White paper

Skilling and Capability Development for AI-powered SDV Enterprise

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CRAFTING FUTURES

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AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL

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CreamCollar is a **Capability research and development organization** specialized in **data-driven Capability and Competency solutions** for the SDV and AI domain within Automotive Industry. With deep expertise in **SDV** and **AI**, **CreamCollar empowers organizations to develop future-fit capabilities** that match the accelerating pace of technology and Competitive Cost in Mobility Industry.

The **Automotive Skills Development Council (ASDC)** is **India's pioneering sector-skills council** for the automotive industry. **Promoted by leading industry bodies (SIAM, ACMA, FADA) alongside Government of India** via **the Department of Heavy Industry and NSDC**, **ASDC develops qualification packs, certifies training centre's and trainers, and ensures industry-aligned, credible skilling** across the Valuechain.

Introducing Objectives

The automotive industry is undergoing a seismic shift, yet the workforce remains rooted in legacy frameworks. This gap between technological advancement and human capability needs urgent attention.

At the heart of this transformation lies the challenge and opportunity of skilling. To remain competitive, organizations must move beyond conventional training models and adopt data-driven skilling capabilities that keep pace with the rapid evolution of SDVs and AI. The industry's ability to unlock the full potential of these technologies will depend not only on innovation in vehicles but also on innovation in workforce development.

This whitepaper, developed by **CreamCollar and the Automotive Skills Development Council (ASDC)**, offers a roadmap for navigating this transformation. It explores:

- **How SDV and AI are disrupting the automotive industry.**
- **The changing priorities of value chain players in an EV and SDV-driven world.**
- **The importance of data-driven skilling capabilities and why they are essential.**
- **A Skilling Capability Maturity Framework to guide organizations in their journey.**
- **Key skilling initiatives and the top challenges faced by the industry.**
- **How these challenges can be addressed through data-driven approaches.**
- **The AI use cases that will drive transformation across automotive product domains.**
- **Practical steps to transform and build sustainable skilling capabilities.**

This whitepaper is designed for automotive leaders, OEMs, Tier-1 suppliers, service providers, policymakers, and educators who recognize that the future of mobility hinges on building the right talent ecosystem. It provides insight into how domains such as ADAS, Battery Management Systems, Digital Cockpit, and Cybersecurity are evolving, and why the industry must treat skilling as a strategic necessity.

SDV & AI Disruption in Automotive Industry

The automotive industry stands at the intersection of two powerful disruptions—Software-Defined Vehicles (SDVs) and Artificial Intelligence (AI). SDVs are redefining vehicles as software-first platforms, while AI is accelerating innovation across the enterprise, enabling decisions and capabilities that hardware alone cannot deliver. Together, they are reshaping not just products but the very way automotive organizations design, operate, and compete.

Software-Defined Vehicles: The Core of Transformation

The shift to Software-Defined Vehicles (SDVs) represents the most profound transformation in the automotive industry in over a century. No longer defined by static hardware, vehicles are becoming dynamic, updateable platforms where software determines capability, performance, and customer experience.

This evolution is driven by the transition from fragmented electronic control units (ECUs) toward centralized, high-performance compute architectures, enabling software to be decoupled from hardware. In parallel, cloud-native integration allows continuous development, testing, and deployment of new features throughout the vehicle lifecycle. For OEMs and suppliers, this requires re-architecting not only product development but also enterprise operations, supply chains, and compliance processes.

Continuous software release cycles are replacing rigid engineering timelines, while recurring digital services are reshaping revenue streams and customer relationships. At the same time, cybersecurity, data protection, and regulatory adherence are becoming as critical as mechanical safety standards. From our perspective, SDV adoption is not a technology choice but a strategic imperative.

The disruption lies in how organizations re-skill talent, redesign engineering systems, and build cross-functional collaboration across hardware, software, and regulatory domains to deliver agility at the pace of customer expectations.

Artificial Intelligence: The Strategic Accelerator

If SDV sets the destination, Artificial Intelligence (AI) is the accelerator that makes the journey possible. . We see AI as a universal enabler that multiplies the impact of SDV, ensuring enterprises can deploy new features, enhance safety, and unlock recurring value with speed and precision. AI is not limited to autonomous driving or ADAS; it is redefining diagnostics, predictive maintenance, dynamic calibration, and personalized driver experiences. Its role extends deeper into the enterprise—accelerating simulation, enabling generative design, automating quality validation, and significantly reducing development cycles..

Value Chain Players and Changing Priorities

With SDV & AI disruption and transformational Shift in the Industry, Value chains are getting reset and the players are redefining their new priorities to position their products and services in the Automotive Global Market. Below table provides the view on Transformation priorities for the selective value chain players.

Value Chain player	Shift in Business	Transformation Priorities	Talent Transformation Needs
Vehicle OEMs	Software and Data led innovations are the key enablers of business Digital and Recurring revenue streams as New Revenue Channels Strategic and direct partnerships with Cloud Infrastructure partners , System Integrators and Chip providers along side of Tier 1. D2C model shift from wholesale business model. Open and standardized Architectures with increased collaboration with similar value chain players for continued relevance Services revenue shifting from Dealers to Vehicle OEMs as the Over the Air updates capability enables the Vehicle OEMs to deliver the new features and fixes through updates.	In-sourcing, for IP Protection and faster execution of innovation in their product space. Speed in Adopting to New Technology and Continuous innovation processes New Business models for the upcoming products and features Readiness for New regulatory compliance and standards which is majorly aligned with safety, security, data privacy and data ownership. Prioritization of high value innovation which helps in Brand value retention and differentiation from Competitors Capability transformation for Strategic Suppliers as priority to reduce the risk in adopting New Business Models and Technology	Workforce with New Skills to focus on Software-led business Innovations Leadership and middle management equipped with insights and training for decision making in Product roadmap and development operations . Strategic platforms for personalized learning journeys and on-demand skilling curriculum for Product and Business Teams. Building exposure and confidence for all the employees to leverage AI tools and AI first processes by abiding to the safety compliance and Sustainability guidelines.

Value Chain player	Shift in Business	Transformation Priorities	Talent Transformation Needs
Component Manufacturers	Revenue model shifting from one-time sale to long-term service contracts (predictive maintenance, performance upgrades) Partnerships with OEMs, Tier-1s, and cloud/AI providers to enable end-to-end data-driven solutions Increased demand for modular, interoperable, and standardized components to fit into SDV ecosystems Hardware components are increasingly becoming software-integrated smart systems (sensors, ECUs, actuators).	Establishing ecosystem partnerships with semiconductor firms, AI providers, and software developers. Adoption of digital twins and simulation-first development to reduce testing cost and time-to-market Building cybersecure and updatable components (OTA-ready firmware and software layers) Adapt quickly to OEM-led architectural changes (e.g., zonal architectures, standard APIs).	Building a future-ready workforce that can seamlessly bridge hardware expertise with software, AI, and data-driven innovation to stay ahead of industry shifts Developing cross-functional leadership to manage co-development with OEMs and tech partners Equipping engineers with data analytics and digital twin modeling skills Reskilling workforce on embedded software, AI/ML, and edge computing.
System Integrators	Evolving from "execution partners" to "strategic co-creators" of SDV platforms Shift from project-based delivery to long-term lifecycle partnership models with OEMs. Moving from hardware-centric integration to software-defined architectures. Extended role in end-to-end platform development (middleware, cloud connectivity, AI models).	Proactively anticipating and adapting to evolving customer and OEM requirements to stay ahead of changing market dynamics Establishing scalable reuse frameworks to accelerate development across multiple OEM programs Building capabilities for end-to-end SDV platforms (connectivity, AI, edge-cloud orchestration) Prioritization of cybersecurity and functional safety integration across all subsystems.	Preparing leadership to manage co-innovation ecosystems with OEMs, component makers, and tech firms. Building organizational fluency in agile at scale and product-based delivery over traditional project outsourcing. Developing cross-domain expertise (mechanical + electrical + software) Workforce reskilling in software architecture, middleware, and model-based systems engineering (MBSE)

