Deloitte.

Automotive IT Strategy 2024

Edition 8 – Emerging 2024 IT Shifts in Automotive

Four shifts are taking place in response to changes in the automotive IT environment

Changes in the automotive and IT context are forcing companies to react. We identified four shifts happening at automotive clients in 2024 that are impacting the CIO agenda

The automotive world is constantly changing…

Current Automotive Trends

Our research on what is happening and coming up in the automotive market[1] [2]

- Connectivity
- Alternative driving technologies
- Shared mobility solutions
- Sustainability
- Autonomous driving
- Automotive retail experience

Cross Industry Tech Trends

Deloitte's perspective on the 2024 technology trends on the CIO Agenda.[3]

- Spatial computing
- Generative AI
- Smarter Computation
- Cyber & Trust
- From DevOps to DevEx
- Core modernization

Our Client Experience in the Automotive Industry

In-depth expertise based on our commitment to support our automotive industry clients in transforming their business and technology.

… and we see IT shifts happening in 2024

Shift #1: (Gen) AI moves from theory into practice

In this paper: We discuss what is happening in the market, where the potential lies and describe one of the use cases we have supported.

Shift #2: Bringing the business into business agility

In this paper: We highlight how agility is implemented, the significance of business in agility and lessons we learned at our engagements.

Shift #3: Market slow downs force it cost optimization

In this paper: We recap on market developments, introduce our framework to manage IT costs and discuss enablers for our clients.

Shift #4: Improving technical health through rationalization

In this paper: We dive into applying rationalization in automotive, provide a perspective on our approach and a client use case.

[1] 2024 Deloitte Global Automotive Consumer Study (2024) [2] Deloitte Thought Leadership: Automotive Trend Radar (2024) [3] Deloitte Insights: Tech Trends 2024 (2023)

Shift #1

Generative AI moves from theory into practice

We discuss what is happening in the market, where the potential lies and describe one of the use cases we have supported.

(Gen) AI changed the market and the way how machines interact with and understand humans

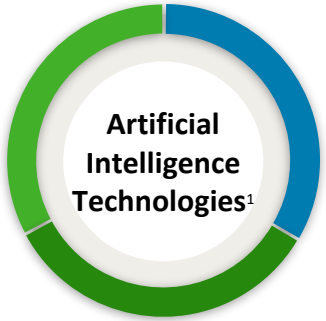
AI technology enables businesses to unlock new growth opportunities and drive innovation by leveraging the technological capability to perform human like functions in ways previously impossible

Breaking down the AI technology

Artificial Intelligence is a machine's ability to perform human-like functions by detect patterns, make decisions, classify data and detect fraud.

Predictive AI

Enables companies to identify emerging trends or forecast risks and solutions by using machine learning to study past patterns and predict future events and needs.



Prescriptive AI

Utilizes prediction and optimization to select a course of action that achieves a desired outcome.

Generative AI

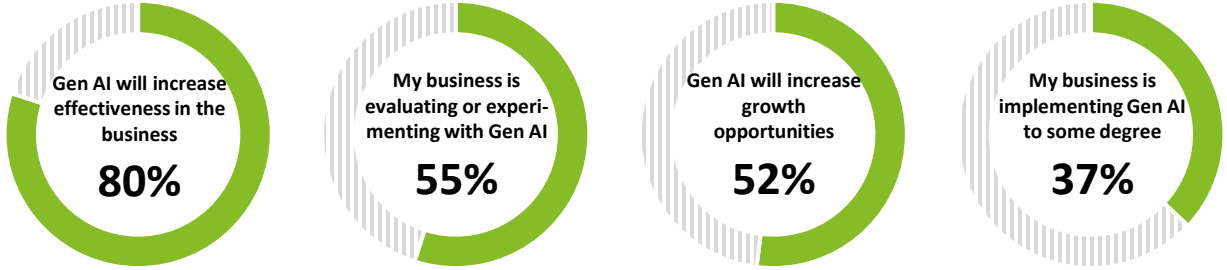
Specializes in generating text, images, or other media in response to prompts.

Generative AI capabilities[1]

Text | Code | Image | Video | Audio | 3D Asset

How business leaders perceive the use of Gen AI

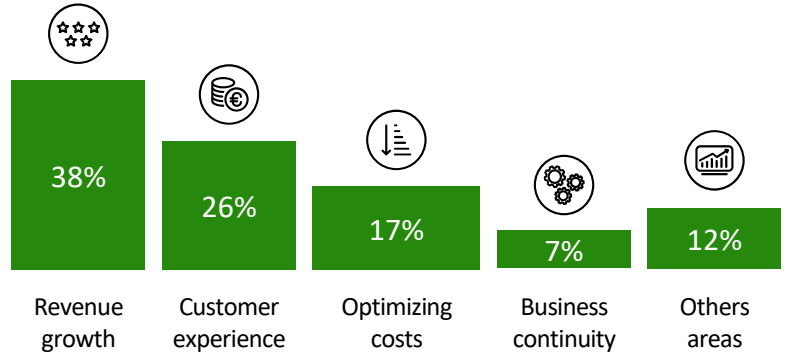
Percentage of business leaders who agree with the following sentences[2]:



Primary focus of Gen AI initiatives in enterprises[3]

Gen AI offers different opportunities for businesses to improve efficiency and productivity, adapt to fast pacing market dynamics, create new ways of developing products and services as well as interacting with people and technology.

