

AI Quality Next:

How AI is Revolutionizing
Quality in Automotive
Manufacturing



| **accenture**



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01

Introduction





Attila Gökdemir

BMW

- Product Owner of AIQX at BMW.
- Pioneered AI in automotive quality checks.
- Advanced automated KPI dashboard for engine planning.
- Oversaw BMW's global Big Data platform tendering.



Philipp Pösche

Accenture

- Founder of „AI Framework for organ transplants“.
- Tech Lead at Accenture in the automotive sector.
- Patent Owner for autonomous driving.
- Awarded "Leader" for AI Innovation in 2021.

"Uncover the **transformative power** of computer vision in manufacturing, where real-time quality feedback is **elevating production standards** and fostering **continuous improvement**."



02

Unveiling Computer Vision: Applications & Industries



v What is Computer Vision?

Computer Vision is a subset of Artificial Intelligence. It enables machines to take decisions based on visual data, such as images and videos

Business Applications

Computer Vision (CV) can be applied in various industries and use cases such as quality control in manufacturing, facial recognition for security, and augmented reality for consumer experiences

Data Driven

CV is based on machine learning algorithms that are trained to identify patterns, objects, or features in visual data.

Strategic Advantage

CV allows to automate tasks that require visual understanding, leading to operational efficiencies and new revenue streams.

Computer Vision can be deployed across industries



Computer vision, an AI Subset, enables machine learning to interpret images with increasing accuracy in multiple use cases and industries.

The market size is expected to be more than 41 \$bn by 2030.



Energy and Utility – Enhance operational efficiency and safety



Hospitality – Reduce waiting times and capture customer experience metrics



Healthcare – Improve medical finding accuracy and prevent surgical errors



Retail – Automates inventory management and enable new customer experiences



Automotive – Improves quality measures and autonomous driving performance

Key Take away: Computer Vision enhances efficiency, accuracy and safety across sectors. Businesses should partner with reliable tech firms for successful AI integration





03

BMW's Quest: Quality in Manufacturing



Quality Control:

OEMs are required to consistently meet high standards for safety and performance in a complex environment

Regulatory Compliance:

Manufacturers must adhere to a growing array of regulations e.g., environmental, safety and data protection

Technology Integration:

Adapting to new technologies like Internet of Things (IoT), machine learning, and advanced materials can be expensive and difficult to integrate with legacy systems



Supply Chain Disruptions:

Supply chain volatility, often due to geopolitical events, natural disasters or pandemics, can disrupt production schedules and increase costs

Labor Costs and Skills Gap:

Automation and robotics are transforming the manufacturing floor. Simultaneously skilled labor for specialized tasks is often hard to find and expensive, making it challenging to maintain cost-effectiveness

Market Dynamics and Customization:

Consumer demands for customization and rapid changes in preferred features (e.g., electric vehicles) require flexibility and agile production capabilities, which many traditional manufacturing setups are not equipped for

6 KEY SUCCESS FACTORS for Automotive Manufacturing

04

AI Quality Next: Quality Revolutionized



AIQX as a Functional Platform.

State-of-the-Art components and self-service functionalities secure future viability



IMPORTANT KEY-FACTS

Focus on **Stability & Availability**

Easy-to-use Architecture **Self-Service Approach** for our customers

Functional extension enabled through a **Modular Architecture**

Data Privacy & Security according to BMW Group Standards

TECHNICAL COMPONENTS



In the munich plant alone there are more than thirty quality features in production that are secured by the AIQX platform



Variant nameplate and lettering



Variant brake line engine compartment



Twist head airbag



KAFAS camera plug and latching



Latching C-pillar fascia



Variant fuel line



Fitting IWT pipe



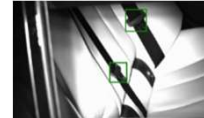
Tape on the disc



Latching KMS clamp



Variant door brake



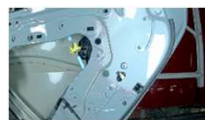
Presence belt buckles



Waterproofing CFRP roof



Quantity and variant clip headboard



Presence of door plug



Glue bead and pins roof antenna hood



Documentation roof rails



Variant brake line underbody



Height sensor position



Presence and variant rear emblem



Variant and presence roof spoiler



A white security camera is mounted on a metal mesh fence. The camera is positioned in the center-right of the frame, pointing towards the left. The background shows an industrial environment with various machinery and components, including green and yellow elements. The overall scene is brightly lit, suggesting an indoor factory or warehouse setting.