Value Chain player	Shift in Business	Transformation Priorities	Talent Transformation Needs
Tier1 suppliers	Expanding from hardware and subsystem delivery to software-defined platforms (ADAS, infotainment, power electronics). Shift from one-off deliveries to lifecycle partnerships with OEMs (continuous updates, performance enhancements). Increased role in domain/zonal controllers and consolidation of multiple ECUs. Closer collaboration with cloud/AI partners for connected services and data monetization. Rising demand for platform standardization to serve multiple OEMs efficiently.	Transforming from subsystem providers to full-stack solution partners, staying ahead by enabling OEM innovation at scale Building modular and reusable software stacks to accelerate integration with OEM SDV platforms. Prioritizing end-to-end validation using simulation and digital twins. Establishing platform partnerships with semiconductor firms, AI providers, and hyperscalers. Developing OTA-ready architectures to support continuous feature upgrades.	Building a workforce that blends deep subsystem expertise with agile software and platform innovation capabilities. Developing customer-facing product management and co-innovation leadership to align with OEM roadmaps. Reskilling workforce in embedded software, AI/ML, and cloud-native development. Training engineers in system-of-systems integration (zonal architectures, cross-domain controllers).
Tool Provider	Moving from niche engineering tools to end-to-end SDV development ecosystems (model-based design, simulation, validation, cybersecurity). Shift from point-solutions to integrated toolchains that connect design → test → deployment → compliance. Shift towards cloud-native, scalable, and collaborative platforms for distributed development teams. Expanding role in AI-driven automation (e.g., automated code generation, self-healing test suites). Increasing demand for regulatory-aligned testing environments (ISO 26262, SOTIF, UNECE WP.29).	Evolving from tool vendors to strategic innovation enablers, driving faster, safer, and more intelligent SDV development Accelerating virtual validation and digital twin adoption to reduce cost and time-to-market Building interoperable and open platforms that can integrate with OEM, Tier-1, and component supplier ecosystems Enabling continuous testing, CI/CD, and DevOps integration for automotive software development Embedding AI/ML for predictive testing, defect detection, and design optimization. Developing cybersecurity and compliance-ready toolchains for global standards	Creating talent that blends deep tool expertise with domain knowledge in automotive software, enabling co-innovation with customers Training workforce in AI/ML-driven automation for design and testing tools. Building expertise in cloud-native tool architectures and distributed development collaboration. Developing skills in digital twin and simulation-first methodologies.

Value Chain player	Shift in Business	Transformation Priorities	Talent Transformation Needs
SoC and Hardware Provider	Shifting from commodity chip suppliers to end-to-end platform providers (compute, connectivity, AI stacks, SDKs, middleware). Expanding from ECU-specific chips to domain/zonal controllers and centralized compute platforms. Growing demand in safety-critical, cybersecurity-hardened chips for compliance with global standards Increasing focus on co-innovation with OEMs, Tier-1s, and tool providers through reference designs and open platforms Rising importance of power-efficient, sustainable chip architectures for EVs and green mobility	Transforming from chip vendors to strategic platform partners powering the intelligence layer of SDVs Building high-performance, power-efficient SoCs optimized for SDV workloads (AI, ML, graphics, sensor fusion). Investing in cybersecurity-by-design for chips (secure boot, hardware root of trust, encrypted data flows) Establishing open SDKs, APIs, and developer ecosystems to accelerate adoption by OEMs and integrators Expanding role in edge-cloud orchestration (chips enabling distributed intelligence across vehicle and cloud). Enabling scalable platforms that support multiple vehicle models and OEM programs.	Creating a workforce that unites semiconductor design excellence with automotive-grade safety, AI, and platform ecosystem innovation Reskilling engineers on AI/ML model optimization at the silicon level. Training in heterogeneous compute architectures (CPU, GPU, NPU, DSP integration) Upskilling in software-hardware co-design (SDKs, compilers, middleware for automotive workloads) Cultivating ecosystem collaboration skills to co-innovate with OEMs, Tier-1s, and software tool providers
Cloud Infra Provider (Hyperscaler)	Shifting from generic cloud services to automotive-specific cloud platforms (SDV dev clouds, digital twins, mobility services) Expanding role in end-to-end lifecycle enablement: design → simulation → deployment → OTA updates → analytics. Moving from data storage/compute providers to AI-driven mobility enablers (training ADAS/AV models, predictive maintenance, personalization). Deepening partnerships with OEMs, Tier-1s, semiconductor, and tool providers to co-build SDV ecosystems Rising importance in regulatory compliance, cybersecurity, and data sovereignty for automotive cloud deployments	Evolving from infrastructure providers to strategic mobility innovation partners powering the SDV value chain Building automotive-grade cloud platforms with real-time, low-latency, and safety-critical capabilities Enabling large-scale digital twin ecosystems for full-vehicle and fleet simulation. Providing end-to-end CI/CD pipelines for automotive software deployment. Developing AI/ML model training, validation, and deployment infrastructure for autonomous and connected vehicles. Ensuring data security, privacy, and regional compliance (GDPR, UNECE, ISO standards).	Creating talent that blends hyperscale cloud expertise with deep automotive domain knowledge to accelerate SDV innovation Upskilling workforce in automotive software lifecycle management on cloud platforms. Training in real-time, safety-critical, and edge-cloud orchestration. Building expertise in AI/ML operations (MLOps) for autonomous driving and mobility services. Reskilling in cybersecurity and regulatory compliance for automotive cloud. Cultivating talent in mobility business models (subscription services, fleet analytics, MaaS)

