

MAKING
**SOFTWARE
DEFINED VEHICLE
A REALITY**

MATHWORKS AUTOMOTIVE
CONFERENCE 2024, PUNE
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KISHOR PATIL

Co-founder and CEO,
KPIT Technologies Limited



AGENDA

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SDV Trends and Evolution in last 5 years

2

Industry Commitment for SDV Transformation (Global and India)

3

Challenges faced by OEMs in achieving their SDV Goals

4

Crucial factors in making SDV Successful

5

KPIT SDV Partnerships with OEMs

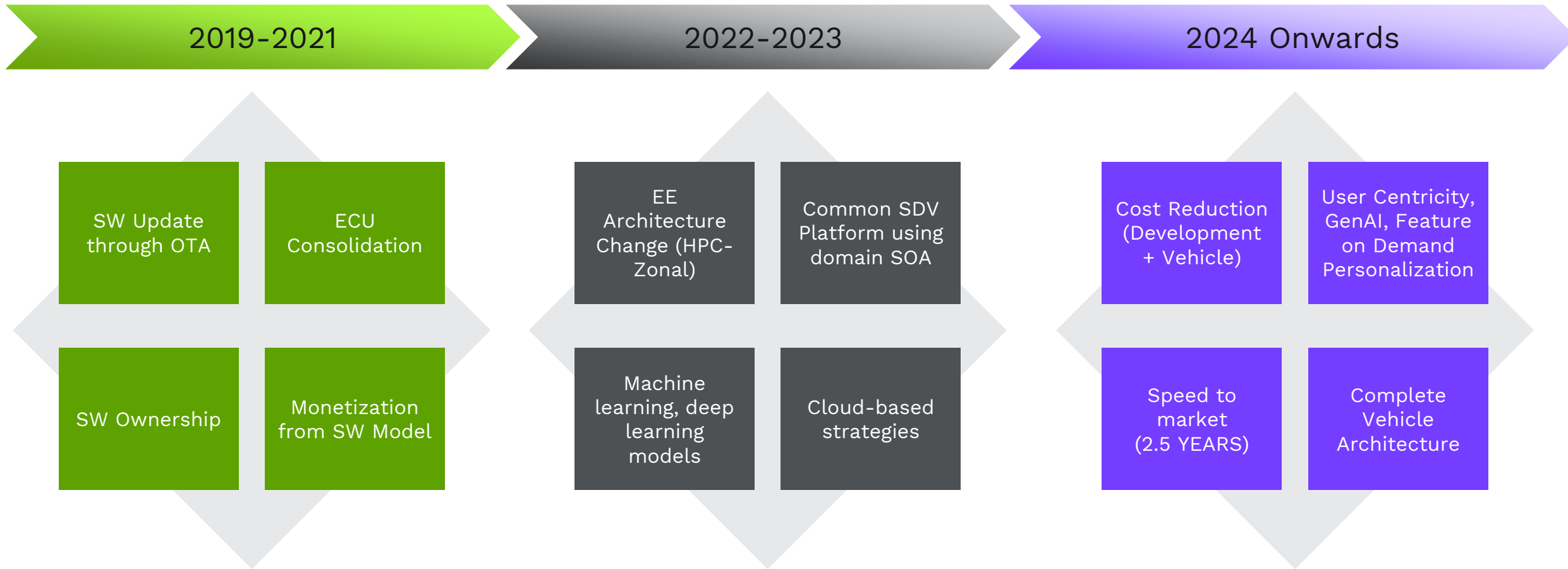
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Collaboration with MathWorks

7

Summary – Our Learnings from Global SDV Programs

SDV Goals and Motivations have changed since last 5 years



OEMs in different Geos are in different stages of maturity of SDV

India – All set to follow SDV Evolution?

