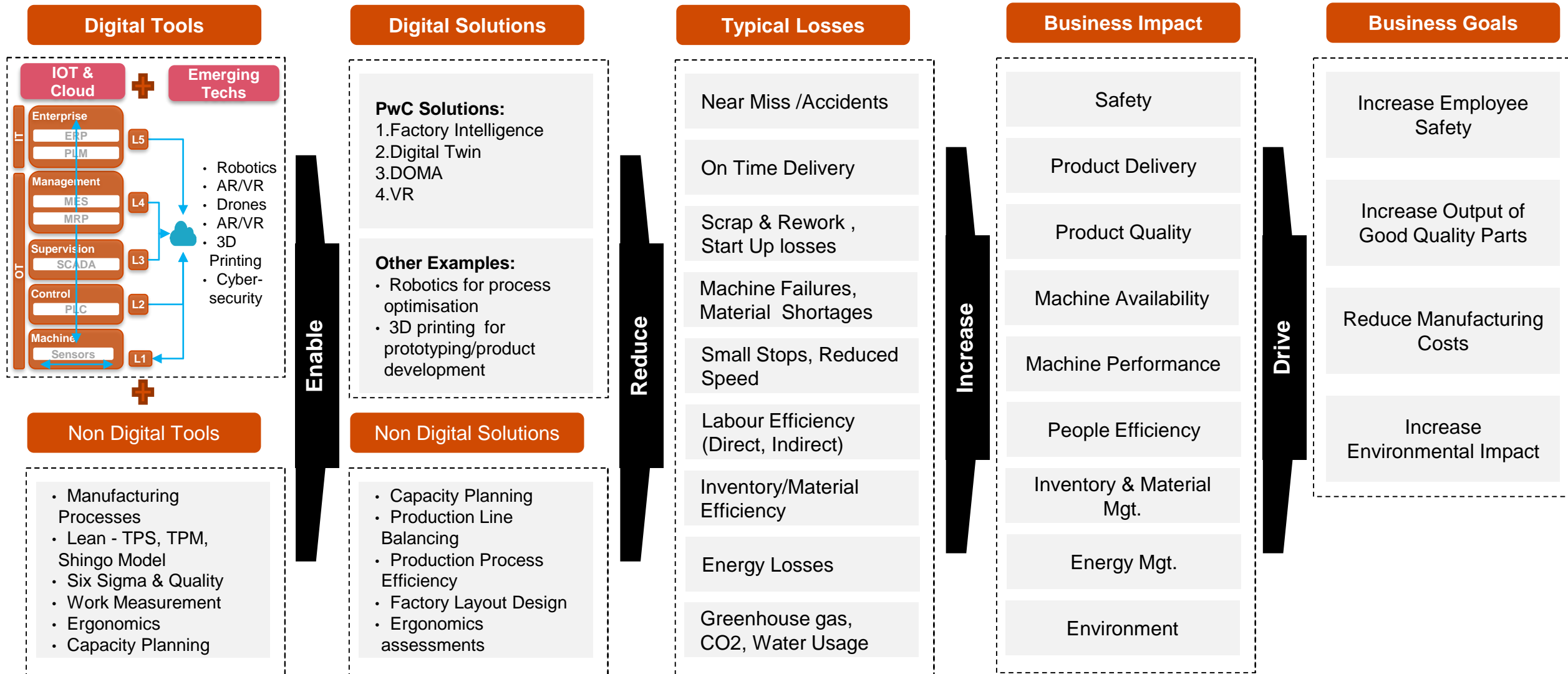- Sets up a qualified team with the right capabilities to drive and support innovation

Business Driven

Technology Driven

Roadmap for achieving the Business Goals

Digital Tools

IOT & Cloud ➕ **Emerging Techs**

IT	Enterprise		
	ERP		L5
	PLM		
OT	Management		
	MES		L4
	MRP		
	Supervision		
	SCADA		L3
	Control		
	PLC		L2
	Machine		
	Sensors		L1

- Robotics
- AR/VR
- Drones
- AR/VR
- 3D Printing
- Cyber-security

Non Digital Tools

- Manufacturing Processes
- Lean - TPS, TPM, Shingo Model
- Six Sigma & Quality
- Work Measurement
- Ergonomics
- Capacity Planning

Enable

Digital Solutions

PwC Solutions:
1. Factory Intelligence
2. Digital Twin
3. DOMA
4. VR

Other Examples:
- Robotics for process optimisation
- 3D printing for prototyping/product development

Non Digital Solutions

- Capacity Planning
- Production Line Balancing
- Production Process Efficiency
- Factory Layout Design
- Ergonomics assessments

Reduce

Typical Losses

- Near Miss /Accidents
- On Time Delivery
- Scrap & Rework , Start Up losses
- Machine Failures, Material Shortages
- Small Stops, Reduced Speed
- Labour Efficiency (Direct, Indirect)
- Inventory/Material Efficiency
- Energy Losses
- Greenhouse gas, CO_2, Water Usage

Increase

Business Impact

- Safety
- Product Delivery
- Product Quality
- Machine Availability
- Machine Performance
- People Efficiency
- Inventory & Material Mgt.
- Energy Mgt.
- Environment

Drive

Business Goals

- Increase Employee Safety
- Increase Output of Good Quality Parts
- Reduce Manufacturing Costs
- Increase Environmental Impact

Video https://www.youtube.com/watch?v=2uL-0CbJXv0&feature=youtu.be

By applying PwC Smart Factory approach, we have realized significant improvements and savings across industries