Data-driven SDV Capability Development

Continuous Product Delivery and Continuous Innovation as New Normal

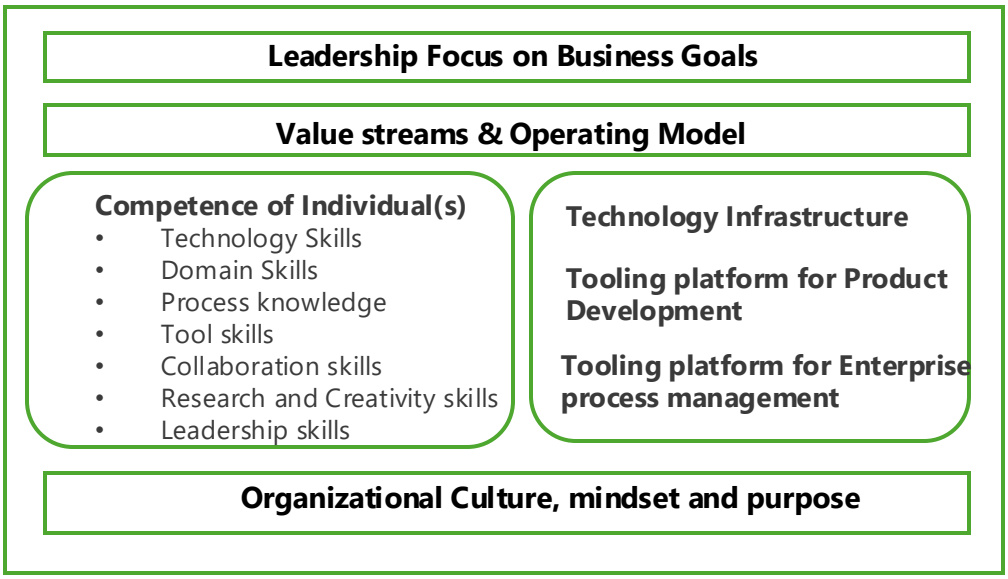
Capabilities for the Software-defined product delivery would be under going continuous shift due to the changes in Technology, evolving business models and re-imagined engineering process with AI. One of the prime transformation initiative here is, Value stream mapping for re-designing Process specific workflows and updating the operating model in product development , engineering , manufacturing and after sales.

In-order to drive the transformation and measure the results, transformation teams and **owners in Business Units and HR Organization would require both internal data from various systems captured in real-time to understand the AS-IS state of the Capabilities at a given point in time** at Team level and BU level.

Similarly on the external data side, **Curated Research data and Benchmarks is required for Skills, Capabilities , Technology , Business Use cases, Product Usecases , Cost Benchmarks and Competitor details .** This will enable the leaders and decision owners to decide on Product roadmap and Capability roadmap which will be again constantly updated due to the market changes.

Skilling and Competence development of the Individual in Role should be aligned and measured for the impact in Capability improvement at Business Unit or Team level. To name a few example here,

- Fulfilment of Role DevOps, AI and AutoSAR demands via Recruitment or Upskilling / Reskilling
- Productivity improvement of Validation teams via Cross functional collaboration



Business Unit level Capability/ Team Capability

Skilling Initiatives - with data driven decision making

To successfully execute a skilling strategy — whether **Foundational, Tactical, or Strategic** — organizations need a set of core initiatives that provide structure, governance, and measurable impact. These initiatives ensure that skilling efforts are not ad hoc but systematically aligned to business priorities and capable of delivering sustained value.

1. Skilling Initiative Aligned to Business Goal

Every skilling effort must begin with clarity on how it supports organizational objectives. Strategic initiatives may aim at market leadership or future readiness, tactical ones may target project delivery or compliance, while foundational efforts may focus on role readiness. This alignment ensures skilling directly contributes to measurable business outcomes.

2.Identification of Strategic Skills/Roles

Organizations must identify the skills and roles that are critical for success. For strategic skilling, this means rare or emerging capabilities; for tactical, project- or compliance-driven roles; and for foundational, entry-level or role-readiness skills. Clear identification prevents dilution of resources and focuses investments where they matter most.

3.Need Identification / Requirement Identification

This involves assessing current workforce skills, mapping gaps, and defining future requirements. It includes competency assessments, project pipeline analysis, and industry benchmarking to determine whether gaps are foundational, tactical, or strategic in nature.

4.Target Audience (Build, Not Buy)

Deciding the target population for skilling programs is essential. For strategic needs, the focus is often on leadership or niche roles; for tactical, on delivery teams or compliance-driven functions; and for foundational, on freshers, returnees, or role changers. This ensures training reaches the right audience and maximizes ROI.

5.Skilling Requirement Scoping

This step translates needs into structured learning objectives and curriculum design. It defines the breadth and depth of coverage, expected proficiency levels, and delivery modes appropriate for each type of skilling.

6.Costing & Budgeting

Budgeting ensures resources are allocated proportionately across strategic, tactical, and foundational priorities. Strategic skilling may require higher long-term investments, while tactical and foundational initiatives often demand scale and cost efficiency.

7.Skilling Program Structure

This defines the format, duration, delivery mode (classroom, digital, blended), and assessment mechanisms. Strategic programs may involve innovation labs or leadership academies, tactical ones may use modular short courses, while foundational ones rely on standardized induction or bootcamps.

8.Training Readiness

Before execution, organizations must ensure infrastructure, content availability, trainer readiness, and participant preparedness. Readiness also includes aligning stakeholders and securing leadership sponsorship.

9.Training Execution

The delivery of learning interventions using a mix of approaches — workshops, simulations, e-learning, mentoring, or on-the-job training. Execution must be adaptable to the type of skilling strategy being deployed.

10.Monitoring and Evaluation

Tracking participation, progress, and completion rates is essential to measure effectiveness. Tactical and foundational programs often use operational KPIs, while strategic programs emphasize innovation outcomes and leadership readiness.

11.Continuous Improvement and Feedback

Feedback loops enable refinement of training content, methods, and delivery. This ensures the programs remain relevant, learner-centric, and aligned with evolving business priorities.

12.Business Impact KPI Measurement

The final measure of success is whether skilling delivers business impact. Foundational skilling is measured by employability and role-readiness, tactical by delivery efficiency and compliance, and strategic by innovation, differentiation, and future readiness