The exact impact of utilizing Gen AI depends on how the technology is applied.



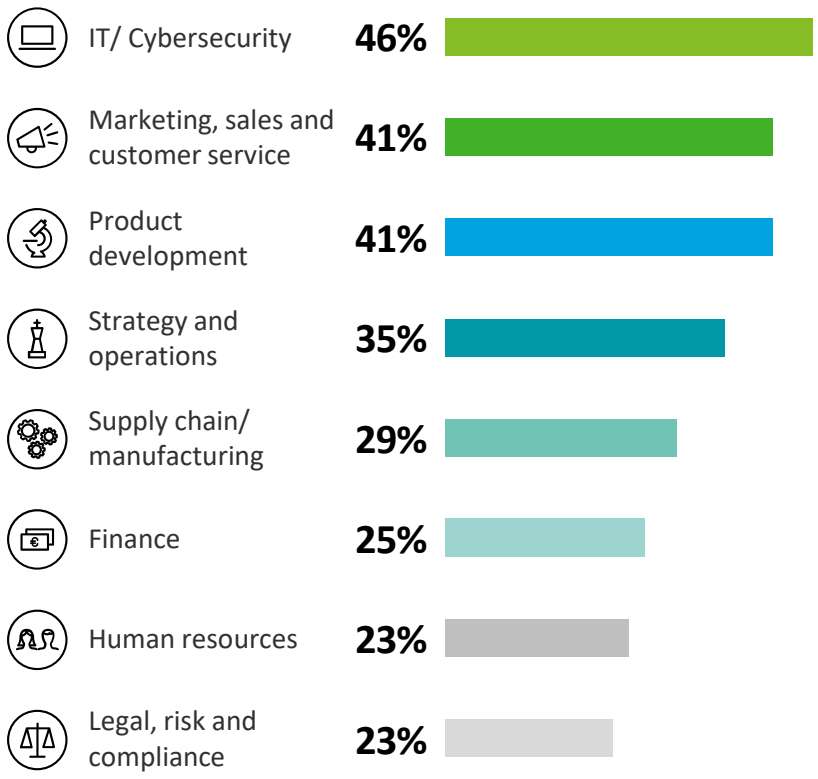
[1] Deloitte Generative AI - Industry Vision (2023) [2] Fortune/ Deloitte CEO Survey Insights (2023) [3] Gartner (2023)

Adoption of Gen AI across business departments

Deloitte research has identified that IT/Cybersecurity is the business function which has the highest potential for Gen AI use. The software development lifecycle is an example which shows high potential for Gen AI

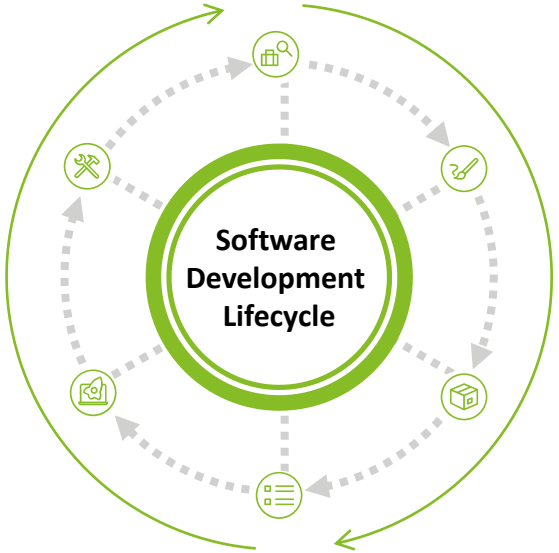
Gen AI use across departments

Percentage of those who are using generative AI in a limited or at-scale implementation[1]



Which tasks can Gen AI take over in IT?