Exemplary Smart Factory Projects

Business Driven

- Digitalization of two plants in Germany and US
- Optimization of capacity constraint production sites
- Identification of bottlenecks on the shop floor (machine, labor, tools)
- Integration of relevant source systems (MES, ERP, HR systems)
- Development of predictive analytical models and applications to improve operational excellence

Technology Driven

- Trusted advisor for client's Digital Production Program
- Digital Production Vision & Strategy development
- Design & Implementation client's Digital Production Platform
- Implementation of end-user centric value driven digital use cases for different categories, e.g. reliability, efficiency

Additional references

- Our Strategy through execution approach has been proven in many client engagements across industries

Electronics

Automotive

Process

Manufacturing

Retail & consumer goods

Chemicals

Exemplary project output

> 7% cost savings
of conversion cost

&

8% pts OTIF
Improvement

7.500.000 minutes
Reduced downtime

+

25.000.000 minutes
Increased production time

=

15% pts OEE
Improvement

Plant Performance Insights

Increase the **output** of bottleneck production assets by ~ **30%.**
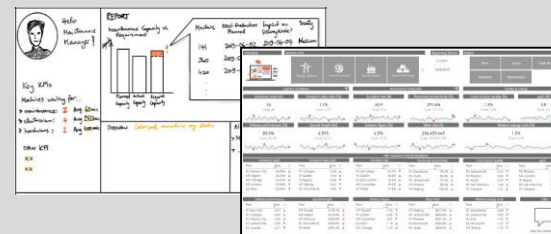
Predictive Quality

Reduce the **costs scrap, rework** and manual sorting by ~ **40%.**
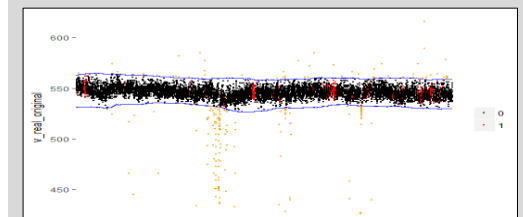
Our model enables us to help clients' to envision the future, design the future solution and scale it up across production network

	Step 1	Step 2a	Step 2b	Step 3
	Understand the value of the Smart Factory	**Show, don't just tell**	**Get prepared for the Smart Factory Transformation**	**Lighthouse plant implementation**

Focus areas	• Focus on understanding the maturity, target state and providing PwC-Microsoft perspective on successful Smart Factory transformation
	• Different maturity stages
	  • **Strategy** – Outline how the Smart Factory would look like
	  • **Design & Build** – Focus on value creation and technical platform
	  • **Operate & Scale** – Focus on augmenting and scaling the solution
	• Understand potential gap to the target state
		• High level use case identification and definition
		• Benefits identification
		• Implementation of the PoC use case
		• Demonstration of the Factory Intelligence
		• Deep dive into state-of-the-art platform architecture
			• Focus on understanding the business problem
			• Estimate the potential business value of the Smart Factory
			• Detail the epics and use cases
			• Build potential PoC
			• Ensure robust and scalable platform and architecture
			• Select the plant for lighthouse implementation or scale-up
				• Develop use cases following agile model
				• Implement use cases
				• Improve solutions and stabilize operations
				• Ensure change adoption and scalability
				• Scale to other plants

Duration	**1 - 2 weeks**	**4 - 6 weeks**	**4 - 6 weeks**	**4 - 12 months**
Cost	**Free of charge**	**50 - 75 k€**	**50 - 75 k€**	**Depends on the size of the operations**

Factory Intelligence

pwc

"PwC Factory Intelligence is centered around a set of dashboards that matter and analytics that drive results and fast ROI for our initiatives. It has the DNA for driving results through AI, analytics and process integration that is missing from most Smart Factory software solutions on the market."

Plant Manager, Automotive Supplier

Dashboards that matter
Operations room that aggregates and orchestrates all relevant KPIs, production alerts and actions

Production Analytics
Identify reasons for being off track in production and enable root cause analysis.

Real-time Resource Planning
Plan and allocate available resources cost and time efficiently to ensure the target output.

Maintenance Intelligence
Avoid downtimes and integrate predictive maintenance into an intelligent process.

Predictive Quality
Early detection of quality issues and automatic suggestions for rework needs

Digital Lean
Revealing Value Stream lags and inefficiencies to identify waste and increase efficiency

PwC

Factory Intelligence is not a boxed, final set of applications but an integral part of the Smart Factory Integrated Solution that unlocks the potential of smart manufacturing transformation

What **is** PwC Factory Intelligence?

- Part of an integrated solution that is designed to support Smart Factory Transformation projects with a flexible framework for fast use case realization.

- A thin layer on top of your existing shop floor applications that allows you to easily combine any kind of data.

- A solution that was built with the idea in mind to leverage existing applications but make todays static connections flexible and create intelligent process chains.

- A PaaS based pre-defined architecture for Smart Factory solutions based on Microsoft Azure that is customizable based on the client´s needs.

What **is** PwC Factory Intelligence **not**?

- PwC's own MES, ERP or scheduling application and does not aim to implement those functionalities at all.

- A full stack IIoT platform like PTC Thingworkx or Siemens Mindsphere.

- A setup.exe or 100% Plug-and-Play solution where solely the deployment is sufficient to have a ready-to-use solution in place.

PwC Factory Intelligence is an holistic solution that captures production KPIs at different levels to provide the right data, to the right person at the right time

Dashboards that matter
Functionality in
Factory Intelligence

- Allows user to analyze all relevant production metrics
- Provides transparency across plants with ability to trigger actions
- Support daily business with view on plants with (selected) KPIs and configured alerts
- Common data basis that breaks data silos and enables combined analysis

Exemplary Factory Intelligence Apps

Factory Control Tower

Real-time performance monitoring on local and global level based on all relevant data – from sensor to ERP.