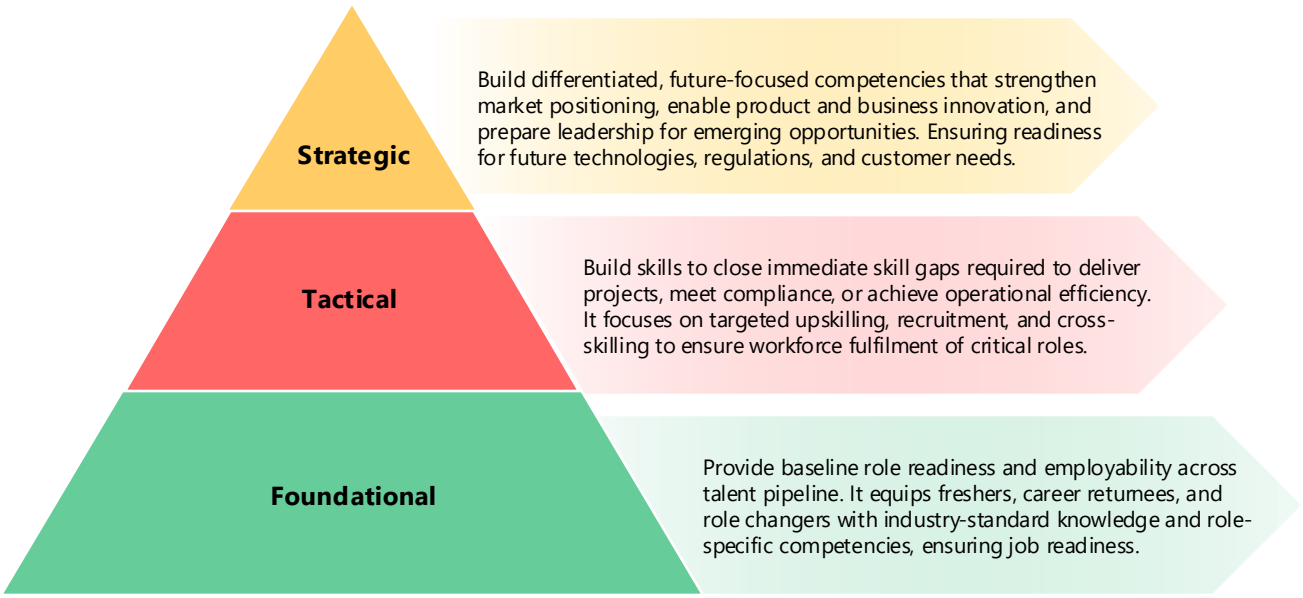
Skilling Capability Maturity Framework

Enterprises require a structured approach to build, measure, and evolve their workforce capabilities in alignment with both short-term business needs and long-term strategic goals. The **Skilling Capability Maturity Framework** provides such a structured lens. It defines how an organization develops and institutionalizes its skilling practices across three distinct yet interdependent layers: **Foundational, Tactical,** and **Strategic**. Each layer represents a different purpose and horizon of skilling — from building baseline role readiness, to enabling efficient project delivery, to creating future-ready and market-differentiating capabilities.

Having this framework helps organizations in multiple ways:

- **Clarity and Prioritization**: It creates a clear taxonomy for categorizing skilling initiatives, ensuring leaders can prioritize investments based on business criticality and time horizon.
- **Consistency and Scale**: It provides a repeatable model that enables scaling of skilling programs across roles, geographies, and functions while maintaining coherence.
- **Alignment with Business Strategy**: It ensures that workforce development efforts are not ad hoc but explicitly tied to business outcomes — whether it is achieving compliance, driving productivity, or shaping future market leadership.
- **Future Readiness**: By balancing immediate needs with long-term capability building, the framework safeguards the organization against disruption while accelerating transformation.

In essence, the Skilling Capability Maturity Framework allows enterprises to move from fragmented training initiatives toward a **systematic, maturity-driven approach** where workforce development becomes a true enabler of organizational resilience, innovation, and growth.



Maturity level Explained - Example Scenarios

Maturity Levels	Skilling Type	Definition	Example
Strategic	**Skilling for Market Leadership**	Developing capabilities that directly support the organization's positioning in the market and strengthen the Brand to differentiate against competitors.	Driving Sustainable Innovation Training for Battery and BMS teams for Sustainable Material selections and cell-level State-of-Health (SoH) algorithms to deliver longer battery warranties (e.g., 10 years/1M miles), building strong research and sustainable battery development capabilities
Strategic	**Skilling for Strategic Advantage**	Building specialized skills that create differentiation in the product or business model, making it difficult for competitors to replicate.	Upskilling cockpit engineers in multi-display orchestration and UI/UX frameworks to deliver cinematic in-cabin experiences that competitors struggle to match.
Strategic	**Skilling for Scale**	Creating standardized and reusable skill frameworks that allow the organization to expand across geographies, products, or customer segments efficiently.	Reusable Capability Framework that can scale across domains, products, geographies etc.
Strategic	**Skilling for Future Readiness**	Preparing the workforce with forward-looking skills needed for emerging technologies, regulations, and market shifts.	Training engineers on Cybersecurity standards/Regulation and software update regulations
Tactical	**Skilling for Productivity**	Enabling employees to work faster and more efficiently by eliminating bottlenecks and redundant efforts through targeted upskilling.	Training testing teams on automated test pipelines, reducing manual effort and cutting validation time by 30%.
Tactical	**Skilling for fulfilment**	Ensuring the workforce has the skills needed to fill open or critical roles in ongoing projects, achieved through recruitment, upskilling, or cross-skilling.	Upskilling software engineers on sensor calibration when hiring for that role takes too long, avoiding project delays.
Foundational	**Skilling for Role (Career Readiness)**	Equipping new joiners, career returnees, or role changers with the skills necessary to quickly integrate into project-specific responsibilities.	A new engineer on the digital cockpit team undergoes Android Automotive OS (AAOS) training, enabling them to contribute to custom app development for OEM ecosystems within 3 months.
Foundational	**Skilling for Employability**	Providing foundational skills to graduates, job seekers, or career-switchers so they meet industry standards and are ready for employment.	An SDV Foundation Program covering AUTOSAR Adaptive, OTA basics, cybersecurity (ISO/SAE 21434), and battery fundamentals, ensuring employability in Tier-1/OEM projects as industry shifts from hardware-first to software-first vehicles

Data driven transformation to achieve New Product and Business Goals

Scenario :
CHRO lens for human capability transformation aligned towards business and product goals

Business goal :
Reduce **time-to-market by 25%** versus current ADAS launches.

Product goal :
Deliver an **ADAS Level 3 system** that achieves **99%+ detection accuracy** for safety-critical applications in varied conditions

1 **Assess key capability needs**

- Technology & Infrastructure
- Processes & Methodologies
- Compliance & Standards
- Competencies & Skills
- Data & Knowledge Assets

2 **Identify key capability gaps**

- Only 10% of engineers are capable to build AI powered critical systems
- Higher Dependencies on contractors for verification and validation

Capability Assessment **Identify Capability Gaps**

4 **Prioritize high impact roles and risks associated with not having them built**

- Functional safety + AI expertise shortage → compliance and accuracy risk
- Lack of leadership in AI validation teams → bottlenecks in scaling MLOps adoption

3 **Dive deeper to analyze skill gaps**

- Analyse gaps in competence required to deliver L3 perception system on time
- Identify high critical roles
- Decide on Build Vs Buy Vs Contract

Prioritize Gaps by Impact **Data driven skill gap analysis**

5 **Data driven insights for decision making**

- Launch **accelerated upskilling program** for 50 engineers in AI + Functional Safety.
- **Strategic hiring** of 5 senior MLOps engineers with safety experience.
- **Partner** with specialized vendors for simulation to bridge interim capacity gap.

Insight & Decision Support

Business Value

- **Timeline** → Ensure launch readiness without last-minute hiring scramble.
- **Compliance** → Reduce audit failure risk by 80%.
- **Cost** → Avoid contractor overdependence & premium hiring costs

SDV Centre of Excellence & Focus Areas

SDV Centre of Excellence (SDV CoE) is required at Organizations specifically at Vehicle OEMs, Tier 1, System Integrators and Component Suppliers to evolve on the SDV centric capabilities.

SDV CoE can be operated either as **centralized transformation orchestrator** or **hub and spoke modelled enabler** for various teams depending on the **Product Complexity, Degree of Innovation, Collaboration needs and Resource availability** (Expertise, Infra and Process systems) to achieve innovation at Scale.

SDV Enterprise through an enabling CoE can be achieved by setting the focus on 4 key dimensions.