Example: Software development lifecycle



Software development lifecycle phases	Tasks potentially taken over by Gen AI
1. Requirement Analysis	• Identify user needs • Generate user stories • Reverse engineering • Resolve conflicts
2. Design	• Generate EA diagrams • Select optimal technologies • Generate data models • Generate wireframes
3. Build	• Code generation • Code review and debugging • Code migration • Unit test generation
4. Testing	• Test case generation • Test data sets generation • Testing automation • Root cause analysis
5. Implementation	• Generating infrastructure as code definitions • Generating container build scripts • Generating CI/CD pipelines • Identifying and fixing security vulnerabilities
6. Maintenance	• Anomaly detection & alerting • Feedback analysis & bug • Incident prioritization & resolution • AI-powered support tools

[1] Deloitte: State of Generative AI in the Enterprise Quarter one report (2024)

The automotive industry is rapidly implementing (Gen) AI

AI has become a transformative force in the automotive industry, with OEMs and suppliers leveraging AI for diverse applications in the production, legal, sales, infotainment and personalized customer experiences domains

Mercedes Benz

Software | Further develop voice control of the in-house MBUX infotainment system with a ChatGPT upgrade.

Production | Analysis tool using ChatGPT combines R&D, production, and customer data to identify error sources for quality assurance.

Legal | Legal data (code of conduct and regulations) is added to ChatGPT for testing as a contact point for employees.

Sales | LLM-powered smart sales assistant on Mercedes-Benz's online platforms, designed to enhance customer facing functionalities.

Digital product development | Integrate AI with traditional computer-aided design processes to enhance product development.

BMW

Production | Car2X is a cloud-based feature enabling real-time communication and interaction between vehicles the BMW production system.

Software | In-car Gen AI supports voice control using Alexa's language model understanding inputs and providing how-to responses.

Legal | Launched Project AI to ensure ethical AI use, efficient deployment, and promote knowledge sharing.

Supply Chain | During production, automated image recognition compares component images to others from the same sequence.

Production | Production line uses IoT ecosystem: self-analyzing, interacting, and autom. sharing production-related messages.

Volkswagen

Software | Volkswagen Group established an 'AI Lab' as a global competence center to incubate and identify new product ideas.

Software | In-car voice assistant IDA uses ChatGPT, with all models featuring latest info-tainment receiving AI-supported chatbot info.

Production | AI optimizes spot welds at VW Group, using real-time analytics to automatically detect quality anomalies.

Legal | Prewave AI detects sustainability risks, e.g. environmental pollution and corruption, early in business partners and supply chains.

Production | Industrial computer vision uses AI for independent inspection of delivery box packaging, both in the lab and in logistics.

Others

Production | Porsche uses AI to recognize small damages. AI shows the technicians smallest production faults on a car surface.

Software | Motional uses it's continuous learning framework of AI to improve remote vehicle assistance for automotive vehicles.

Employees | Ford uses AI to train employees on a new streaming service-like platform on products, competitors, service repairs and sales.

Software | GM collaborates with Microsoft and develops a ChatGPT based voice assistant for their vehicles.

Software | Nio aims to further develop the voice assistant "Nomi" towards "Nomi GPT" using the integration with Azure OpenAI.

Case example of AI-based pricing in direct sales

Enhancing effectivity of pricing and increasing profits leveraging data using an AI-based price engine for dynamic pricing with 24h response time at an automotive OEM

Case Example

Situation

Pricing decisions are based on experience, manual data reporting and basic KPI's of a handful of pricing specialists

- Long delays in price adjustments
- Limited sophistication of pricing decisions
- Increased data availability through the switch to a direct sales model

Approach

- Implementation of AI-based pricing engine
- Integration of competitor and market sentiment data
- Development of multi-layer analytics dashboard that increases acceptance and trust in AI-derived prices
- Measurement and visualization of business impact

Impact

Full-fledged dynamic pricing within 24h response time

Automated price adjustments on the basis of the respective market situation in stationary and online channel.

Deep dive market triggers:

- Price positioning of the competition within the relevant market /sales area
- Historical price development
- Current promotions (e.g. clearance sales bonuses)
- Competitive effects in leasing and financing
- Profile and segment of the user
- Current & expected inventory situation in the relevant market environment (stock reach and stock age)

Advantages

Results of client's success story

Shift #2

Bringing the business into business agility

We highlight how agility is implemented, the significance of business in agility and lessons we learned at our engagements.

Business agility is currently adopted primarily in IT

Business agility is popular in IT among automobile manufacturers. Our business agility survey indicates that companies have a lower adoption agility outside IT borders

Business agility has been popular over the last years in IT…

BMW
"Agile working replaces waterfall model in BMW Group IT"[1]

Mercedes-Benz
"'People Before Technology': How Mercedes-Benz Connects Business and IT"[2]

Porsche
"Digital transformation at Porsche: Global SAFe summit"[3]

Audi
"How CIO Frank Loydl is making Audi IT agile"[4]