- Compare plant performance based on selected measurement criteria like a production KPI system.
- Activity feed sending notifications and alerts with the ability to take action immediately.

Stakeholder:

- COO
- Regional / BU Operations Manager
- Plant Manager

Plant Performance

Analysis of the most important KPIs across all factories & Business Units.

- Serves as an alerting and global reliability portal with cross plant transparency.
- Natural language report querying
- High-level analysis with the possibility to get detailed information.

Stakeholder:

- Plant Manager
- Operations Excellence Expert

Daily Plant Performance Digest

Condensed overview of production KPIs on a daily level.

- Daily Summary of key plant performance KPIs on machine and shift level.
- Ad-hoc decision support cockpit
- First indicator for production performance loss.

Stakeholder:

- Plant Manager
- Maintenance Expert
- Operations Excellence Expert

Hence, Production Analytics empowers clients to save costs by ensuring that they can run their machines efficiently and optimize their operations KPI

Production Analytics Functionality in Factory Intelligence

- Platform provides near real-time data, and guided analytics to identify patterns and root causes of performance loss areas
- Enables identification of improvement opportunities and inefficiencies on machine level and thus drives data-driven decision making.
- Alerting functionality based on user requirements.

Exemplary Factory Intelligence Apps

Shop Floor Efficiency

Solution that tracks machine KPIs with a focus on OEE across a factory.

- Alerting and smart activity scheduling
- Identify potential OEE decreases
- Analyze machine performance based on multiple machine measures individually selectable

Stakeholder

- Plant Manager
- Operations Expert

Explore Performance

App that provides a stop code analyzer and a shop floor performance analysis focusing on OEE.
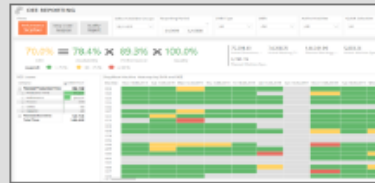
- Provide visibility to root causes of machine downtime and identify systematic issues to improve performance
- Identify reason for OEE decrease

Stakeholder

- Plant Manager
- Operations Expert
- Quality Manager

Machine Stop-and-Go Analyzer

Cockpit displaying machine stops and stop codes accurate to the minute.

- Capture root causes for downtime and increase coordinated collaboration to solve issues and track impact
- Track down-time and reasons in real-time including historic information

Stakeholder

- Plant Manager
- Operations Excellence Expert

Alerts and KPI monitor

Comprehensive report on alerts, respective counter-measures and patterns.
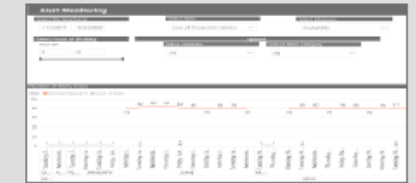
- Machine level downtime analytics
- Early issue detection through alerts
- Preconfigured alerts specific to each person's role to trigger timely counter-action

Stakeholder

- Plant Manager
- Operations Excellence Expert

PwC Factory Intelligence addresses these challenges and provides the required functionality, to execute quality related analytic models

Predictive Quality Functionality in Factory Intelligence

- Providing a database that connects various data sources and heterogenous data structures

- AI-based algorithms and implementation of use cases

- Empowerment of users by providing them the ability to trigger actions

- End-to-end integration with the ability to track the production process anytime anywhere

Exemplary Factory Intelligence Apps

End-of-Line Testing

AI based solution to track process quality and operationalize rework.

End of Line Expert - Cluster Assessment

- Control cockpit to verify the results
- Establishes full-process transparency
- Ensures end-to-end process traceability
- Use predefined Machine Learning models to identify relevant pattern

Stakeholder

- Quality Manager
- Process Expert
- Data Scientist

Dynamic Threshold Adjustments

Dynamically adjust threshold value curves to detect quality issues.

- Analysis of high frequency vibration data to detect process derivations
- Adjust threshold limits for automatic yield detection to increase selection accuracy
- Derive optimized process parameters to continuously improve machine configuration

Stakeholder

- Quality Manager
- Process Expert / Data Scientist

Real-time production process optimization

Real-time detection of specific NOK parts within one production cycle.
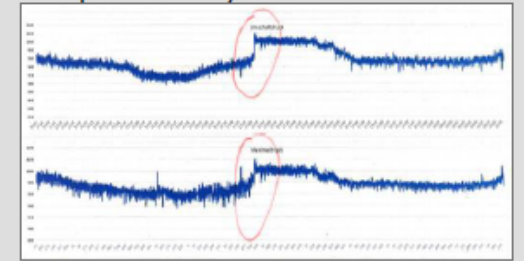
- Applies anomaly detection algorithms to identify "hidden" outliers in process parameters which result in NOK parts
- Identification of more complex patterns by applying dimension reduction algorithm (t-SNE, PCA) in combination with clustering (k-means, DBSCAN)

Stakeholder

- Quality Manager / Lead
- Plant Manager

The maintenance intelligence solution enables the customer to steer and analyze the entire maintenance process end to end (1/2)

Maintenance Intelligence Functionality in Factory Intelligence

- Avoid downtimes and integrate predictive maintenance into an intelligent process
- Alerting functionality with the ability to trigger actions immediately
- Mobile applications with the possibility to track & trace maintenance activities
- Paperless maintenance processes
- Alerting and global reliability portal

Example of Use Case

Long-term Reliability

Portal that analyses machine reliability level on an aggregated and plant specific level.