- **Technology driven Architecture** (Powered by New Technologies (Cloud, GPUs, IoT, Cybersecurity)
- **Engineering workflow optimization** for speed, scale and continuous improvement with multiple iterations.
- **Re-imagining product development processes** in Value streams with Gen AI
- **Post-production data monetization** for research, engineering design, engineering validations, fixes for diagnosed issues , new feature updates, new revenue channels and Personalized user experiences

Technology driven Architecture	Engineering workflow Optimization	Re-imagined Product development with AI	Monetizing the Post-Production Vehicle Data
Centralized E/E Architecture	Data driven Product lifecycle Management	Concept design to Product design	OTA for New Product features
Digital twin for systems in Cloud	Developer API Portal for standardized API usage	AI-first software development processes	Personalization of Customer and User experience
Cloud Native & Mixed Critical Orchestration of Workloads	Continuous Integration, Deployment and Homologation	AI-based validation for compliances across the product lifecycle	Cross Industry Data Monetization
Zero Trust Architecture	Virtual Validation with vECUs	AI-driven systems for scenario validations	Simulations on real data for research, design and validation of new features
Vehicle OS / Middleware (Proprietary &Open Source)	OTA for Product updates for maintenance	AI- driven productivity optimization	Software-defined updates enablement for component providers and sub-system providers

SDV Centre of Excellence - Objectives

1. Awareness and Adoption of Engineers

Awareness	Clarity for Change	Target Competencies for future	Upskilling and Reskilling Initiatives
Provide sessions through Experts with deep understanding on SDV Disruption. Continuous Communication on evolving strategy	Personalized communication on Change and impact for the Teams Identify pilot team members	Benchmarks to achieve on competencies in mid-term and long term Skill mapping and Gap Identification Prioritization of investments	Upskilling programs and initiatives designed for teams Continuous Delivery of Programs and measurement of Impact

2. Innovation Pilots for Business

Innovation Usecases	Reference Architectures	PoCs & Pilot	Success Criteria & Metrics
Data-driven product engineering lifecycle Virtual Twin for Control system and compliance process validation Data Monetization through data quality and value mapping	OTA Architectures and Agent driven automated approval workflows Continuous Deployment and homologation Architectures	AS-IS Assessment , To-Be Solution Architecture Tool & Technology selection , Domain specific requirements Business Case for PoC or Pilot Team Setup and Objectives to qualify for Pilot	Cost & Tech utilization metrics Functional metrics for the product Architecture metrics For safety, reliability & re-usability Business performance Metrics

SDV Centre of Excellence - Objectives

3. Governance for Compliant Innovation

Domain & System Regulations	IP Protection and Standards	Data quality, access and Protection	AI usage and Compliance
Functional Safety OTA Regulations Cybersecurity at Edge Security during Development & Production	Design (Multi-disciplinary engineering systems) Algorithms and Proprietary models SDK Plug-in designs for integration	Driver and occupant Data Privacy Ownership Rights for Data usage and Monetization Data availability for real-time and on-demand access	Safe Training Data for Models Model Explainability Cloud-Edge Usage Secure access and usage of the model

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4. Scale for RoI

Accelerators	Assets	Partnerships	Community Development
Demonstrators and implementation templates Re-usable Testing Accelerators for SIL Best practices checklist by systems and Technology Tool / Technology decision support for SDV aligned Usecases	Estimation and assumption validation tool Compliance Validation tool Role, Responsibilities, KPIs for Team	Tooling Partners Cloud and Hardware Partners Open Source Consortium for Virtual Hardware Architecture standards and middleware	Developer Community Architects Network Trainer Community

AI Centre of Excellence (AI CoE)

AI CoE provides the foundation for systematic, enterprise-wide AI adoption, ensuring that innovation is not limited to pilots **but embedded into the organization's DNA**. It standardizes processes from prototype to production, aligning technology with business goals and providing the governance required to manage complexity. The COE **does not just accelerate adoption—it safeguards it**, ensuring AI remains sustainable, ethical, and value-driven.

The roles of an AI COE span across both technical and strategic domains. Key capabilities include:

- **Agent Frameworks**: Establishing reusable architectures for intelligent agents across workflows.
- **LLM Utilization:** Leveraging large language models effectively for engineering, operations, and customer interfaces.
- **Infrastructure Management**: Ensuring scalable, cost-efficient, and secure deployment environments.
- **Data Security and Privacy**: Safeguarding sensitive automotive and customer data in compliance with regulations.
- **Ethical Validation**: Embedding fairness, transparency, and accountability into AI systems.
- **Monitoring and Tracing**: Enabling observability of AI systems to ensure reliability and detect drift.
- **Agent Training and Evaluation**: Building systematic processes for continuous improvement of AI models and agents.
- **Cost and Business Value Alignment**: Measuring ROI, balancing expenses, and linking AI initiatives to tangible benefits.
- **End-to-End Standardization**: Governing the entire lifecycle from prototype to production, ensuring consistency and repeatability.

When it comes to adoption, organizations face a critical choice: build their own AI COE internally or onboard a COE partner. Building internally provides greater ownership and alignment with business culture, but it demands significant investment in talent, infrastructure, and governance frameworks. Partnering with an experienced AI COE provider, on the other hand, helps organizations navigate complexities faster, leveraging pre-built frameworks, domain expertise, and established best practices. For many automotive players, a hybrid approach—combining internal leadership with external expertise—can provide the most balanced path forward.

Those who institutionalize AI through a robust COE will not only adapt to the changing landscape but also lead the future of mobility.

AI CoE (Usecases to get started)

AI CoE is crucial for the **automobile industry and involved business players** to build a clear roadmap for their **transformation towards SDV, Autonomous, Electric and Connected** Vehicle Innovations.

With **GenAI and Edge AI architectures advancing** to get ready for **Safe Enterprise grade implementation** maturity , it is important to understand the value chain specific business opportunities and Customer Value propositions to deliver value through differentiated products and business models.

While the spectrum of **AI impact is both broad and deep**, some of the **high value and foundational usecases** are listed in the below table for different value chain players involved in Product Innovation, Development, Manufacturing and After-sales.

AI for Engineering workflow

Engineering Stage	AI Use Case	How AI Helps
Requirement Engineering	Automated Requirement Generation	AI can transform stakeholder inputs, past project data (Jira, DOORS), and domain knowledge into precise system requirements by applying RAG and automotive-specific ontologies. Using NLP, it analyses vast unstructured sources like customer feedback, market research, and engineering specs into clear, actionable requirements.
Traceability	Automated traceability linking	Links requirements automatically to system-level requirements, use cases, safety goals, and test cases.
Compliance and Cyber Security	AI Enforce Compliance for each system requirement	LLM ensures requirements comply with ASPICE, ISO 26262, ISO 21434, UNECE R155/R156, including safety integrity levels (ASIL) & cybersecurity.
System Design	AI-Assisted Architecture Design	AI can suggest optimized system/middleware architectures based on system requirements, best practices, past projects and specified parameters. AI can pull virtual verification and validation upfront in the design concept stage.
Software Development	AI Coding Assistant	Co-pilot can provides code suggestions, bug detection, and auto-generation of APIs/middleware stubs.
Verification & Validation	AI-Driven SiL and HiL	Virtual electronic control units (vECUs) accelerate development cycle by enabling software development and Software-in-Loop testing much earlier than the physical hardware availability. Hardware in loop allows the physical ECU test with system simulating the operation of an assembled product in real-world conditions.
Simulation & Digital Twins	AI-Augmented Simulation Models	Generates & optimizes driving scenarios for ADAS/Autonomy testing. Test the vehicle performance under various conditions without the need for physical prototypes

AI for Enterprise Productivity and Collaboration

Area	AI Use Case	How AI Helps
Cross-Team Collaboration	**AI knowledge copilot**	Retrieves system requirements, Jira tickets, test reports, compliance docs from multiple platforms using SDV ontology.
Onboarding New Engineers	**AI persona specific assistant**	Provides guidance on automotive processes (ASPICE, ISO 26262, ISO 21434), domain terms, and workflows.
Documentation & Reporting	**Automated report generation for Audit & Compliance**	Uses predefined templates to generate structured requirement documents, Unit test documents. Creates ASPICE compliance reports, test coverage reports, and safety documentation from project data.
Project Management	**AI for task prioritization**	AI can analyse Jira/ALM data, predicts delays, and recommends task prioritization.
Code & Design Reviews	**AI review assistant**	Suggests improvements in code, architecture diagrams, and documentation automatically. Can perform the static code analysis to check for cyber security compliance.
Knowledge Retention & Management	**AI-powered knowledge base**	Captures lessons learned, defects, and fixes into reusable knowledge graphs.