**\$800
Billion**

Consumer digital economy market in India by 2030

152%

Rise expected in AI adoption in the Indian Auto industry by 2028

56%

of Pass car sales in India is from **Utility Vehicles - Growing aspirations** for big vehicles

40%

Share in global R&D coming from India based auto companies

80+ %

Increase in Pass car EV sales in FY24 from FY23

600K +

Engineers in software, embedded systems and electronics domain

SDV will bring huge Digital Revenue opportunities for OEMs

Industry Commitment for SDV Transformation

GLOBAL OEMS



Honda, Nissan deepen partnership to jointly research **EV technologies for a next-generation SDV platform**



Volvo Group and Daimler Truck forms **JV to develop software-defined vehicle platform**



Cloud-First Approach on AWS Accelerates BMW's Software-Defined Vision



Hyundai **banks on software-centric shift** for new global growth strategy

INDIAN OEMS



Focuses on technologies empowering **'Software on Wheels'**



Partnering to **bring most advanced cockpit SOCs** on future Maruti Suzuki cars



Investing to **build competencies in advanced software, User experience**



Targets to grow its new software engineering arm in **anticipation of software-defined commercial vehicles**

SDV approach enables Business Model change & opportunities to generate Additional Revenue

Challenges faced by OEMs in achieving their SDV Goals

Technical

EE Network Performance

Domain Architecture towards SOA

Establishment of development environment
(CI-CD-CT)

Common Data Platform & Cloud Development &
Validation Environment

Complexity in Integration (HPC, Zone, System)