- Tracks maintenance issues, their corrective measures, and respective downtime for better transparency and pattern detection.
- Intelligent suggestion of root causes for failed maintenance

Stakeholder

- Maintenance Expert

Predictive Maintenance in Production

Provides insights to increase production quality and efficiency by utilizing Advanced Analytics and ML.

- Real-time application providing insights concerning machine failures and tool fractures.
- Enables a dynamic adjustment of boundary values to supersede time and cost intensive manual refinements.

Stakeholder

- Maintenance Expert
- Operations Manager
- Data Scientist

Predictive Maintenance in EoL Benches

Solution that allows users to optimize test bench performance and overall process performance
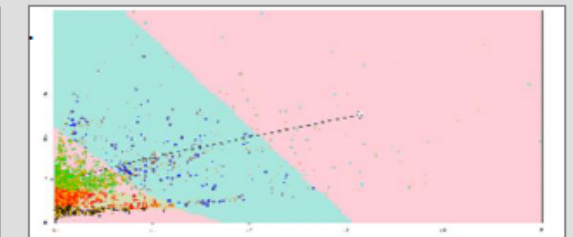
- Intelligent identification of pattern for testing tool wear.
- Identifies potential scrap and offers information about associated measure of severity.

Stakeholder

- Maintenance Expert
- Operations Manager
- Data Scientist

Clients can identify inefficiencies and digitize lean activities through the implementation of Factory Intelligence' digital lean solution to optimize their production, prevent waste and save costs

Digital Lean Functionality in Factory Intelligence

- End-to-end process transparency that disclosures inefficiencies and waste
- Digitalize lean activities and make use of data and analytics.
- Immediate Benchmarking to other plants, BUs or machines or any other resources.
- Mobile applications to conduct lean activities paperless by being location- and time-independently.

Example of Use Case

Digital Shop Floor Management

Data-driven Gemba Walks with integrated analytics functionality.
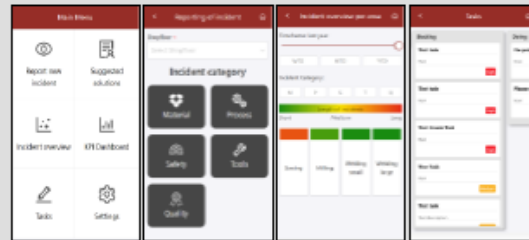
- Mobile Application for easy and quick capturing of incidents on the shop floor
- Visualization and analysis of incidents to be used during shop floor meetings
- Tracking of counter-measurements

Stakeholder:

- Lean Expert
- Machine Operator
- Plant Manager

Digital Lean Tracking

Smart Tracking application that collects position data and transform it into KPIs to improve processes.
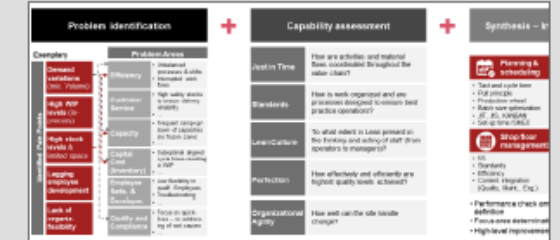

- Data-based identification of hidden production variance and bottlenecks
- Transport and movement tracking to optimize work flows and layout design
- Reveal hidden improvement potentials

Stakeholder:

- Lean Expert

Digital Lean Assessment

Identification of problem areas and evaluation of improvement areas on the shop floor.

- Gain overview of production processes and shop floor
- Assess lean activities through process analysis and interviews
- Define improvement hypotheses

Stakeholder:

- Lean Expert

Case Study #1 Large Oil & Gas Company in South Africa

Local Project – Large Manufacturer

We increased the plant's capacity by 35% through improved ways of working, whilst unlocking more than 20% in inventory optimisation benefits, and enabling an improved S&OP cycle, through technology and optimised processes…

Capacity Improvement

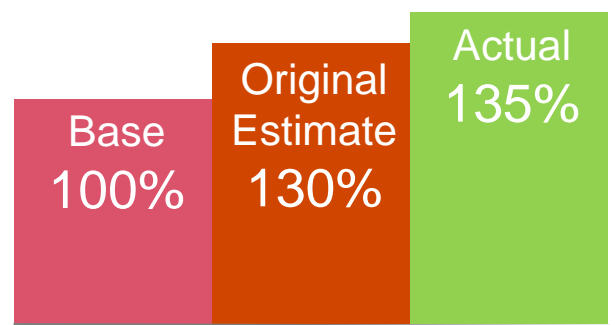# ~ 22%

Increased fill line utilisation from 29% to 51%

525 HRS

Additional direct filling lines operating time

35%+

Additional capacity across [Client] from X to Y ML

Plant's annual constrained capacity

| Base 100% | Original Estimate 130% | Actual 135% |

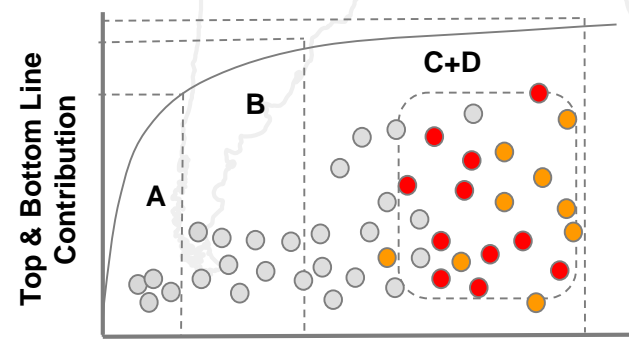**Operational Excellence**

Potential Gross Margin

~ 35%

Gross margin at R x / Litre

Sales increase enabled through additional capacity improvement ('19 - '20)