AI for Product feature & User Experience

Area	Use Case	How AI Helps
Personalized Customization	**Personalized In-Car Experience**	AI can identify and learns driver behaviour, preferences, and routines to personalize seat position, climate, infotainment, and driving modes. It can suggest user specific subscription services.
Voice Assistants	**Voice & Multimodal Digital Assistants**	NLP-powered copilots respond to natural voice commands, gestures, and contextual queries.
Infotainment	**Adaptive Infotainment & Content Curation**	AI can recommend music, podcasts, or apps based on trip context, mood, or driver history. Computer vision and NLP can detect driver/passenger emotions and adapt lighting, music, or climate.
Navigation	**Context-Aware Navigation & Guidance**	AI provides dynamic routing with real-time traffic, weather, charging stations, and POIs. AI integrates AR navigation overlays and VR experiences for passengers.
Over-the-Air (OTA)	**AI-Powered Feature Updates**	AI enables predictive upgrades of infotainment and safety features via OTA updates. Quickly fix vulnerabilities to strengthen device security.

AI for Business Development and Market Intelligence

Area	AI Use Case	How AI Helps
Market Trend Analysis	**AI-Powered Market Intelligence**	NLP & GenAI can analyse industry reports, competitor strategies, patent filings, white papers, market trends and customer behaviour to provide the detail report on new market trends where the industry is heading.
Customer Insights	**AI-Driven Sentiment & Feedback Analysis**	AI sentiment analysis can process social media, forums, and surveys to identify customer needs and pain points for SDVs as per customer segments.
Business Development	**AI-Powered Proposal Generator**	Creates tailored proposals and RFP responses by pulling data from past bids, case studies, and product capabilities.
Competitive Benchmarking	**AI Competitor Copilot**	Tracks new model launch, pricing models, features, subscription-based services, partnerships, and software capabilities of competitors in real-time.
Sales Enablement	**AI Knowledge Assistant for Sales Teams**	Provides instant access to technical documentation on all the new ADAS features, safety features, compliance standards, and value propositions during client discussions.
Product Positioning	**AI Feature-Value Mapping**	Maps SDV features (e.g., OTA updates, ADAS, predictive maintenance) to customer personas and use cases. Identify the right customer segments for a specific model.

AI for Manufacturing

Area	AI Use Case	How AI Helps
Production Line Operations	**Process Optimization Models**	Continuously analyse cycle time, takt time, robot loads, software flashing times and rework rates to fine-tune the software integration line and auto-redistribute work.
Production Line Operations	**AI-Driven Digital Twins**	Creates real-time digital replicas of production lines to simulate hardware + software integration and predict bottlenecks.
Quality & Validation	**Vision AI for Quality Checks**	Uses cameras + AI to inspect ECU wiring, sensor placements, chip boards, and validate correct flashing/installation.
Quality & Validation	**Software Flash Validation Models**	AI validates software signatures during ECU flashing to detect tampering ML models verify ECU flashing by learning from historical error patterns.
Cybersecurity	**Cybersecurity Compliance Check**	AI scans flashed software for vulnerabilities and compliance gaps before vehicle release based on ISO 26262, ISO 21434, UNECE R155..

AI for Manufacturing cont...

Area	AI Use Case	How AI Helps
Compliance	**Automated Documentation**	Generates and updates compliance reports, test logs, and work instructions aligned with ISO 26262, UNECE R155.
Predictive Maintenance	**Predictive Maintenance of Factory Assets**	ML analyses vibration, thermal, and operational data to predict failures in robots, testers, or conveyors.
Collaboration & Knowledge	**Manufacturing Process Copilot**	GenAI copilots guide engineers/operators by answering queries from Jira, SharePoint, manuals, and test reports.

AI for After Sales

Area	AI Use Case	How AI Helps
Predictive Maintenance	**Remote predictive vehicle diagnostic**	Vehicles use on-board AI to monitor vehicle telemetry like engine vibration, battery voltage, thermal sensors, brake wear patterns, ECU logs to detect anomalies and degradation early, sending rich vehicle health data to the cloud for deep analysis and providing proactive repair recommendations, part delivery scheduling
OTA (Over-the-Air)	**OTA (Over-the-Air) Update Optimization**	AI prioritizes and validates which vehicles should receive which updates first, based on usage and risks. Suggest the subscription-based services based on the user profile and usage.
Warranty Claim	**Warranty Analytics**	ML learns from historical claims, user profile and service data to detect early defect trends across vehicle fleets. Compares telemetry with claim data to detect anomalies in reported incidents.
Insurance	**Usage-Based Insurance & Services**	ML models analyse driving behaviour, mileage, and braking data to personalize insurance or service plans.
Customer Support Copilot	**Automated Customer Support**	Conversational copilots handle FAQs, service booking, recalls, and personalized recommendations.
Workshops & Service Network	**Parts Demand Forecasting**	ML models predict spare parts demand across regions using vehicle health and driving pattern data.
Virtual Showrooms	**VR/AR based virtual showroom**	AI recommends vehicle models, trims, and features based on customer lifestyle, budget, and past preferences. Conversational AI explains features, financing options, SDV software upgrades, and safety packages. AI tracks customer reactions during virtual exploration and adapts the experience
Forecasting	**Failure Mode Prediction**	Analyses ECU fault logs across fleets to predict systemic failures before they scale.

Change in Core Capability - Explained

As automotive enterprises transition from ECU-heavy architectures to zonal compute, cloud-native pipelines, and continuous OTA lifecycles, the **skill foundations of the industry are undergoing rapid change**. The challenge is twofold:

- **New skills** are emerging — AI/ML engineering, cloud-native DevOps, cybersecurity governance, and digital twin development.
- **Existing skills** are evolving in scope — ECU programming is giving way to service-oriented software, manual testing is shifting to AI-driven validation, and program management is adapting to agile and continuous release models.