Insights from our 2022 Automotive IT Strategy Publication on Agility

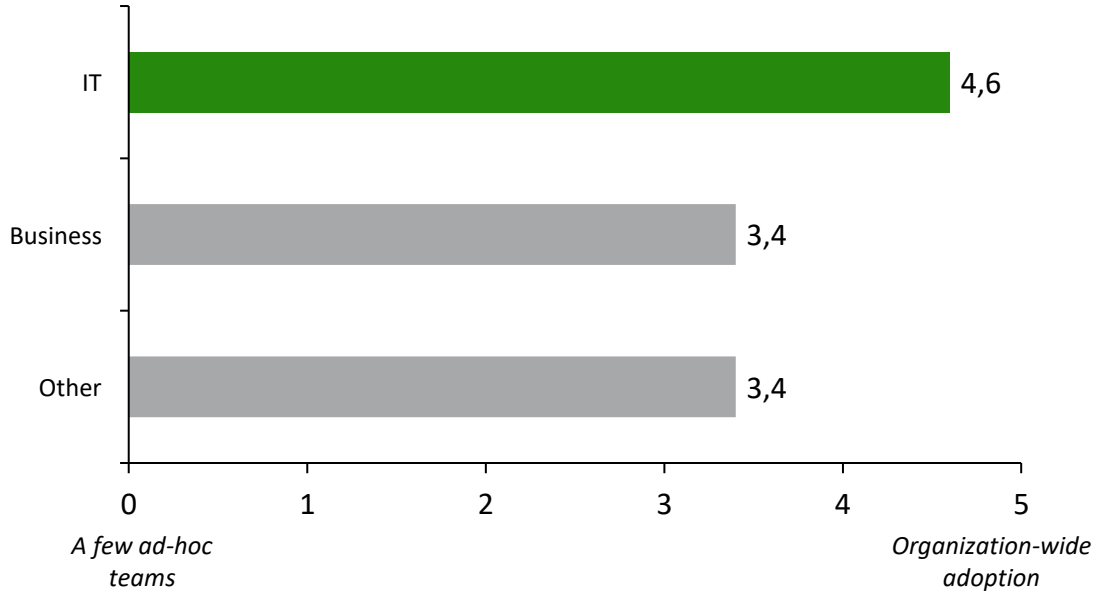
Business Agility is essential to be able to adapt quickly to the changing market. In our 2022 publication, we showcased how to achieve business agility using a SAFe dual operating model.

Further Reading: 2022 Automotive IT Strategy

… yet our surveys indicate that business is lacking behind

Historically, agile transformation has started within the IT organization. In order to become an agile enterprise, the whole organization must embrace the agile mindset: **Product-orientation and customer-centricity.**

Which part of your business has adopted business agility?[1]



[1] automotiveit.eu (2024) [2] The Wall Street Journal (2024) [3] Porsche Newsroom (2024) [4] CIO.de (2024) [5] Deloitte Business Agility Survey 2024 (2024)

The role of business in scaled agile frameworks

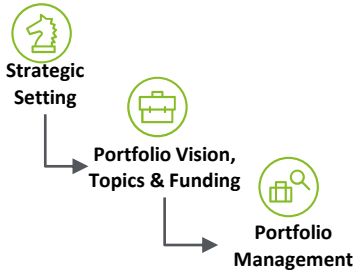
Business agility requires continuous engagement of business stakeholders to communicate and connect the business priorities to the organization and steer the portfolio as well as the teams into the right direction

Organizational levels and the role and tasks of business[1]

Leadership

Lean Portfolio Management
LPM

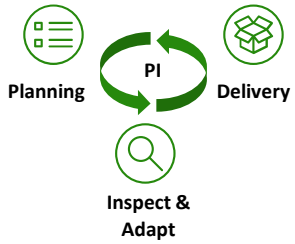
Enterprise Executives



- **Connect the enterprise strategy to the portfolio** by providing guidance for the portfolio backlog based on company strategy and strategic themes
- **Translates business priorities into funding allocation** by highlighting solutions and specific budgets required to meet business targets
- **Actively engage in portfolio management** through decision-making and occasionally owning large work items (Epics) as the business perspective will benefit them in terms of domain knowledge and expertise

Scaled Agile Product Delivery
Solution / ART

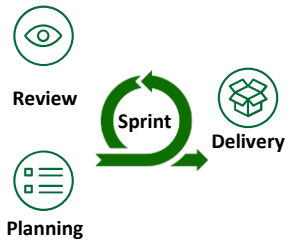
Business Owners



- **Communicate business context, objectives and priorities** during planning and backlog refinement activities to ensure the delivery understands and can act accordingly
- **Actively engage in planning** by reviewing planning, highlighting dependencies, circulating through different teams and support problem solving
- **Sponsor relentless improvement** by highlighting how the planned value delivery was achieved and perceived from a business perspective, as well as evaluate ways of further enhancements