~20%

32% SKUs

Shortening the noisy long tail. Identified 98 non contributors (32% of skus) to rationalize
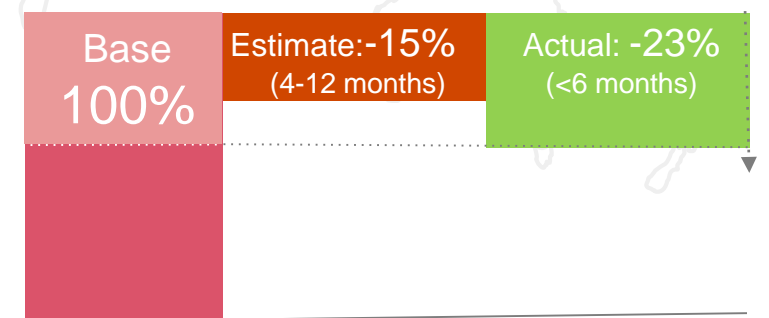

SKU Count

Inventory Optimisation

~ 20%

Capital value released, tied up in finished goods and 30% moving average reduction in raw materials

From 6 → 9

Increased Average Inventory turnover

From 36 → 31

Inventory days on hand cover reduction with optimal mix

[Client]'s finished goods inventory

| Base 100% | Estimate:-15% (4-12 months) | Actual: -23% (<6 months) |

S&OP

Dashboards on Factory Intelligence to provide leadership with a single source of the truth...timeously

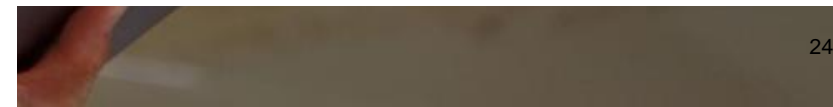## Executive Dashboard

Plant Manager Dashboard

Maintenance Manager Dashboard

Case Study #2 Predictive Maintenance

Outcomes and opportunities of Predictive Maintenance

Outcomes and Opportunities

💵 **£31m**

savings over 5 years
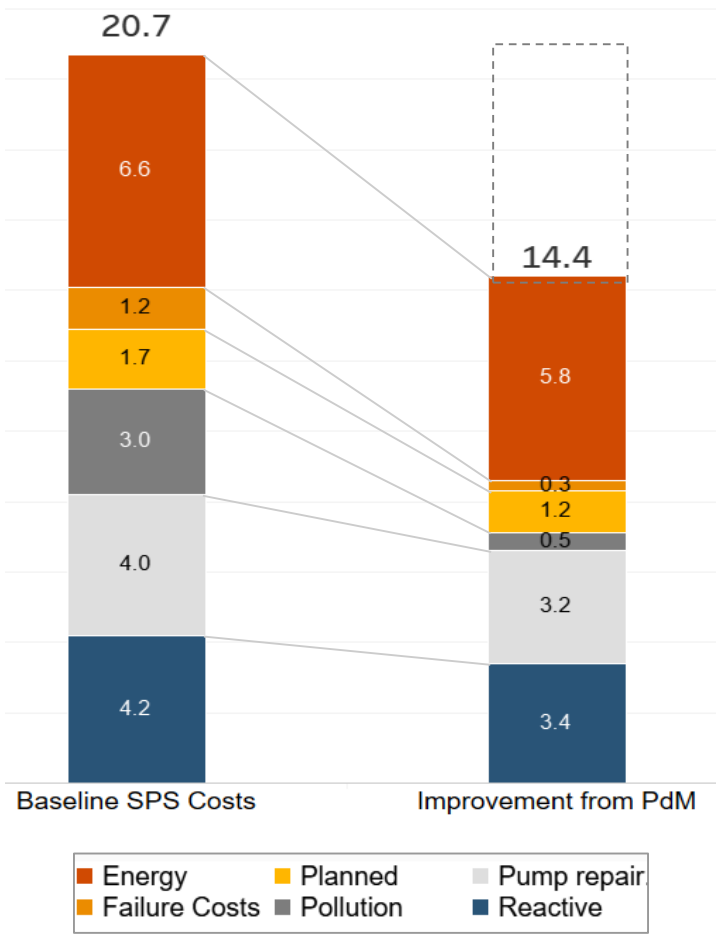*AMP 7*

⚙️ **20%**

extension in asset life

🌿 **12-20%**

Energy Savings

for 1 asset type !

Predictive Maintenance has a potential of £6.3m savings per annum for 1 asset type

Baseline SPS Costs: 20.7 (Energy 6.6, Failure Costs 1.2, Planned 1.7, Pollution 3.0, Pump repair 4.0, Reactive 4.2)

Improvement from PdM: 14.4 (Energy 5.8, Failure Costs 0.3, Planned 1.2, Pollution 0.5, Pump repair 3.2, Reactive 3.4)

Legend: Energy, Failure Costs, Planned, Pollution, Pump repair, Reactive

- Extended asset life with lesser asset repair/replacement costs
- Optimised Energy Consumption
- Reduction in consequential costs of failure (tankering, jet washing)
- Fewer pollution events
- Reduction in planned and unplanned/ reactive maintenance effort

Case Study #3 Large Automotive Supplier

Microsoft and PwC conducted a joint pre-study for an automotive supplier to explore value creation opportunities through Smart Factory

Background

- **Microsoft and PwC propose to transform one of the Automotive Supplier's plants** using Microsoft technologies to show real value by unleashing true P&L effects

- **Microsoft and PwC conducted a joint pre-study** project to evaluate opportunity to proceed