Validation Strategy, Scale, Automation

Operational

Organization Structure
One Program vs Multiple Departments

Integration R&R
OEM, Tier 1, SW partner

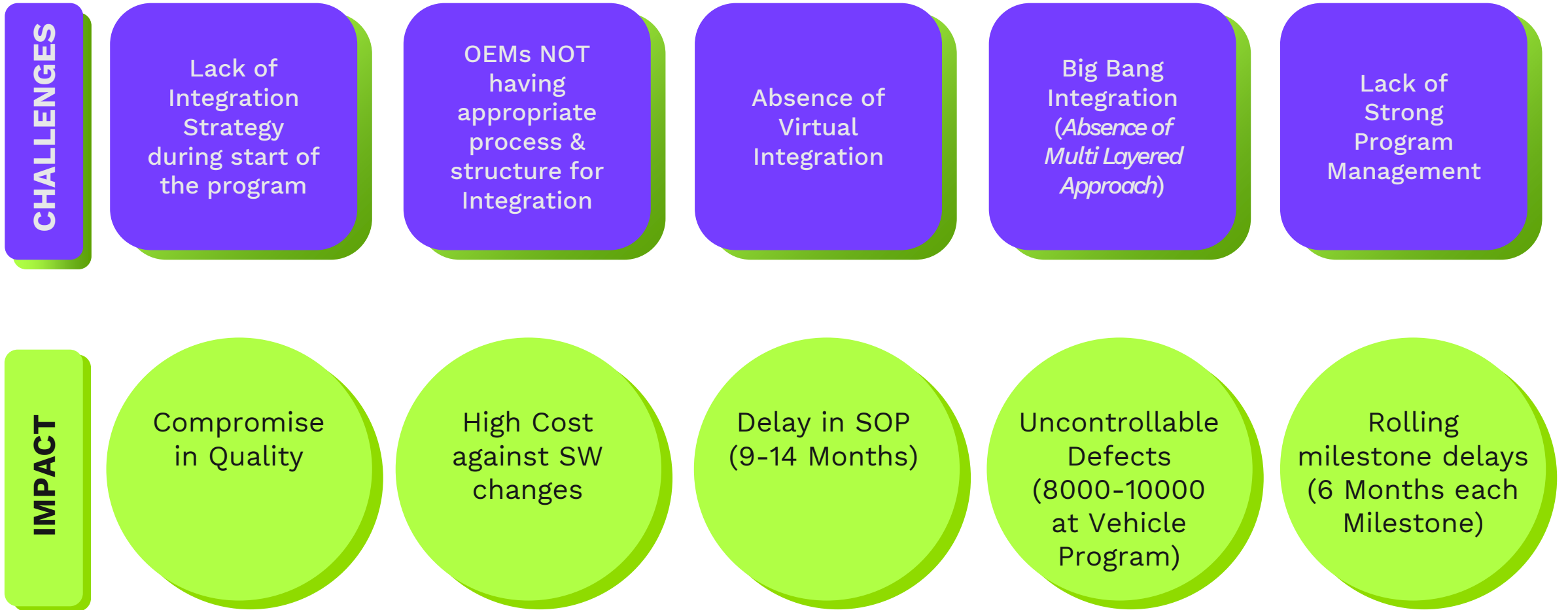
Infrastructure Readiness
Reuse Vs. New

Process, Methods, Tools
New vs Upgrade, Adapt Vs Build

Scaled Agile
KPIs & Agile Rituals

Mindset Change
One Team, Product Mindset, Solution Orientation

SDV Integration Challenges & Impact

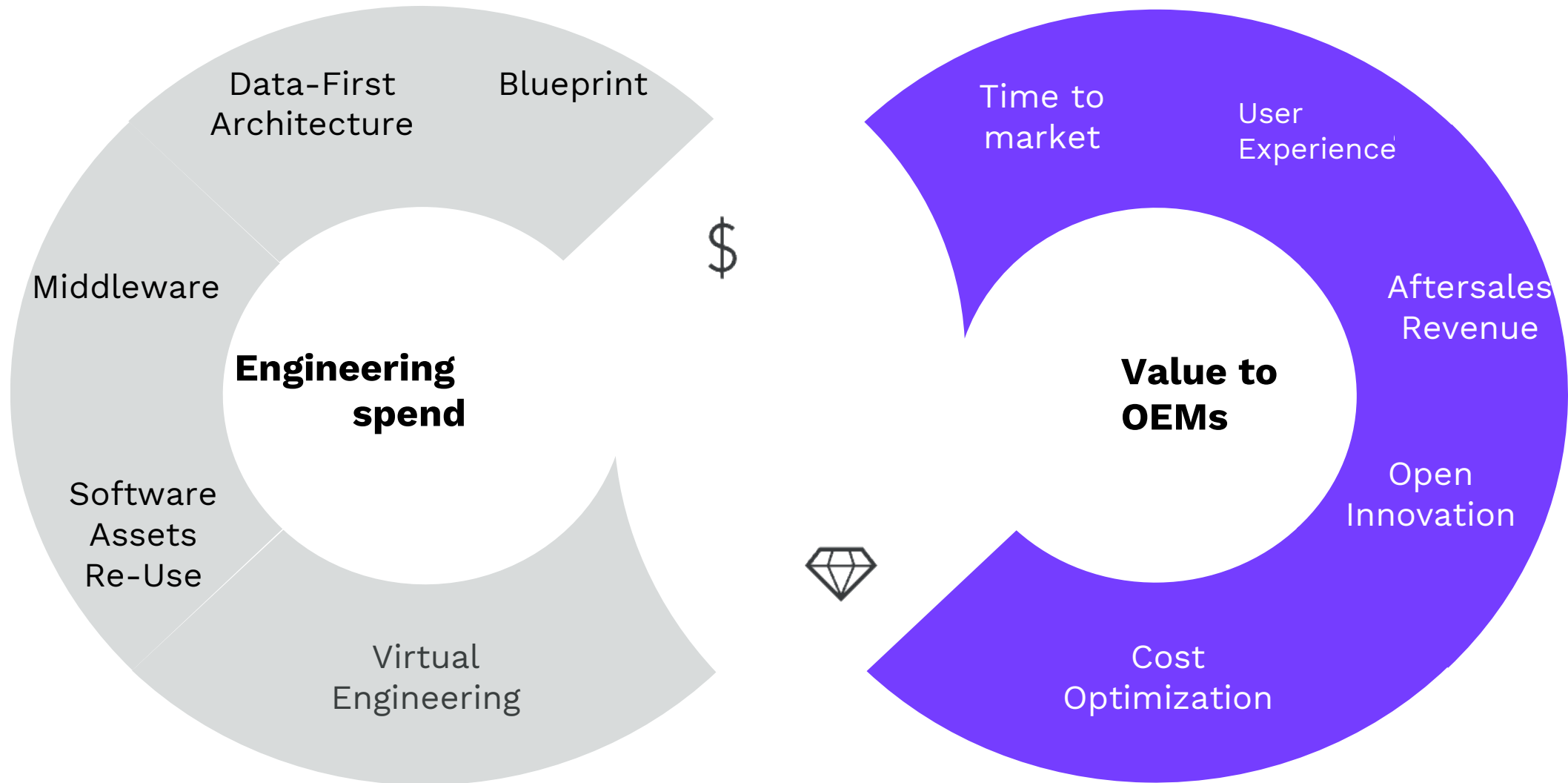


Crucial factors in making SDV Successful

E/E Architecture Blueprint and Data-First Architecture	Open APIs and Scalable Middleware	Software Assets Re-use	Virtual Engineering
<ul style="list-style-type: none">▪ Jump start pre-SOP to SOP workflows▪ Create PoC for architectural specification to reduce risk▪ Realize future revenue streams with data-driven approach	<ul style="list-style-type: none">▪ Launch features faster with performance & reliability▪ Drive open innovation▪ Separate “ease of development” from “complexity of deployment”	<ul style="list-style-type: none">▪ Accelerate migration to SDV with minimum re-investment▪ Automate using tooling▪ Leverage using existing test assets	<ul style="list-style-type: none">▪ Left-shift the V cycle/ capture and fix software defects early in program increment

The inability to achieve these factors would be counter productive to realize the goals of SDV

Engineering **Spend** and **Value Creation**