Team and Technical Agility
Agile Team

Power Users/Business Owner



- **Support sprint planning and continuous backlog refinement** to ensure backlog priorities are accurate, aligned with business context and understood by teams
- **Ensure continuous alignment** with teams by being available for team sparring and questions to prevent business context unclarity in the teams
- **Frequently review solution demos** to reduce feedback time and risk for errors by providing real user feedback and use cases to the team

Team

[1] *ScaledAgileFramework (2024)*

Lessons learned in integrating business in business agility

Our client engagements taught us key success factors for business involvement in business agility for the areas of customer orientation, business enablement, delivery ownership and portfolio steering

Customer orientation

- **Align the product landscape based on value streams** to ensure the product segmentation makes sense from a customer and business perspective
- **Develop IT into a co-creator role with business** by driving change together, moving away from handover points towards collaboration

Business Enablement

- **Enable business stakeholders with trainings and coaching** to ensure understanding of business agility principles, benefits and responsibilities
- **Fit the agile working model to business situations** (and not only IT) by adapting standard roles, events and responsibilities while remaining pragmatic

Delivery Ownership

- **Business is the driver of the transformation** by not merely responding to IT changes punctually but continuously engaging and steering the changes
- **Business takes ownership for the changes** it aims to implement. It drives the product backlog and provides a constant feedback flow

Portfolio Steering

- **Business actively steers the portfolio continuously** as constant member of the lean portfolio management by translating business strategy
- **Time-invest and involvement of business on all levels** from LPM down to ART or team level as team autonomy requires business understanding

What to avoid based on our experiences in automotive and beyond

- Same “old” silo org structures in agility
- IT fulfils requests without understanding

- Introduce agility without understanding
- Inflexibility in adapting frameworks

- “Agile is only an IT thing”
- We drop requests at IT and leave

- Punctually joining LPM but not constant
- Business only in management discussion

SHIFT#3

Market slow downs force IT cost optimization

We recap on market developments, introduce our framework to manage IT costs and discuss enablers for our clients.

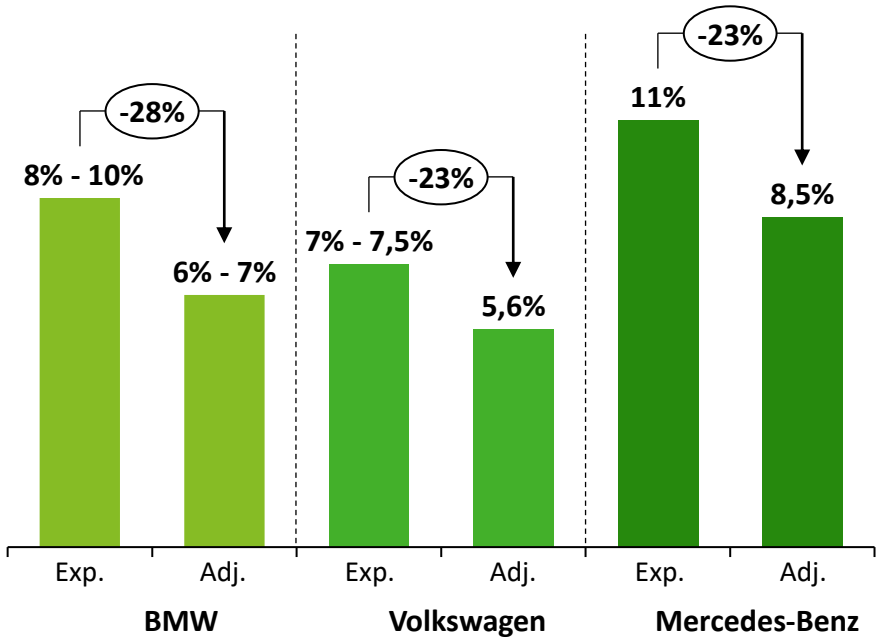
Market slow downs force automotive industry to optimize costs

German automotive OEMs have reduced expected earnings during the course of 2024 due to market slow downs. Many companies in the industry respond by setting up initiatives for cost optimizations

Market slow downs reduce expected earnings

The automotive market and world economy has slowed down during 2024 leading to reduced expected earning for OEMs…

Expected versus adjusted profit margins for 2024 [1]



Automotive companies respond with cost savings

… OEMs aim to optimize costs to increase profit margins and adapt to the changing market situation

VW "Accelerate Forward" programme[2]

- With "Accelerate Forward", a multi-billion euro savings program is being implemented designed to **reduce personnel costs in administration** by **20%**
- The performance program aims to improve **earnings by four billion euros by 2024** and sustainably **increase** the **return on sales to 6.5%.**

Ford Personal Cost reduction[3]

- Already in 2023, Ford announced that it is taking action to restructure its business in Europe, creating a leaner, more competitive cost structure
- This included the **elimination of 3,800 jobs** over the next three years

Tesla Performance Program[4]