- **After a successful lighthouse plant** implementation, the developed digital factory solutions shall be rolled out to further plants globally
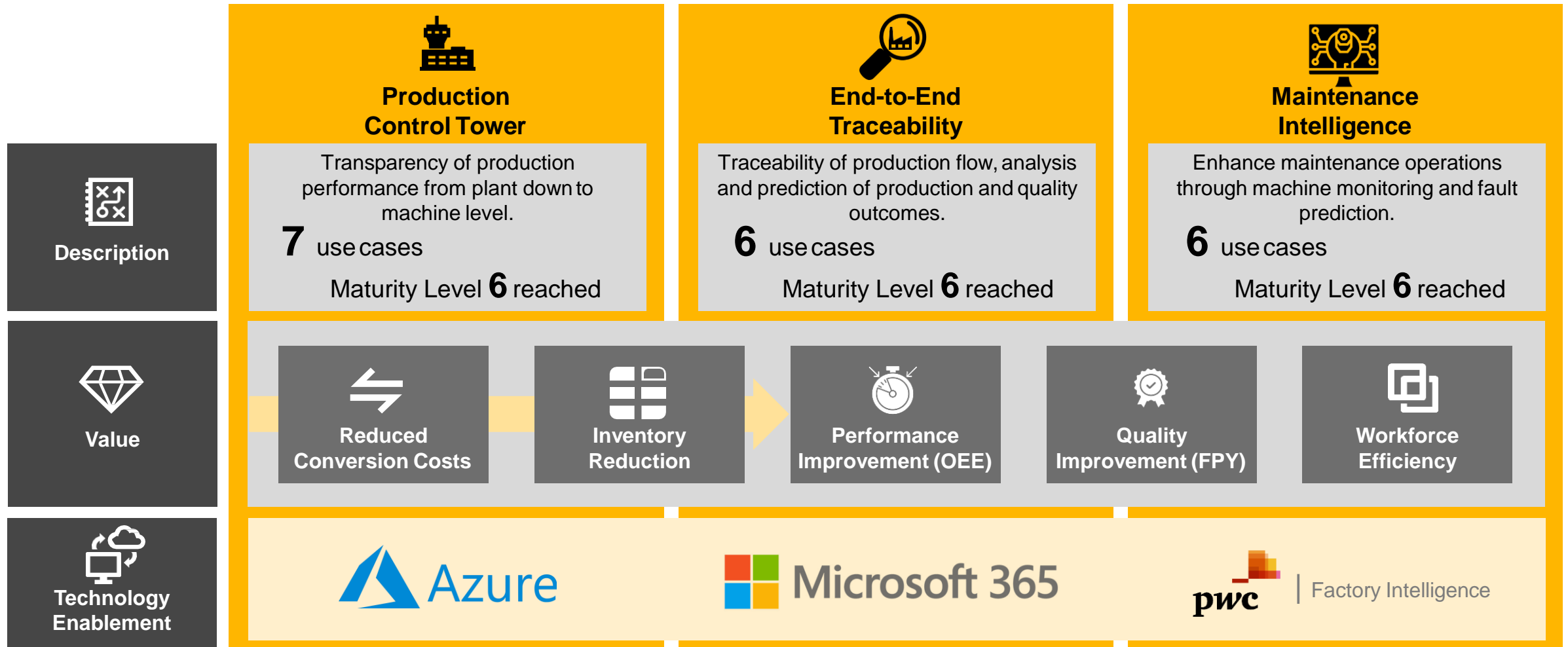
Pre-study project

- **Joint teaming** with Client, Microsoft and PwC Operations & Technology consulting to conduct pre-study