KPIT Partnerships with Honda and Renault on SDV



Enabling vision for Software Defined Mobility



Co-developing SDV from Blueprint to SOP 2026

DOMAIN

AUTOSAR/Middleware, Autonomous, Electric, Digital Twin, Infotainment

DEVELOPMENT MODEL

- Jointly accountable for platform & feature development, software integration
- Agile
- Directed sourcing to Tier-1

KPIT OWNERSHIP

- SDV Integration
- SDV Test House
- Development Environment set up with AWS
- Locations - Japan, USA, India, China (significant client presence offshore)

DOMAIN

AUTOSAR / Middleware, Autonomous, Body Electronics, FOTA & Diagnostics, Cockpit, Vehicle System Engineering

DEVELOPMENT MODEL

- Joint development and technology roadmap and investments
- SAFe Agile

KPIT OWNERSHIP

- Virtual ECU Validation for Platform, Domains, System
- Pre-Integration of HPC SW
- ADAS, Body & Chassis Feature Development
- Locations - France, Munich, Egypt, Tunisia, India, China

Collaboration with MathWorks

Long Term Collaboration

Multi-year strong partnership through mutual programs

Joint Pilots in SDV Area

Using SimuLink based tooling in PowerTrain, Virtual Engineering and AD/ADAS

Engineering Productivity/Quality Improvements

Deep integration of MathWorks' tooling in Engineering processes

Thought Leadership

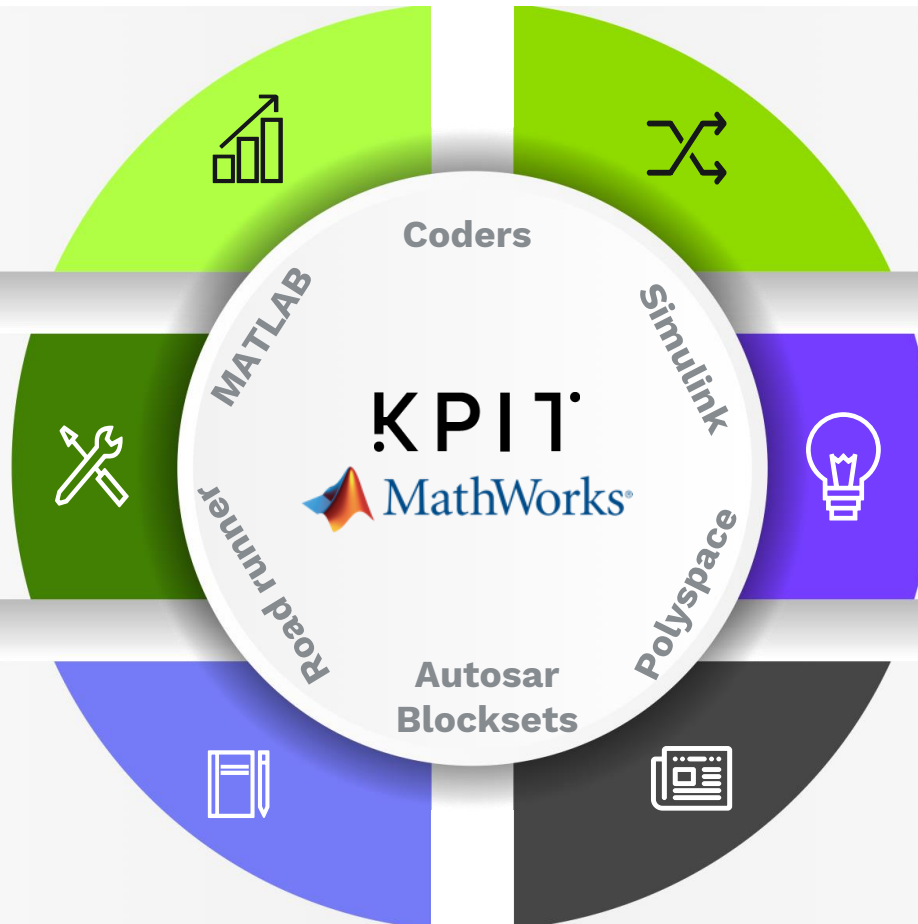
Participation in MAC, Polyspace Advisory Board, MathWorks Automotive Advisory Board