Core Transformation of Automotive Software Products in SDV & AI Era

By Product Development Phase

Subcategory	Conventional Capabilities	Next-Generation Capabilities	Explanation of Transformation
System Architecture	ECU-centric wiring diagrams; CAN, LIN, FlexRay; hardware tightly bound to functions	Zonal + centralized compute; Automotive Ethernet/TSN; workload orchestration across HPCs	ECU sprawl (100+ boxes per vehicle) is no longer viable. Architects must think like cloud engineers, fluent in service-orientation and virtualization.
Testing	Manual benches, ECU-level regression, HIL setups	Simulation-first validation; digital twins; AI-driven test automation; CI/CD regression	Bench testing cannot keep pace with software scale. Testers must become simulation experts with Python, ML ops, and cloud toolchains.
Validation	Feature-level validation; deterministic ISO 26262 safety checks	Scenario-based validation (SOTIF); ML model validation; continuous OTA-aware V&V	Autonomy requires probabilistic safety. Validation engineers must master scenario coverage and ML-based assurance.
Cybersecurity	Bolt-on IT firewalls; ISO 26262 only; compliance post-SOP	Security-by-design; lifecycle CSMS/SUMS; OTA security (ISO 24089); VSOC ops	Connectivity exposes constant attack surfaces. Cyber engineers now need governance, monitoring, and real-time patching fluency.
Program / Project Engineering	Waterfall delivery; hardware milestones; multi-year cycles	Agile + DevOps; continuous software releases; AI/ML lifecycle governance	Hardware-tied project managers must adapt to agile and platform governance with constant software updates.

By Technology Implementation layers

Subcategory	Conventional Capabilities	Next-Generation Capabilities	Explanation of Transformation
Hardware (E/E Architecture)	Distributed ECUs; fragmented domains; proprietary controllers	Centralized HPCs; zonal controllers; software-defined E/E; OTA-ready	ECU proliferation drives cost/complexity. Engineers must pivot to scalable zonal + HPC platforms.
Middleware	AUTOSAR Classic; fixed SOME/IP mappings	AUTOSAR Adaptive; DDS/SOME-IP; dynamic service contracts	Static middleware cannot scale. Middleware engineers must master adaptive, service-oriented architectures.
OS / Virtualization	Bare-metal/RTOS per ECU; limited virtualization	Linux/QNX on HPCs; hypervisors; mixed-criticality partitioning; SOAFEE frameworks,	Consolidation demands virtualization and containerization for mixed workloads.
Application Layer	Proprietary stacks (IVI, ADAS modules); hardware-bound features	Cloud-native apps; Android Automotive OS; app ecosystems; multimodal UX (voice, AR/VR, gesture)	Consumers demand smartphone-like experiences. App engineers must pivot to open ecosystems and OTA rollouts.

By Domain Specific Systems

Subcategory	Conventional Capabilities	Next-Generation Capabilities	Explanation of Transformation
ADAS / AD	ECU-coded features (ACC, LKA); sensor-specific algorithms; road tests	HPC-driven stacks (NVIDIA Thor, Mobileye EyeQ Ultra); CUDA/TensorRT; ML Ops; SOTIF-based validation	ECU-based ADAS can't scale. AD engineers need HPC optimization + AI training pipelines.
BMS	SoC/SoH monitoring; pack balancing; calibration via rigs	ISO 15118-20 Plug & Charge; OTA calibration; AI-driven analytics; digital twins, battery cloud analytics and grid integration	EV scaling demands predictive BMS, OTA tuning, and AI-led lifecycle optimization.
Digital Cockpit	Proprietary infotainment stacks; static HMI; ECU-driven IVI	Android Automotive OS; AR/VR HMI; multimodal UX; OTA-driven personalization	Cockpits are now digital ecosystems. Infotainment coders must evolve into UX/HMI specialists.
Cybersecurity	Perimeter IT defenses; post-SOP fixes	CSMS/SUMS governance; OTA compliance (ISO 24089); anomaly detection; VSOC ops, DevSecOps for automotive	Regulators mandate lifecycle security. Engineers must embed security into every phase.
OTA / Connected Vehicles	Service-center updates; siloed OEM clouds; basic telematics	Cloud-native DevOps pipelines; Kubernetes; V2X (C-V2X, NR-V2X); FleetWise/VSS	OTA has become backbone of SDV. Connected engineers must master orchestration and fleet-scale data governance.

Role Shift Explained – for SDV +AI Era

While the skill transformation matrix highlights the broad shifts across product development phases, technology layers, and domains, it is at the individual role level where disruption becomes most tangible. Engineers, architects, and specialists are experiencing a fundamental redefinition of their day-to-day responsibilities. Tasks that were once centered around ECU-specific development, manual validation, or late-phase compliance are now expanding into areas like AI/ML integration, simulation-first validation, continuous compliance, and service-oriented architectures.

The following tables map this evolution in detail — **showing how domain-specific, process-driven, and technology-focused roles are being reshaped by SDV and AI**. This perspective makes clear that the transformation is not abstract; it is directly impacting how automotive professionals design, validate, secure, and deliver products in the new mobility era.

Role Category	Role Name	Old Responsibilities	New Responsibilities (SDV + AI Era)
Domain Roles	**ADAS System Architect**	Define ADAS features like ACC, LKA as ECU-centric implementations, each tied to dedicated hardware.- **Develop system-level specs using CAN, FlexRay, and LIN topologies.- Allocate compute to individual ECUs, ensuring deterministic timing per sensor (camera ECU, radar ECU).- Interface with Tier-1s for feature-specific ECUs and middleware.-** Manage integration testing via hardware benches and vehicle road validation.	Architect zonal + centralized compute platforms capable of consolidating multiple ADAS functions into a single HPC.- **Define sensor fusion architectures using ML/AI frameworks (TensorRT, CUDA, ONNX Runtime).- Design with service-oriented middleware (AUTOSAR Adaptive, DDS, SOME/IP) rather than static ECU function mapping.- Collaborate with cloud/DevOps engineers to ensure architectures are OTA-ready and support continuous feature updates.-** Define safety & performance budgets for AI models (latency, inference rate) instead of ECU cycle budgets.
	BMS Algorithm Engineer	Develop SoC (State of Charge) and SoH (State of Health) algorithms in MATLAB/Simulink.- **Implement pack balancing strategies (passive or active balancing) for cell uniformity.- Conduct calibration and validation via lab rigs and physical cycling tests.-** Ensure compliance with ISO 26262 safety requirements for BMS control software.- **Support basic diagnostics and DTC management for pack-level events.**	Develop predictive ML algorithms for battery degradation forecasting using Python, TensorFlow, PyTorch.- **Build and maintain digital twins of batteries at cell, module, and pack level for fleet analytics.- Implement OTA-enabled parameter calibration and adaptive control strategies.-** Ensure interoperability with ISO 15118-20 Plug & Charge protocols and grid integration standards.- **Apply AI for thermal management and fast-charging optimization at fleet scale**.