- Run **a series of workshops** to

  - Assess current maturity

  - Define epics and use cases

  - Evaluate business value for all parties

  - Estimate implementation costs

  - Define implementation approach

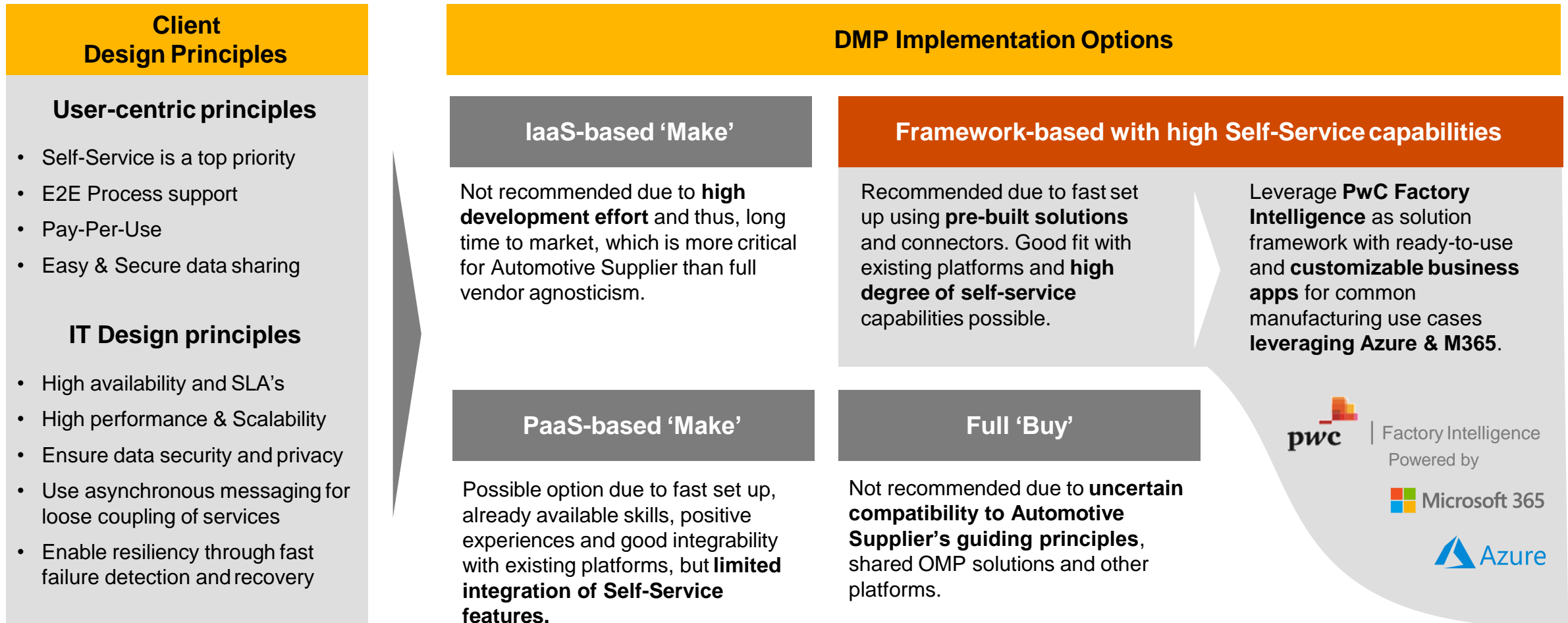- Preparation **of investment case**

Deliverables

1. **Smart Factory Approach**

2. **Lighthouse Plant Defined**

3. **Identified Use Cases**

4. **Assessed Business Value**

5. **Planned Implementation Cost**

6. **Estimated Azure Consumption**

Three epics and 19 use cases have been identified to create high value for Automotive Supplier

	Production Control Tower	End-to-End Traceability	Maintenance Intelligence
Description	Transparency of production performance from plant down to machine level. **7** use cases Maturity Level **6** reached	Traceability of production flow, analysis and prediction of production and quality outcomes. **6** use cases Maturity Level **6** reached	Enhance maintenance operations through machine monitoring and fault prediction. **6** use cases Maturity Level **6** reached

Value

Reduced Conversion Costs	Inventory Reduction	Performance Improvement (OEE)	Quality Improvement (FPY)	Workforce Efficiency

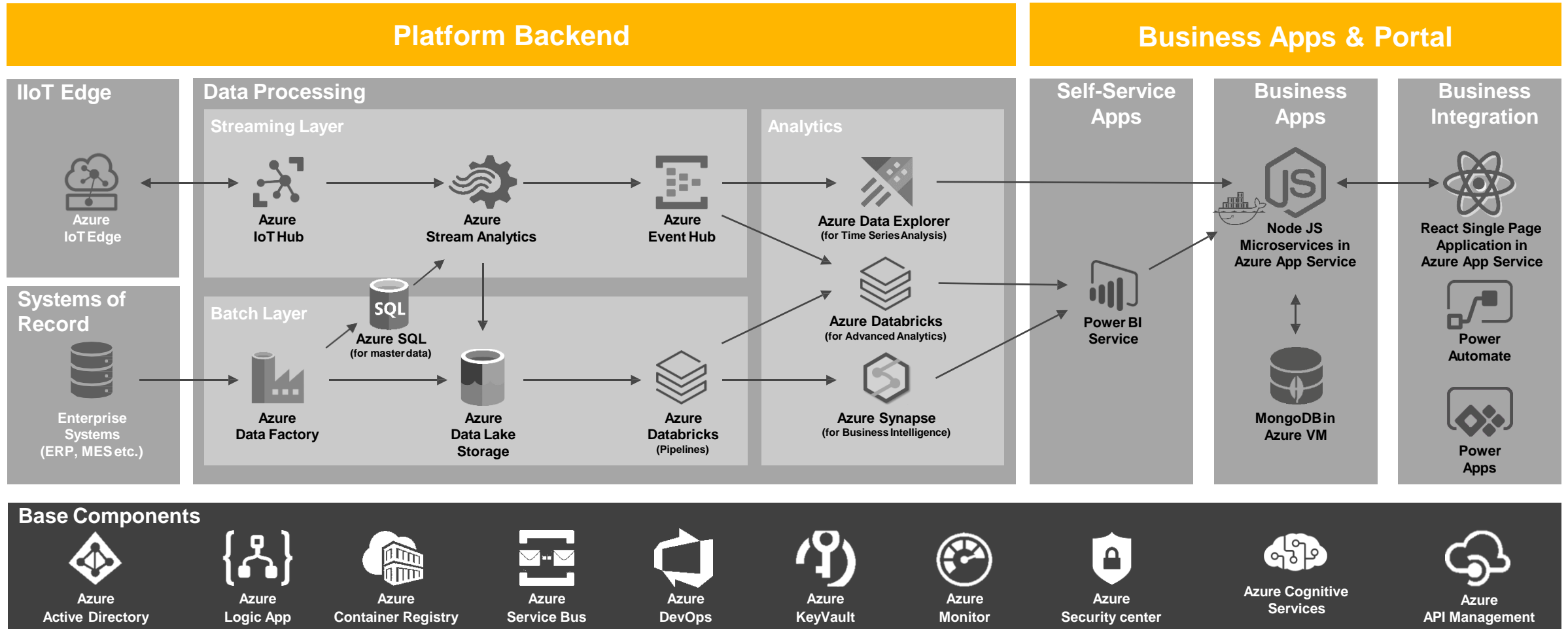**Technology Enablement**

Azure   Microsoft 365   pwc | Factory Intelligence

Following guiding principles to implement the DMP*, we will suggest PwC Factory Intelligence based on Microsoft Azure and Microsoft 365

Client Design Principles

DMP Implementation Options

User-centric principles

- Self-Service is a top priority
- E2E Process support
- Pay-Per-Use
- Easy & Secure data sharing

IT Design principles

- High availability and SLA's
- High performance & Scalability
- Ensure data security and privacy
- Use asynchronous messaging for loose coupling of services
- Enable resiliency through fast failure detection and recovery

IaaS-based 'Make'

Not recommended due to **high development effort** and thus, long time to market, which is more critical for Automotive Supplier than full vendor agnosticism.