Academy

Joint Academic work in colleges and for freshers




Tooling Certification

Joint training and certification for MathWorks tools



KPIT leads the way in leveraging MathWorks' enterprise solutions to drive innovation and excellence

Areas of Collaboration

 AD/ ADAS	 VIRTUAL ENGINEERING	 POWERTRAIN
MBSE for L2 ADAS feature	Simulink based simulation environment with VECU execution	System Architecture using system composure
SOA for SDV for L2 ADAS Feature		Adaptive & Classic AUTOSAR Application Development
Custom plant modeling for Close loop Validation	Plant model development using Simulink	Model based software development for ePT features
Scenario based Validation for AD/ADAS feature		System composure toolchain enhancement
Adaptive Autosar Application testing for ADAS and Chassis		Implementations: Leading Japanese OEM
Implementations: Leading Japanese and European OEMs	Implementations: POC developed	Implementations: Leading Japanese OEM

Overall Impact:
Validation/Simulation enhancements | Model to Code Generation for faster time to market and accuracy

Summary: Our Learnings from Global SDV Programs

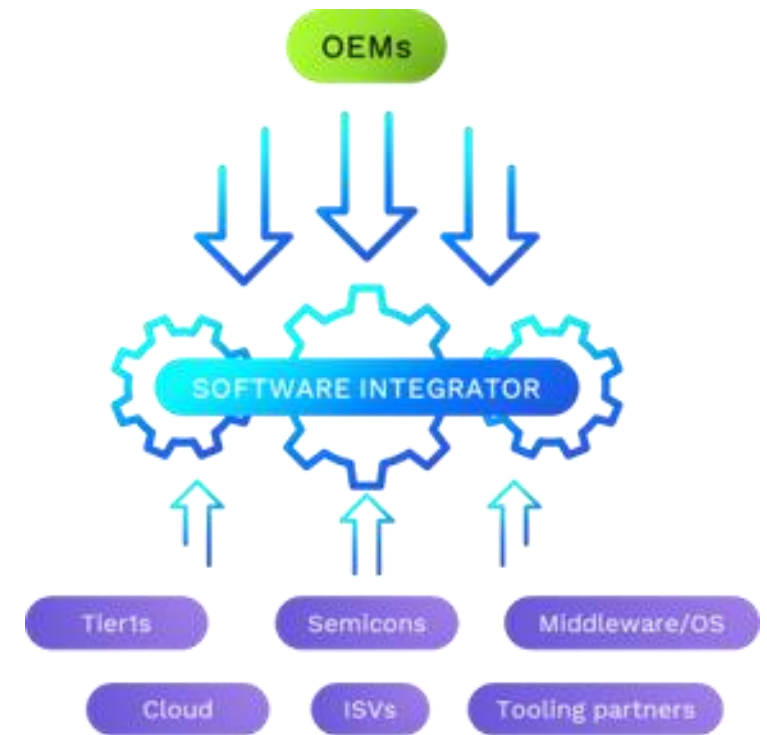
1. Integration role is becoming critical to mitigate program risks

2. Tooling partners have significant role & opportunities in addressing the SDV challenges

3. OEMs are increasingly collaborating with Chip-to-Cloud & tooling partners

4. Restructuring Organization to adopt horizontals (CI/CD/CT, Virtualization, Middleware) & new culture

5. Consistency of Processes, Methodologies and Tools across the Organization



THANK YOU

Visit KPIT Booth for ADAS
and Powertrain demos