- 8.5 percent decline in deliveries compared to the previous year due to production bottlenecks
- Tesla publicizes **lay offs** of more than **ten percent** of its workforce worldwide, affecting more than **14,000 jobs**

[1] As of 01.10.2024, based on press releases by BMW, Volkswagen and Mercedes-Benz
[2] Handelsblatt (2024) [3] Ford (2024) [4] Handelsblatt (2024)

IT cost optimization and the Deloitte Technology Cost Framework

Studies indicate changing behaviors in strategic IT spend. Our Technology Cost Framework provides a structure on deciding on plays and setting levers to optimize costs

Changes in IT spend distribution

The **forecast** for the **IT spend areas 2024** shows that finding the right **strategic IT spend** is one of the focal points of Automotive IT:

Top Five Areas with Increasing Strategic IT Spend[1]

1. Cloud services and solutions
2. Business intelligence / data analytics
3. Security
4. Digital workplace / work from home / collab. tools
5. ERP / CRM / core system transformation

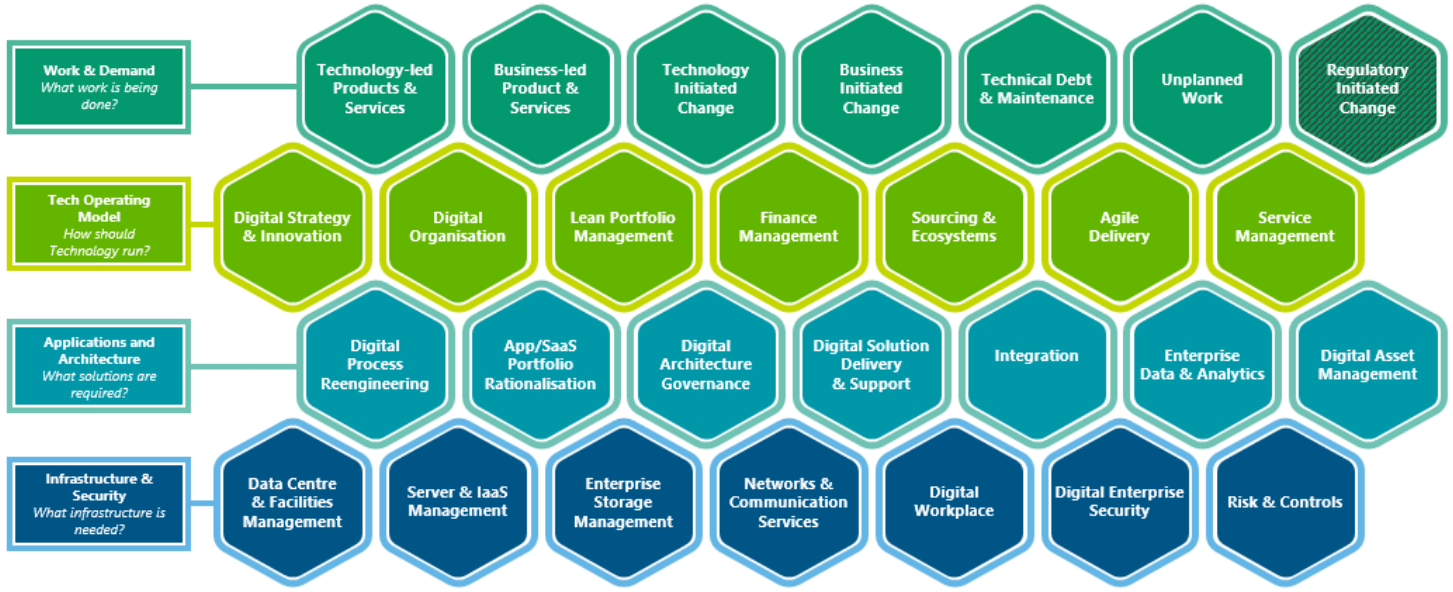
Top Five Areas with Decreasing Strategic IT Spend[1]

1. Communication / connectivity (including 5G)
2. Industry-specific solution
3. Business continuity management
4. Blockchain / distributed ledger
5. Other

Deloitte Technology Cost Framework

There are four main areas across an organization to address value and cost: **Work & Demand, Tech Operating Model, Applications and Architecture, Infrastructure & Security**

Each “play” is supported by multiple “levers” that drive actual benefits realization. Tools and accelerators help to drive analysis and prioritization:



[1] Gartner (2023)

Key enablers for IT cost optimization

Exemplary levers to optimize IT costs in the operational IT domain. Momentum for change can be gained by implementing corresponding quick wins that we propose