PaaS-based 'Make'

Possible option due to fast set up, already available skills, positive experiences and good integrability with existing platforms, but **limited integration of Self-Service features.**

Framework-based with high Self-Service capabilities

Recommended due to fast set up using **pre-built solutions** and connectors. Good fit with existing platforms and **high degree of self-service** capabilities possible.

Leverage **PwC Factory Intelligence** as solution framework with ready-to-use and **customizable business apps** for common manufacturing use cases **leveraging Azure & M365**.

Full 'Buy'

Not recommended due to **uncertain compatibility to Automotive Supplier's guiding principles**, shared OMP solutions and other platforms.

pwc | Factory Intelligence
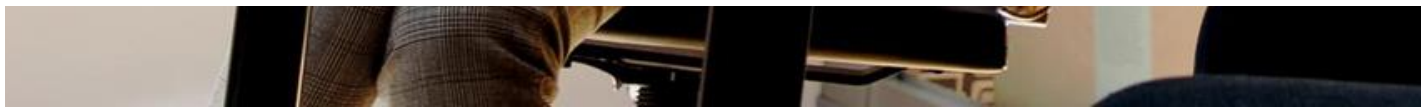Powered by
Microsoft 365
Azure

* DMP = Digital Manufacturing Platform

PwC Factory Intelligence brings ready to use shop-floor solutions and is fully built on Microsoft Azure and Microsoft 365 Services
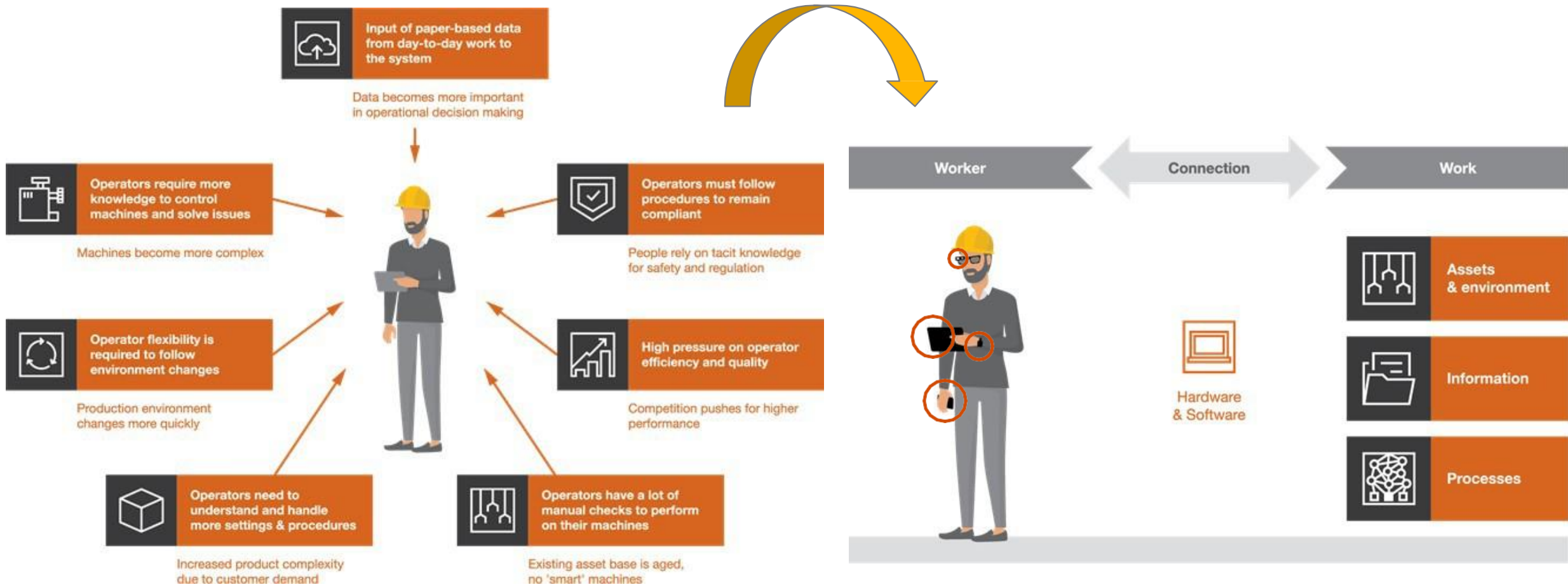
What about the people?

Increasingly complex operator environments are calling for a **connected worker mindset**

Challenges on the shopfloor

Connecting the shopfloor

Thought leadership: **Eight commandments** to digitising our shop floor workforce

The Eight Commandments to digitising your shop floor workforce

pwc

1. Bring the consumer's reality into the realm of industry

2. Select the right challenges

3. Place your workforce at the centre

4. Weigh your options smartly

5. Let the voice of your workforce lead you through your transformation

6. Select the most promising operational area to start your journey

7. Connecting your workforce is the means to an end: unlocking the data

8. A small step for your workforce can be a big step in your digital transformation

Video https://www.youtube.com/watch?app=desktop&v=VenjJl3j7tg

Contact.

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Thank you for your attention!