Role Category	Role Name	Old Responsibilities	New Responsibilities (SDV + AI Era)
Process Roles	**Verification & Validation Engineer**	- **Perform HIL regression testing for ADAS and powertrain ECUs.- Design test cases for deterministic safety validation (ISO 26262).-** Conduct road tests to validate feature behavior in real-world conditions.- **Maintain test reports manually; traceability limited to requirements databases (DOORS, Polarion).- Collaborate with Tier-1s for ECU-level validation**, mainly black-box.	**- Build and manage simulation-first validation platforms (dSPACE, PreScan, CarMaker, Carla).- Generate synthetic datasets for AI model validation and training (e.g., corner cases for perception systems).-** Ensure compliance with ISO/PAS 21448 (SOTIF) for scenario-based safety assurance.- **Automate continuous validation pipelines (CI/CD) with Jenkins, GitLab CI, Python test automation**.- **Deliver hybrid evidence packages (physical + virtual test data) acceptable to regulators.**
	Homologation Engineer	- Prepare documentation for type approval pre-SOP (vehicle safety, crash, emissions).- Focus compliance reviews on ISO 26262 functional safety.- **Work with regulatory bodies at launch phase only**.- **Ensure conformity of production (CoP) via one-time audits.- Limited involvement with post-SOP updates**.	- Manage CSMS/SUMS compliance for cybersecurity (UNECE R155/R156).- **Oversee OTA update compliance as per ISO 24089.- Validate AI explainability and traceability for regulators in ADAS/AD functions**.- Collaborate with **VSOC and DevSecOps teams to ensure continuous conformity.- Engage with regulators throughout vehicle lifecycle, not just SOP**.
Technology Roles	**AI/ML Software Developer**	- Develop perception and control algorithms in MATLAB/Python for proof-of-concepts.- Train models on small, proprietary datasets with limited variation.- **Deliver offline models for integration into ECU firmware with minimal safety review.- Validate performance via road tests or HIL setups, not at fleet scale.-** Rarely exposed to functional safety or real-time constraints.	**- Build production-grade ML pipelines integrated with CI/CD workflows (TensorFlow Extended, Kubeflow).- Optimize models for deployment on HPC hardware (CUDA, TensorRT, ONNX Runtime).- Implement explainable AI frameworks for regulator acceptance (e.g., SHAP, LIME).- Work with ML Ops practices for continuous retraining and OTA deployment**.- Ensure AI compliance with ISO 26262, SOTIF, and emerging AI-specific standards.

Role Category	Role Name	Old Responsibilities	New Responsibilities (SDV + AI Era)
Technology Roles	**Simulation Engineer**	- **Develop small-scale simulation models (Matlab/Simulink, dSPACE HIL).- Focus on component-level validation of subsystems (braking, steering).- Run limited closed-loop HIL scenarios with physical ECUs.- Depend heavily on road tests for system-level validation**.- Deliver validation reports to V&V without deep integration with DevOps.	- **Build full-vehicle digital twins for ADAS/AD validation (CarMaker, Carla, PreScan).- Generate synthetic datasets for perception model training and corner-case validation**.- Scale validation to **billions of virtual miles using cloud HPC (AWS, Azure, NVIDIA DRIVE Sim).-** Automate test case generation via AI/ML to cover edge cases regulators expect.- **Deliver hybrid validation evidence packages for regulators (virtual + physical).**
	Cybersecurity Systems Engineer	- **Design perimeter IT-style defenses (firewalls, encryption modules).- Perform penetration testing near SOP phase.-** Handle patching manually via service campaigns.- **Limited involvement in embedded/vehicle-specific security.- Compliance mainly aligned to ISO 26262 functional safety.**	- **Embed security-by-design into E/E architecture.- Implement CSMS (Cybersecurity Management System) & SUMS (Software Update Management System) per UNECE R155/R156.**- Develop **intrusion detection and prevention systems (IDS/IPS) for in-vehicle networks (CAN, Ethernet).-** Build anomaly **detection models using AI for real-time monitoring.- Operate in Vehicle SOC (VSOC) for continuous lifecycle security.**

Key Takeaways

- The **old baseline is collapsing** — ECU coders, manual testers, and hardware-only architects are being displaced by SDV realities.
- The SDV era demands **hybrid engineers** who merge mechanical, electrical, software, and AI/cloud fluency.
- Cybersecurity and compliance are now **universal skills** across engineering roles, not niche specializations.
- Without **data-driven skilling capabilities**, even the best SDV technology strategies will stall at execution.
- Enterprises that embed skilling into their operating model — not as training, but as a **capability** — will own the future of mobility.

Data Enabled Capability Transformation for AI Powered SDV Enterprise

1

Why capability transformation? – Identify the Business Goals

Capability transformation must directly link to business outcomes, not just HR programs. Key goals include:

- Unlock new revenue through OTA and digital services.
- Differentiate experience with AI, ADAS, and advanced UX.
- Accelerate speed-to-market and compliance readiness.
- Scale efficiently with cost-optimized software engineering

Data Enablers

Market Intelligence → Feature release benchmarks, monetization models.
Customer Insights → Usage telemetry, adoption rates, digital analytics.
Regulatory Trends → Compliance foresight (e.g., UNECE WP.29).

2

What are the required capabilities? – Identify Critical Capabilities

Define high impact capabilities that directly enable business goals, such as:

- Software Engineering Excellence – CI/CD, DevSecOps
- Data, AI & Digital Twin – Simulation-driven validation.
- Cybersecurity & Functional Safety – ISO/SAE 21434, ISO 26262, UNECE WP.29.
- Product Management & Monetization – Subscription models, platform thinking.

Data Enablers

External Benchmarks → Peer maturity in DevSecOps, CI/CD, defect density.
Role Insights → Critical roles and skills for business goals

3

Where we are? – Assess Current (As-Is) Maturity

Benchmark the current state to identify strengths and gaps:

- Competency Mapping – Talent depth, readiness, skills.
- Toolchain Audit – Legacy vs. modern tools.
- Process Review – Agile, DevSecOps, validation maturity.
- Governance & Culture → Accountability, collaboration.

Outcome: Fact-based baseline for transformation

Data Enablers

Competency Heatmaps → Skills readiness, staffing insights.
Tool Analytics → CI/CD, test automation usage.
Delivery Metrics → Cycle time, defect leakage
Culture Signals → Collaboration data from Jira, GitHub, Teams.

4

How to Build? – Roadmap to Develop and Embed Capabilities

Capability building spans four dimensions:

- People – Targeted skilling, CoEs, communities of practice.
- Tools – Modern platforms, simulation, AI-driven design.
- Processes – Agile, DevSecOps, continuous validation.
- Governance – Clear ownership, accountability, KPIs.

Focus on embedding capabilities into workflows so they become self-sustaining.

Data Enablers

Adaptive Skilling → Role & project-based learning
Simulation & Digital Twins → Data-driven system validation
Process Loops → Dashboards for agility & quality
Talent Strategy → Hire vs. upskill optimization

5

How to Measure Impact? – Link to Business Outcomes

- Growth – Faster releases, higher revenue from software features
- Efficiency – Lower cost per feature, greater reuse
- People – Stronger talent pipeline, better employee experience
- Compliance – Improved audit scores, on-time certifications

Data Enablers

Track KPI's on
Innovation → Faster releases, higher backlog throughput
Business → Revenue from software, cost savings via reuse
People → Faster onboarding, internal mobility
Compliance → Strong audit scores, higher certification rates

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About CreamCollar

We help Automotive Product organizations navigate the complexities of transformation towards Software defined and AI-Powered shift with data and research driven Capability development for Deep domain Product Usecases and Business Models.

With more than a decade of Research, Strategy Consulting & Data driven insights delivery experience, we craft tailored strategies that focus on transforming people, processes, and culture. Our approach ensures organizations are equipped with the right capabilities and Competencies to successfully evolve in the SDV space.