Exemplary levers to optimize costs in IT operations

	IT demand	Established processes	Optimize cloud costs	Services	Workforce Optimization	IT security cost
ENABLERS	Review IT demand jointly	Review established processes within IT	Review current cloud spend and its components	Stop consumption of marginal or redundant services	Identify short-term synergies and sourcing potential within workforce	Short-term review of IT security cost and re-calibrate cost/ risk-buy-down
WHY IT MATTERS	**~10-15%** of covered financial baseline	**~15%+** depending on starting point/ ambition level	**~25%+** of covered financial baseline	**~15%** depending on starting point/ ambition level	**~5%+** examples suggest ~5% of covered budget	**~30%** up to ~30% of the addressed baseline
QUICK WINS	• Use joint reviews of IT demand with business customers • Identify unused requirements • Leverage IT automation • Manage software and services life cycle incl. sunset efficiently	• Process steps : (i) Stop doing at all (maximize work not done – quick-win), (ii) Radically simplify, (iii) Automate, (iv) Do with different team (leveraging delivery hubs)	• Investigate alternative delivery options e.g., use cloud-native storage instead of dedicated SSDs, • Avoid overprovisioning of instances • Find smart cost-effective failover concepts, etc.	• Analysis of Service Orchestration including Service Catalogue • Establishment of Service Lifecycle Management • Investigate Service Performance Management	• Teams doing comparable topics or using similar solutions which can be processed jointly • Adjust onshore/offshore staffing ratios and automize workflows to free labor	• Identify applications and hardware that are not part of critical infrastructure, but associated with high security/ redundancy cost compared to their actual criticality

[1] Based on select project experience in comparable situations; depending on individual starting point; listed effects partially overlapping, so cannot be summed up

Legend: Work & Demand; Tech Operating Model; Applications & Architecture; Infrastructure & Security

SHIFT#4

Improving technical health through rationalization

We dive into applying rationalization in automotive, provide a perspective on our approach and a client use case.

Application rationalization in the market and its benefits

Companies in the automotive industry are rationalizing IT costs. They experience benefits in flexibility, elasticity, scalability, efficiency, speed, fit to market and cost savings

What happens in the market?

Cost pressure and the need to create new products and services is forcing automotive companies to optimize their application portfolio:

Continental
Migrated infrastructure to AWS using a **rehost** approach, resulting in rapid scaling, improved part capacity, and cost reduction.[1]

MAN Truck
Replaced legacy systems features by Amazon EC2 to build a payment processing system speeding up transactions in and around vehicles and help optimize fleet management.[1]

Mercedes-Benz
Modernized infrastructure and embraced a microservice architecture by using a hybrid approach of "**refactor"** and "**replatform"** , resulting in improved scalability, performance, and faster introduction of new features.

Effects on future readiness

Flexibility, elasticity and scalability
- Providing capacities as-needed
- Ability to handle unexpected changes
- Ability to quickly respond to changes

Efficiency
- Reduced monitoring & maintenance efforts
- Ability to optimize resource allocation
- Improvement of IT landscape performance

Speed & fit to market
- Quicker adoption of new technologies
- Ability to reduce integration complexities
- Clearer insights & quicker decision-making

Effects for cost savings

Complexity & Time

Savings	**First 10 % savings**	**To get 20%**	**To get 30%**
Cost Optimization	• Software license optimization • Data storage optimization • Project rationalization	• Application rationalization • Server consolidation • Data Center	• Shared services • Application portfolio optimization • Standard application architecture
Focus	**Quick wins**	**Efficiency**	**Organization**

[1] Amazon Web Services (2022)

Deloitte’s approach to application landscape analysis with the 6R method

The 6R method delivers a structure to assess applications for rationalization. The structure includes options to retire applications, retain applications on-premise and move or keep them in the cloud

	Retire	Retain	Replace	Rehost	Replatform	Refactor
	Sundowned	On-Premise	Cloud (Private, Public, Hybrid, Multi, on-prem)			
			SaaS	PaaS / IaaS	PaaS / IaaS	PaaS / IaaS
Description	Application to be decommissioned, possibly with migration of users to another application	Keeping the application as part of the existing, non-cloud-based infrastructure on site	Application that is to be replaced by another application (or a series of applications) and uses commercial software provided as a service	The application component is cloud-ready and requires only a few changes after virtualization. This is a move of the application to a cloud IaaS stack	Application components are not available in the cloud or are not cost-efficient and therefore need to be adapted	The application component is not cloud-ready and/or the business requirements require specific changes to the application to make it cloud-ready
Examples	Custom .NET or Java application with functions that can be consolidated in the OOTB or ERP package.	Legacy applications required by the business	Salesforce or Workday	• Virtual/physical Windows or Linux servers • Cloud-capable workloads • Low effort for the application	• Moving a Java EE application from IBM WebSphere to Red Hat Jboss • Moving database packages - Oracle to AWS RDS	• Use of Azure to restore an old C++ application • Application architecture limitation - non-RESTful architecture, monolithic