AIQX – Quality Revolutionized

**LAST
CALL**

INSIDE THE AI REVOLUTION

HOW BMW IS USING AI TO IMPROVE ITS MANUFACTURING

AIOX Inspection Search Munich

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Stations

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Attila G. ▼ ←

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Date: **Any Time** ▼

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







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		363	G70	33EJ	ALPINWEISS 3	Gurt Inspection	P02.H52.B12.TT6.Gurt	10/27/23 9:54:52PM	OK
		459	G60	33FK	CAPE YORK GRUEN METALLIC	DC Ladeleitung Radhaus	P02.H50.B64.TT1.DC-Ladeleitung-Radhaus	10/27/23 9:54:52PM	OK
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05

Transforming Traditions: Journey & Achievements



AIQX E-2-E Use-Case Lifecycle in AIQX of just 7 weeks



AIQX Set Up
Planner
Operator



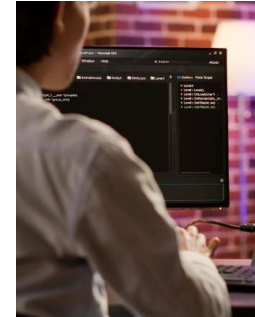
HW Set Up
& Platform
Connectivity



Data Analysis
& AI Strategy



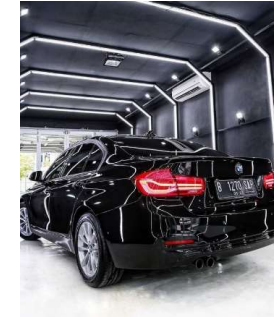
AI Engineering &
Target Definition



DEV & INT
Deployment



PROD
Observation



Go Live



2021

6 MONTHS

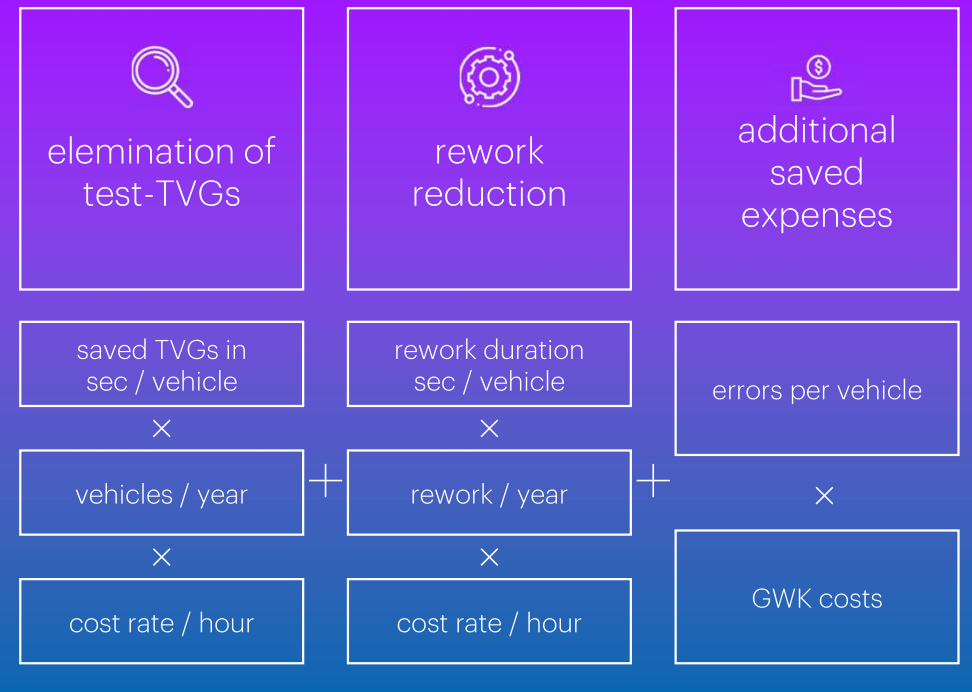
V

The platform-approach and the broad range of use cases of AIQX allows effective scaling beyond 2023

Deployed AIQX Use-cases



Benefits of AIQX





06

The Road Ahead: Innovating Tomorrow's Quality



Innovating Tomorrow's Manufacturing & Quality

CY2023 ————— CY2024 H1 ————— CY2024 H2 ————— CY2025 —————> ongoing

Potential identified  ► Exploration of value  ► Foundation available  ► Scaling AIQX 



Initial **Factory Roadmap** defined

First **Synthetic Data Use-Cases / POCs**

Scaling AIQX along the Value Chain

(Gen)-AI Use-Case Factory Self-Service

Use Case pipeline initiated by BMW

Start to implement **Lighthouse Use Cases**

Global Use-Case Factory Roll-Out

1000+ Use Cases Live

LEVERAGING THE PARTNER ECOSYSTEM



Augmentation



- Existing data to be adjusted
- E.g.: cutting, mirroring, color adjustments

Image editing



- Content in picture to be adjusted
- Tools: Photoshop, Gimp

3D-DATA (CAD)



UNREAL
ENGINE

- Synthetic Data based on CAD-Data
- Tools: NVIDIA Omniverse, Unreal Engine

Hybrid Approach



- Demand-driven combination of methods
- Additional methods, e.g. GenAI inpainting, neural style transfer, ...


APPROACH FOR SYNTHETIC DATA


07

Curtain Close: Sparking Discussions




Success Factors

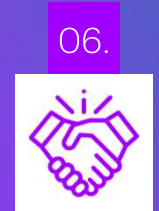
01.  **Depth of value add**
Dedicated depth of value add (based on strategic relevance with focus on efficiency)

02.  **Production complexity**
Enable dramatic reduction of product variance and complexity

03.  **Production technology**
Application of new production technologies and materials (instead of traditional processes & materials)

04.  **Plant design**
Value stream and process design without restrictions from existing brownfield structures

05.  **Production flow & control**
Consistent application of stable production programs



06.
Leadership & collaboration model
Change of traditional frame
conditions for working models



Thank
you.



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