The specifics of an application influencing the hosting decision:

- Application Criticality
- Availability Expectations
- Security requirements
- Compliance & Regulations
- Accessibility
- …

Case example of application rationalization in aftersales

Assessment of the Capability Map and detailing of individual capabilities including the architecture components to provide a comprehensive understanding of the architecture landscape in the aftersales segment

Case Example

Situation

- Automotive OEM wants to reduce costs by using as a service operating models
- The goal is to enable scalability and optimize sizing
- Maximizing profit is complex due to prototype, country, and supply considerations
- Expert opinion may not always account for algorithmically estimated probabilities which impact the company's market share and profits

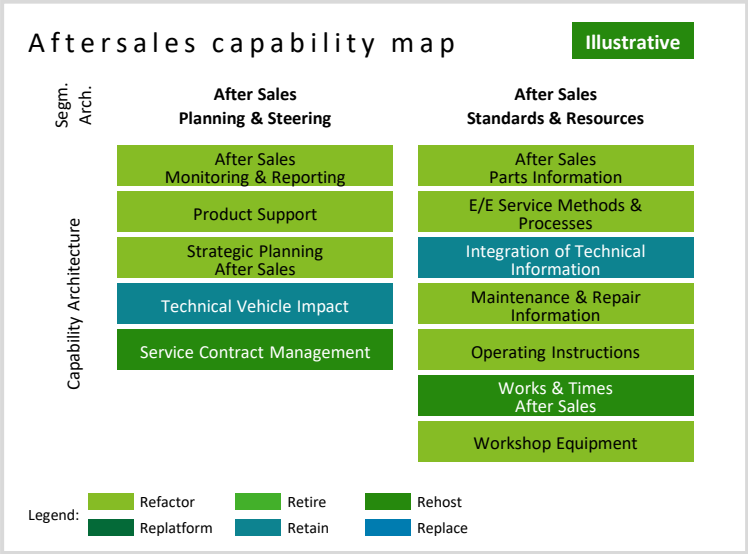
Approach

- Development of a target architecture vision & mission through global policies
- Implementation of manual data profiling by using data lineage
- Completion of large-scale code refactoring
- Identification of modular architectures

Impact

The current (as-is) state of the business data and information architecture were documented. The prioritized capability map which outlines the key capabilities is showcased, including relevant domains.

A technical solution architecture was derived for needed services and categorized based on the approach such as refactor, retain or replatform.



Results of client's success story

- Optimized **profit**
- **Clearly** documented architecture
- **Prioritized** capability map
- **Reduced** technical debt
- Technical solution architecture **derived**

KEY TAKEAWAYS

2024 shifts in automotive IT

Summary of the emerging IT shifts we see in the automotive market and the support we as Deloitte can offer

Key takeaways

Considering the previously shown use cases and leveraging our extensive automotive experience, we can synthesize the key takeaways for adapting to emerging IT trends

	What we see in the market	What we can offer as Deloitte
(Generative) AI	(Gen) AI is being increasingly adopted in the automotive sector driving innovations, enhancing safety features, optimizing manufacturing processes.	Deloitte provides deep insights into (Gen) AI use cases in practice, jointly identifies potentials for adapting (Gen) AI across value chain and provides with holistic support in developing proper (Gen) AI capabilities.
Business Agility	Corporations have implemented scaled agile practices but have difficulties in incorporating business in the efforts	Existing agility frameworks describe business agility support in theory. Deloitte provides practical knowledge and implementation experience in customer orientation, business enablement, and portfolio steering to extend agility beyond IT.
IT Cost Optimization	To keep pace with technological progress, increasing IT spending is essential. The focus is on channeling IT spending into the right strategic areas.	Deloitte's Technology Cost Framework can be used to develop strategic cost optimization measures in the areas of Work & Demand, Tech Operating Model, Applications & Architecture and Infrastructure & Security.
Application Rationalization	Automotive companies are aiming to cut costs by reducing technical debt, while dealing with the complexity of different prototypes and supply chains.	Deloitte offers solutions like target vision development, data profiling, code refactoring, and modular architecture frameworks. These strategic measures aid in service categorization and decision-making for cost optimization.

Connect with us

Contacts

Uwe Strauss
Partner
Tech Strategy & Transformation
ustrauss@deloitte.de

Markus Schmidthuysen
Partner
Automotive Industry
mschmidthuysen@deloitte.de

Mirko Maier
Senior Manager
Tech Strategy & Transformation
mmaier@deloitte.de

Authors

Xander Seerden
Manager
Tech Strategy & Transformation

Miloud El Idrissi
Senior Consultant
Tech Strategy & Transformation

Simon Isleyen
Senior Consultant
Tech Strategy & Transformation

Christoph Berndt
Consultant
Tech Strategy & Transformation

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